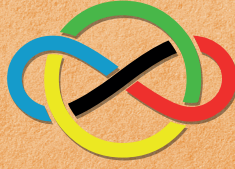
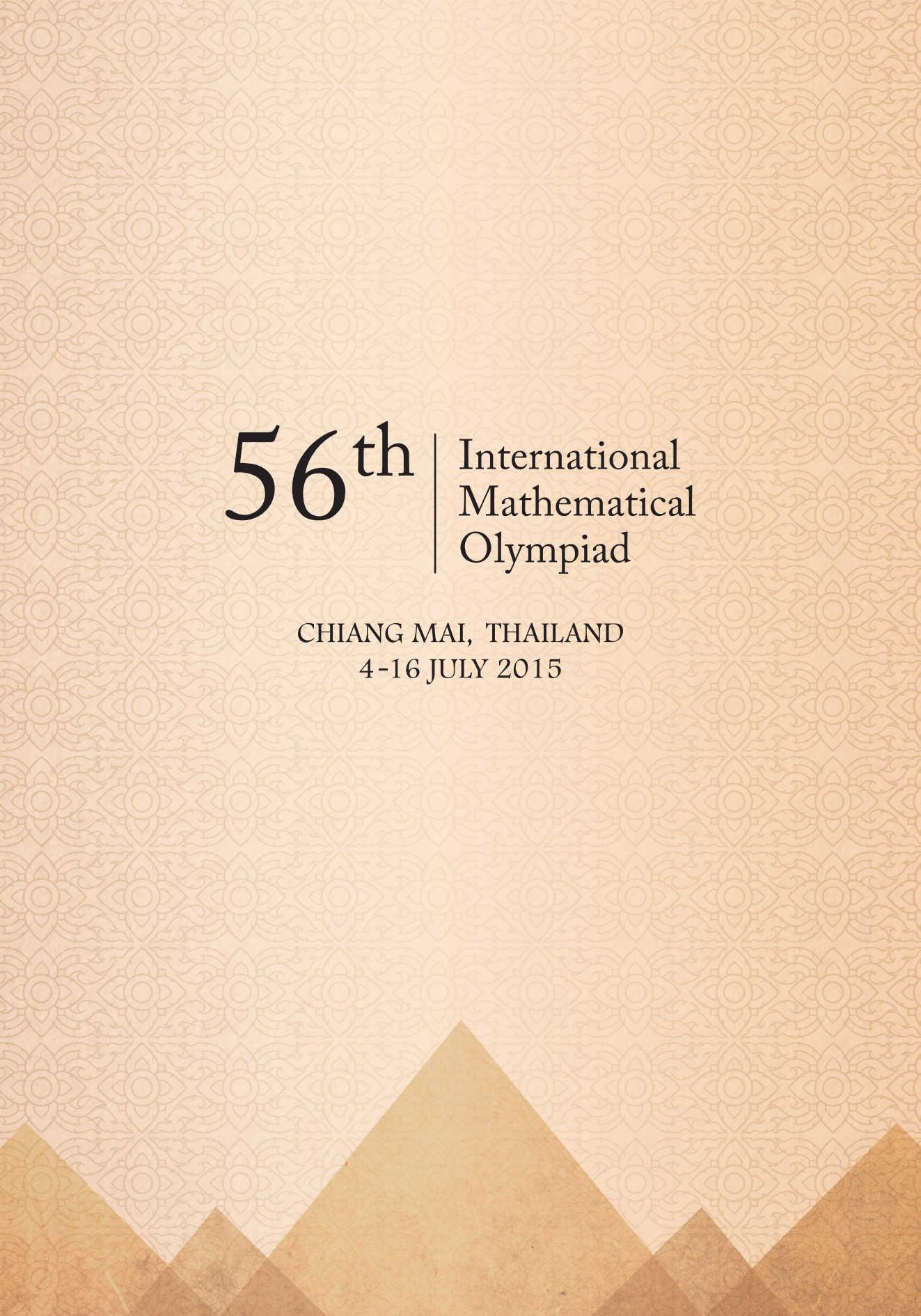


56th | International
Mathematical
Olympiad



FINAL REPORT



56th | International Mathematical Olympiad

CHIANG MAI, THAILAND
4-16 JULY 2015



The 56th International Mathematical Olympiad (IMO 2015)
to celebrate the occasion of Her Royal Highness
Princess Maha Chakri Sirindhorn's 60th birthday on 2nd April 2015

ROYAL OPENING ADDRESS

Her Royal Highness Princess Maha Chakri Sirindhorn
The 56th International Mathematical Olympiad Opening Ceremony
Chiang Mai University Convention Hall, Chiang Mai
Thursday, 9 July 2015

It is my pleasure to preside over the opening ceremony of the 2015 International Mathematical Olympiad.

On behalf of the people of Thailand, I would like to welcome the contestants from all over the world who are joining us today. It is a remarkable occasion when a large group of mathematicians from all levels - professors, teachers, and students from over hundred countries - can gather together for an entire week. It is a great honor for Thailand to have this opportunity to host the 56th International Mathematical Olympiad.

Mathematics can be realized as a language to understand all sorts of things in the world around us. It is the most versatile: not only for playing a central role in academics and research, but also for application in all subjects.

Any development in science and technology requires knowledge of mathematics. In order for any nation to achieve technological advancement, it will have to place the highest priority on promoting education and research in mathematics. By hosting the International Mathematical Olympiad, Thailand has a tremendous opportunity to raise students' awareness of the significance of this field. The excitement of organizing and participating in this event will stimulate our people to take a keen interest in mathematics and other fundamental sciences. This is certain to contribute greatly to the advancement of mathematics and science education in Thailand.

This Olympiad is a great opportunity for students and researchers to interact and exchange ideas in mathematics over the whole week. It is a valuable step for people who are interested in the same field to become acquainted with one another. The Olympiad thus represents a wonderful opportunity for almost 600 mathematicians to become not only friends but also potential future collaborators. Importantly, this event will simultaneously enhance cultural understanding and good relationship among all the participating nations.

I would like to thank all organizations and the people whose hard work and dedication have made this remarkable event a reality. To the contestants of all teams, I wish you success and utmost benefit from this competition.

I take great pleasure in declaring the 56th International Mathematical Olympiad open. I wish this Olympiad a truly fruitful and productive one.

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PREFACE

Thailand participated in the IMO (International Mathematical Olympiad) for the first time in 1989 when a team of six students was sent to the 30th IMO in Braunschweig, Germany. The team received one bronze medal and two honorable mentions. The event awakened the interest in mathematics and science studies throughout the country. For the first time Thailand was academically recognized in an international arena. In the following years, Thailand sent students to compete in other subjects such as Physics, Chemistry, Biology and Informatics. At that time, subjects related to pure science received little attention compared to those associated with applied science. The IMO seems to stimulate mathematical interests in a number of young students who could become a mathematician. Naturally, it takes a good deal of time for them to grow and bloom.

In the early years, Thailand's performance in International Olympiads was merely satisfactory. It is only in the last decade that our teams have performed exceptionally well. Thailand was ranked fifth for two consecutive years, in 2011 and 2012. Thai student won a gold medal for the first time in 2003 at the 44th IMO in Japan, 15 years after the first participation. With such joy and glory, the next natural question popped up from one of the contestants 'So when are we going to host the first IMO in Thailand?' We then joked about the timing. That we should wait for these students to obtain their Ph.D. then they could help to organize the first IMO to be hosted by Thailand. In other words, in about ten years. In the meantime, other International Olympiads took place in Thailand. But hosting the International Mathematical Olympiad seemed to be a task more daunting than any other subjects in terms of budget and qualified personnel.

Discussions about hosting the IMO in Thailand went on for a few years. The year 2015 was considered an auspicious year, because holding IMO in Thailand could be a part of the celebration of the 60th birth anniversary of Her Royal Highness Princess Maha Chakri Sirindhorn, the patron of Science and Mathematics Olympiad Competitions in Thailand. At the 2010 IMO in Kazakhstan, Thailand unofficially expressed interest in hosting the IMO. Official proposal to host the 2015 IMO was then made in the Netherlands at the 2011 IMO. Whilst hosting of IMO is traditionally approved only three years in advance, Thailand's hosting proposal was unanimously approved by the Jury at the final meeting that year. After the bid to host the 56th IMO (2015) had been accepted by the IMO Advisory Board and the IMO Jury during the 52nd IMO (2011) in the Netherlands, on June 2012 the Thai Cabinet approved and allocated a budget for the event and relevant undertakings from 2013 until 2016, with The Institute for the Promotion of Teaching Science and Technology (IPST), affiliated with the Ministry of Education, as the main organizer.

The 56th IMO Organizing Committee was appointed in March 2012, followed by the Academic Committee in April 2012. At the early stage, this very first IMO to be held in Thailand encountered a number of ups and downs including financial support, recruitment of personnel, selection of venue, to mention a few. Arrangements progressed rather slowly during the first year of preparation, but after the initial push, things started to fall into places.

Decisions on management action plans, venues, equipment, activities and, most importantly, staff were made and various experiments as well as implementations began to roll.

The competition dates were set for 4–16 July 2015. The province of Chiang Mai, the capital of the North, was chosen as venue.

IPST did not serve as just a comptroller, but played a central role of coordinator. Chiang Mai University agreed to be a local host accommodating the contest and all related activities. The Mathematical Association of Thailand under the Patronage of His Majesty the King took care of all academic aspects (jury meeting, problem selection, coordination, information technology supports) and POSN (the Promotion of Academic Olympiad and Development of Science Education Foundation under the Patronage of Her Royal Highness Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra) assisted in recruiting and training of a large number of academic personnel through the three successive Thai Mathematical Olympiads, TMO10(2013), TMO11(2014) and TMO12(2015).

The work carried out by the parties involved in the 56th IMO, which ended with fond and lasting memories, is detailed in this report. An event of such magnitude would not have been a success without supports from our sponsors, both local and abroad. The Organizing Committee sincerely thanks each and every one who joined in the efforts. The Committee also appreciates the support received from Google, Chevron, the Government Savings Bank, the Viriyah Insurance, EduPark, RATCH, Royal Umbrella Rice, Lanna Products, Nestlé, Farmhouse, SCG, Wichitra Upakarnitikaset, Ongart Supackchookul, and Thanachart Bank.

SPEECHES FROM THE OPENING CEREMONY

Chiang Mai University Convention Hall, Chiang Mai

Thursday, 9 July 2015



Dr. Krissanapong Kirtikara

Deputy Minister of Education

On behalf of the Organizing Committee of the 2015 International Mathematical Olympiad, I would like to express my deepest gratitude to Your Royal Highness for presiding over this opening ceremony of the 56th International Mathematical Olympiad. With Your Royal Highness's permission, as representative of the IMO 2015 organizing parties, namely The Institute for the Promotion of Teaching Science and Technology (IPST), Chiang Mai University, the Mathematical Association of Thailand under the Patronage of His Majesty the King, the Promotion of Academic Olympiad and Development of Science Education Foundation under the Patronage of Her Royal Highness Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra (POSN), I would like to extend the warm welcomes to student contestants, team leaders and all delegates to this extraordinary event.

The International Mathematical Olympiad (IMO) is the world championship mathematics competition for high school students and is held annually in a different host country. The first IMO was organized 56 years ago in 1959 in Romania. Nowadays, over 100 countries from 5 continents participate in the IMO whose objectives are to promote mathematics education, to increase public awareness and to provide a source of stimulation for the new generation of young mathematicians. In addition, the IMO also provides a unique opportunity for students, teachers and mathematicians across the nations to interact and become acquainted, leading to future collaboration and establishment of academic networks.

This year, Thailand is greatly honored to be hosting the 56th International Mathematical Olympiad from 4 to 16 July. Over 100 countries are taking part in this year's IMO in Chiang Mai. Present here today, are 580 student contestants, 103 team leaders, 100 deputy leaders, 54 observers A, 45 observers B, and 16 observers C as well as a number of distinguished guests and members of the Organizing Committee. I hope that you will have a great experience in the competition and enjoy your time in Chiang Mai.

In organizing the International Mathematical Olympiad, the Committee is deeply indebted to Your Royal Highness for the continuous support. This extraordinary event is also made possible through the cooperation and support of the Royal Thai Government, several state enterprises, and private corporations.

Finally at this most auspicious moment, I have the great honor of inviting Your Royal Highness to give an opening speech and declare the 56th International Mathematical Olympiad open.



Assoc. Prof. Niwes Nantachit, M.D.
President of Chiang Mai University

Chiang Mai University is most grateful to Your Royal Highness Princess Maha Chakri Sirindhorn for presiding over the opening ceremony of the 56th International Mathematical Olympiad (IMO 2015). With your gracious permission, may I, on behalf of Chiang Mai University, welcome you all to this year's International Mathematical Olympiad. Today's special event is also dedicated to celebrate the auspicious occasion of Her Royal Highness Princess Maha Chakri Sirindhorn's 60th birthday on 2nd April 2015.

Olympiads are all about bringing together talented young people from around the world representing their respective countries at a friendly international competition. I would therefore like to congratulate all participants for having earned the right to be here for this IMO 2015, and as mathematics underpins our scientific development. Whatever the outcome of this Olympiad may be, I hope you will treasure the experience and put it to good use for yourself and others. I wish all participants and accompanying teachers and staff, a rewarding Olympiad and an enjoyable stay here in Chiang Mai.

Now, I would like to ask Your Royal Highness's permission to screen the video presentation.

Ladies and gentlemen, may I draw your attention to the video presentation in celebration of Her Royal Highness Princess Maha Chakri Sirindhorn's 60th birthday and to honor her great contribution to Science and Technology.



Dr. Geoff Smith

Chairman of the IMO Advisory Board

We are honoured by the presence of Her Royal Highness Princess Maha Chakri Sirindhorn and we congratulate her for having an important birthday this year. I thank the Thai organizers for doing such a wonderful job by creating IMO 2015 in beautiful Chiang Mai.

It is an amazing sight to see people gathered here to celebrate mathematics from all over the world. We are here because we love mathematics. This year we are exceptionally lucky to be able to enjoy Thailand, famous for its ancient culture, beautiful temples, fine food, wonderful weather, and the friendliness of the Thai people.

Students, you are already the mathematical champions of your own countries. Some of you will do very well at our exams, but not everybody of course, but taking part in an IMO is a prize all by itself.

We expect the highest ethical standards. We are going to have a great event, governed by the principle of “Fair Play”.

In the name of all the participants, I promise that as we take part in this International Mathematical Olympiad, we will respect and abide by the rules which govern it.

We commit ourselves to honest conduct in the true spirit of fair play, for the glory of mathematics and the honour of our teams.

Enjoy the exams, and afterwards enjoy the exciting social programme (especially the elephants!) while your leaders and deputies have to go to work.

May I once again thank you, Your Royal Highness, for gracing our opening ceremony.

SPEECHES FROM THE CLOSING CEREMONY

Kad Theatre, Kad Suan Kaew Shopping Centre, Chiang Mai

Wednesday, 15 July 2015



Dr. Krissanapong Kirtikara
Deputy Minister of Education

It is my great pleasure and honor to deliver the closing remarks of the 56th International Mathematical Olympiad. I sincerely thank the organizers and all those who made the 56th IMO a great success.

As we know, the nature of mathematics is rigorous and highly complicated. It requires perseverance and meticulousness to bear fruition. I hope the participants of the IMO embody a similar spirit and remain steadfast despite having endured the tough training and rigorous problem solving during this competition. I am sure you have learned a great deal and hopefully gleaned much deeper insight into the impact and implications of mathematics.

Over the past week, you have met other students who share the same passion. There may have been moments of nervousness, moments of achievement and of course moments of laughter. As this IMO comes to an end, some of you must be very satisfied with the results; others may regret that they have not reached their goals. Nevertheless, please remember this Olympiad as one of the opportunities in your life and whatever the outcome might be, it is an experience you have gained.

For the recent medalists, please accept my sincerest congratulations and to all of our guests, it has been a great honor to host you here in Chiang Mai. I wish you all safe and pleasant journey back home, taking with you happy memories from Chiang Mai and Thailand.



Assoc. Prof. Dr. Sampan Singharajwarapan

Dean of Faculty of Science, Chiang Mai University

On behalf of Faculty of Science, Chiang Mai University, I would like to thank the people and organizations, in particular the co-hosts of IMO 2015: The Institute for the Promotion of Teaching Science and Technology (IPST), the Mathematical Association of Thailand under the Patronage of His Majesty the King, the Promotion of Academic Olympiad and Development of Science Education Foundation under the Patronage of Her Royal Highness Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra (POSN), and the various committee members who have made this Olympiad possible and a great success.

For this 56th International Mathematical Olympiad held in Chiang Mai from 4 to 16 July, there are 577 competing contestants from 104 countries. The Jury has reached a decision for gold, silver and bronze medals and honorable mentions. In total, 39 gold medals, 100 silver medals, 143 bronze medals and 126 honorable mentions will be awarded this year.

It has been an honor to host this IMO 2015 in Chiang Mai. We hope that every participant had an enjoyable time, and that our facilities and services met with general approval.

IMO 2015 LOGO



The 56th International Mathematical Olympiad or IMO 2015 logo comes from the drawing of an elephant, which has been long linked to Thai history and revered as a national animal of Thailand. The elephant with its trunk raised is a gesture of friendship and respect, symbolizing politeness, humbleness and hospitality of Thai people.

The letter “O” in IMO represents the globe, conveying the meaning of youth coming to Thailand from all over the world to participate in IMO 2015 and making friends with each other.

The red, white and blue colors are the colors of Thailand’s national flag.

PROGRAM OVERVIEW

Day	Date	Leaders	Deputy Leaders	Contestants
1	Friday 3 July	Early arrivals		
2	Saturday 4 July	Arrivals		
		IMO AB meeting		
3	Sunday 5 July	Jury meeting		
4	Monday 6 July	Jury meeting		
5	Tuesday 7 July	Jury meeting		
6	Wednesday 8 July	Jury meeting	Arrivals	
7	Thursday 9 July	Opening ceremony		
8	Friday 10 July	Q&A session	Excursion	Contest (Paper I)
		Excursion		
		Welcome dinner		
9	Saturday 11 July	Q&A session	Move to coordination site	Contest (Paper II)
10	Sunday 12 July	Coordination		Excursion
11	Monday 13 July	Coordination		Excursion
12	Tuesday 14 July	Coordination		IMO Lectures
		Excursion		
		Final jury meeting		
13	Wednesday 15 July	Closing ceremony / Farewell party		
14	Thursday 16 July	Departures		

PROBLEM SELECTION

Prologue

My IMO 2015 journey began in early 2012, when I was recruited by Vichian Laohakosol to join the academic team for IMO 2015. At the time, I was not actively involved in Thailand Mathematical Olympiad program; but as a former contestant, I was eager to help Thailand host this prestigious event.

Many former contestants were recruited and re-familiarized with IMO problem style as well as the many processes involved in organizing such an event. Fortunately, our national Mathematical Olympiad provided us an excellent training ground. Through participating in the Thailand Mathematical Olympiad, we were able to gain experience, experiment, and learn from the actual problems encountered.

The next step was gaining international experience. In 2013, core members of the academic team attended IMO 2013 as observers, during this time we had a chance to talk at length with Federico Ardila, chairman of the Problem Selection Committee for IMO 2013. Federico was very helpful, and walked us through the problem selection process, providing many tips along the way. The tips that I took to heart, and would wholeheartedly endorse were “prepare to work hard” and “you could never have enough time” (probably not his exact words, but those were the ideas). Shortly after the competition, I was appointed chair of the Problem Selection Committee (PSC).

Dungjade Shioiwattana



The Team

It was decided that the PSC for IMO 2015 would comprise younger generation of talented problem solvers, complemented by experienced experts from the international IMO community. The team was assembled by enlisting the help of our highly successful former IMO contestants. Vichian Laohakosol and Vorrapan Chandee helped immensely in the recruiting process. For the expert members, we invited Ilya I. Bogdanov, Géza Kós, and Christian Reiher to join the Committee.

The final Committee consisted of 12 members: Dungjade Shioiwattana, Ilya I. Bogdanov, Tirasana Khandhawit, Wittawat Kositwattanarerk, Géza Kós, Weerachai Neeranartvong, Nipun Pitimanaaree, Christian Reiher, Nat Sothanaphan, Warut Suksompong, Wuttisak Trongsiwat, Wijit Yangjit. Part-time members included Jirawat Anunrojwong and Pakawut Jiradilok who helped during the early stages of the problem

selection process but were unable to attend the local meetings and the actual IMO due to conflicting schedules.

The Mission

At this point a few definitions are in order. An IMO shortlist is a collection of about 30 mathematical problems that will be used by the IMO Jury as starting point in constructing an IMO paper. Problems in an IMO shortlist are categorized into four subject areas, namely, Algebra, Combinatorics, Geometry and Number Theory, and three difficulty levels: easy, medium or hard.

The mission of the PSC is to compose an IMO shortlist from problems submitted to the Committee, so that for each combination of difficulty level and subject area, at least two problems can be classified as such. This helps ensure that the jury will have flexibility when constructing the IMO paper. Additionally, the shortlisted problems should represent (as best possible) a variety of topics and techniques from pre-university mathematics.

The Process

The problem submission deadline for IMO 2015 was originally 31 March 2015, but was later extended to 10 April 2015 to accommodate late submissions. In total, 155 problems were received from the following 53 countries: Albania, Algeria, Armenia, Australia, Austria, Brazil, Bulgaria, Canada, Costa Rica, Croatia, Cyprus, Denmark, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hong Kong, Hungary, India, Iran, Ireland, Israel, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Montenegro, Morocco, Netherlands, Pakistan,

Poland, Republic of Korea, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Sweden, Turkey, Turkmenistan, Taiwan, Tanzania, Ukraine, United Kingdom, U.S.A., Uzbekistan. The Committee would like to thank all for their contribution.

The submitted problems were compiled into a “problems only” list (aka the “longlist”) and distributed to the committee members so as to encourage them to attempt to solve the problems without knowledge of the submitted solution. Other benefits included minimizing bias based on the elegance or length of the solution, and allowing the Committee to discover many different approaches to each problem.

The problem selection process was carried out in two phases: online and on-site. The online phase ran from April to early June 2015. During this period, 12 online meetings via Skype were held to discuss and comment on the problems. The online discussion forum, set up by Matjaž Željko on the official IMO website, was utilized for commenting and posting alternate solutions. In the course of this phase, some problems were discarded mainly due to their similarity to known problems, the problem yielding to standard or well-known techniques, or mathematical content or difficulty considered inappropriate for the IMO.

At the end of the online phase, 70 problems remained to be discussed at on-site meetings. Whereas the number of remaining problems was higher than anticipated, the Committee was of the opinion that they were of sufficiently high quality that they merited careful deliberation – a testament

to the excellent problem proposers in our community. The on-site meetings were held during 8-28 June 2015 at a secluded location near Pattaya City.

Evaluating the beauty and difficulty of mathematical problems can be a highly subjective process. Many of the remaining problems had both supporters and detractors. The Committee elected to use the always reliable propose-debate-vote protocol for the final selection. That is, a committee member proposes a motion (usually to discard a problem or mark it as a “strong candidate”); after which follows a lively debate, discussing the merits and demerits of the problem; finally, a vote is taken to adopt or reject the motion. This was repeated in multiple stages to narrow the list from 70 problems to 40, and down to the final 29 problems.

One issue that complicated the selection process was the mission to compose a flexible and diverse shortlist. This meant that, in addition to the merits of a problem itself, the subject/difficulty balance and diversity of the shortlist also had to be considered. The result was that some problems were cut despite being more popular. Specifically, many good functional equation problems had to be cut in the final stages in order to preserve diversity.

Just to give you an idea of the hard work we did, let me share some colorful comments from the discussions: “the problem makes me feel happy after solving it”, “it feels like a problem Euler might have asked”, (regarding a problem the Jury selected on the final paper) “there is no chance the Jury will select this problem”, “magical towers, armies or bulldozers”, “poor donkey”, “the problem is

going to be a nightmare to coordinate”.

After submitting the final questions and attending the Jury meetings to answer questions, the Committee had one final job – to prepare and send feedback to problem proposers explaining the reason their problems were not selected. Traditionally, no feedback was given, but we believed the feedback could be useful in improving the quality of future submissions.

Confidentiality

An issue that we took seriously throughout the problem selection process was confidentiality. Due to the relatively large size of the Committee, and the dire consequences of a leak, we were extremely cautious in handling sensitive information about the problems. In particular, the forum and file uploads were hosted in the secure section of the IMO official site (which requires public key based authentication to access), all files sent via e-mail were encrypted, the printing of the shortlist was supervised, and all draft paper, scrap paper were destroyed.



Lessons Learned

Notwithstanding the Committee's contentment with the shortlist, in retrospect, there are rooms for improvement.

- There is a tendency for the PSC to underestimate the difficulty of a problem, which is evident in the results of the beauty contest judged by the PSC and the Jury. This could be the result of the PSC's longer exposure to the problem, and knowing its many solutions. It would be sensible to be aware of this bias and keep it in check during the selection process.
- Easier problems tend to get eliminated early on in the selection process, since these problems can be solved rather quickly, and likely will succumb to some variation of a well-known technique. It might be prudent to deliberately keep more easy questions for the final selection (although there is much ambiguity, and it depends largely on the experiences of the committee members whether a problem is considered too easy or not).
- Adding comments in the shortlist was always an afterthought. The Committee spent the final week polishing the solutions and discovering alternate solutions. Time had not been allocated for formulating and inserting comments, especially comments regarding the thought processes, or beauty of the problems. It is advisable to add more comments, especially for the harder problems.

- Although the problem submission site maintained by Matjaž Željko proved to be a great tool for managing and discussing the problems, in the current system, extra effort is required to extract only the problem statements from submitted files. It would be convenient if the process of separating problems and solutions could be somewhat automated.

Acknowledgments

Throughout the process, the PSC received valuable and invaluable support, advice and encouragement from many people and organizations. In particular, the Committee would like to thank the following:

Vichian Laohakosol for his indispensable contribution to the success of IMO 2015, his mentoring and support throughout the process; Wichitra Upakarnitikaset for securing funding from the Mathematical Association of Thailand under the Patronage of His Majesty the King for travelling expenses for the majority of the Committee; and The Institution for the Promotion of Teaching Science and Technology for sponsoring committee meetings.

Ilya I. Bogdanov, Géza Kós and Christian Reiher were the superstars in our Committee. Not only were they brilliant problem solvers, but they were great mentors, imparting their experience and know-how to PSC members. They were an absolute joy to work with. Matjaž Željko has been most helpful in setting up the website for problem submissions as well as the secure online forum.



JURY MEETING

Soontorn Oraitara



The IMO Jury consisting of the team leaders from the participating countries is responsible for all the formal decisions related to the contest. In 2015, 104 countries participated. Among them, Botswana sent students to compete for the first time, and Cambodia returned to the IMO after four years' absence.

One of the most challenging duties of the Jury is to select the six problems from the shortlist to construct the IMO paper. While the problems must be original, other characteristics had to be taken into consideration during the selection process. The problems should (i) be challenging, but can be solved with elementary mathematical tools; (ii) cover the four areas of algebra, geometry, combinatorics and number theory; and (iii) have three levels of difficulty, namely easy, medium and hard. The debate on these issues often takes a great deal of time during

Jury meetings; it is important that the Jury focuses on completing the task and delivers the exam paper on time. Once the problems are identified, they are then polished and translated into other languages, verified and approved. During translation, the Chief Coordinator and his team prepare marking schemes for the problems which will be presented to the Jury for approval. Ideally, the entire process should be completed prior to the first day of exam.

Problem Selection

The first meeting took place in the evening of the leaders' arrival on 4 July 2015. The Jury discussed the problem selection protocol proposed by Geoff Smith which had been previously used in Colombia and South Africa. The main idea of the protocol was to select two easy and two medium problems,

one from each of the four areas. Two hard problems were then chosen from two of the four areas.

Day Two began with approval of the protocol after a short discussion. In the afternoon, the shortlist with solutions were distributed. Each team leader had one day to rank the difficulty level and the appropriateness of each problem for the Beauty Contest. In the evening, the Jury started discussing the problems in the shortlist with a focus on their originality. During the session, only one number theory problem from the shortlist was discarded.



The Beauty Contest result was published in the morning of Day Three, and the members expressed their opinions on the problems. Following the problem selection protocol, the voting process started in the afternoon. The motions were translated into the other official languages when needed. After almost forty rounds of voting, the six problems had been chosen, and the exam paper was drafted.

Translation

The Jury spent most of Day Four on translation of the chosen problems. First, the English Committee led by the team leader from the United Kingdom worked to polish and finalize the official English version. It

then translated into the four other official languages: French, German, Russian and Spanish, and subsequently into all other 55 languages.



Marking Scheme

As soon as the six problems had been identified, the Coordination Team started working on marking criteria for all available solutions. Representatives of problem groups presented their marking scheme to the Jury for approval. By the afternoon of Day Five, the Jury voted to accept all marking schemes.

Blind Medal Cutting

Although the regulation states that the total number of medals should not exceed half the total number of contestants and the ratio of gold, silver and bronze medals must be 1:2:3, there had been a number of occasions where this was not the case in the IMO history. Conventionally, the Jury would vote on a cutting score for each prize. The debate on the cutting score was often time consuming and sometimes long-winded. In order to minimize problems, after the opening ceremony on Day Six, the Jury and the Advisory Board met to consider a new medal cut method. According to the new method, the actual scores would not be revealed during the voting process, but

only the corresponding numbers of awardees to those scores would be made known. The Jury agreed to test this new method for the first time.

Question and Answer (Q&A) Sessions



This year, the Q&A sessions were held at the contest site. The team leaders arrived at the site thirty minutes before the exam started. The students then had thirty minutes to prepare written questions to their leaders. The questions would be brought directly from students to the Q&A room, and then back to the students after having been answered and approved by the Jury. On Exam Days 1 and 2, there were 56 and 17 questions, and the Jury spent approximately 90 and 30 minutes, respectively, to answer them.

Day 2 Exam Remade

Prior to arrival, many countries had requested that Day 1 exam was made available to the deputy leaders while the contestants were still taking the exam so that they had more time to solve the problems. An arrangement was made to distribute Day 1 exam paper at the excursion site of the deputy leaders. Unfortunately, three countries received the exam paper of Day 2 instead of Day 1 due to a computer bug during the printing process. As soon as the incident had been reported,



the elected members of the Advisory Board and the Problem Selection Committee met with Chair of the Jury. The Jury later voted to replace the three problems for Day 2. A few suitable combinations of the remaining problems were considered. The Jury then selected three new problems that met the criteria in the problem selection protocol. By midnight, the new paper was polished and translated, and was ready on time for the students the next morning. While the contestants were still working on the problems, right after Day 2 Q&A session, the team leaders had to return to the leader site to approve the marking schemes for the new problems.

Jury Meeting on Problem 3 During Coordination

During coordination of Problem 3, there were similar cases where team leaders and the Coordination Team could not reach an agreement, and they were referred to the final Jury meeting. After a careful review, the Coordination Team of Problem 3, with approval of the Chief Coordinator, decided to consult with the Jury prior to the final Jury meeting since the number of referred cases was still growing. After hearing from both sides, the Jury upheld the marking criterion suggested by the Coordination Team.

Final Jury Meeting



During the final Jury meeting, there was only one appeal against the decision of the coordinators. After hearing from both sides, the Jury upheld the recommendation of the coordinators. The medal cut process then began by, for each prize, presenting the numbers of awardees corresponding to the two integer cuts (rounded up and rounded down from the ideal cut) without revealing the actual scores. Among 577 contestants, 282 were awarded medals (39 gold, 100 silver and 143 bronze medals). The corresponding scores were then revealed. The cutting scores for gold, silver and bronze were at

26, 19 and 14, respectively. It should be noted that the cut for gold at 26 was the lowest gold medal score in the IMO history.

The International Jury Executive Committee

The International Jury Executive Committee was in charge of scheduling and running the Jury meetings and everything that went on in the Jury room. The Committee consisted of seven members: Soontorn Orintara (Chair), Nataphan Kitisin, Paisan Nakmahachalasint, Chariya Uiyysathian, Yothin Rakvongthai, Nithi Rungtanapirom and Amarisa Chantanasiri. Among them, Soontorn, Paisan, Yothin and Nithi were former contestants; and Nataphan and Paisan were the team leaders for Thailand in 2006-2007 and 2008-2009, respectively. During IMO 2015, except for Soontorn, everyone in the Committee had a second role in the Coordination Team. Yothin also had a third role in the IT Team. Their multiple-role efforts are highly appreciated.



IMO CONTEST

Attapol Kaewkhao, Pradthana Jaipong



The IMO 2015 contest took place on Friday and Saturday, 10-11 July 2015 from 9:00 a.m. to 1:30 p.m. High-ceilinged Baan Lan Tong Hall at Lotus Pang Suan Kaew Hotel which was the contest venue comfortably accommodated all contestants and invigilators in its 3,250 square meters. Seatings were arranged in six blocks, so that contestants from the same country were seated in different blocks. Invigilators

were well-trained and devoted 12 faculty members and 60 undergraduate and graduate students from the Department of Mathematics, Faculty of Science, Chiang Mai University.

The IMO questions were prepared in 60 languages. Each day the contestants were given three problems in up to two languages of their choice. Each morning all

exam materials together with snacks and drinks were placed on spacious working space. The materials included the contest problems in a closed envelop, a contest folder containing an instruction sheet, 20 sheets of answer forms, three sheets of question forms for submitting a question to the Jury, three problem folders each with specific problem's number printed on, and five color-coded cards for assistance. These materials were nicely designed with a touch of Thai patterns inspired by traditional stencils from local teak crafts.

During the exam, the contestants were allowed to submit any pertinent questions they might have within the first 30 minutes. The questions were then delivered to the

Jury room located just upstairs for the Jury to decide on appropriate responses within 60 minutes.

The exam process proceeded smoothly until the time was up and the staff collected all papers and asked all contestants to leave the hall. All folders then were sorted by country and delivered to the Department of Mathematics for scanning before being returned on the same day to the respective team leaders for marking. The same process was repeated and went smoothly on the second day.

This international event was an unforgettable experience for all contestants and IMO staff.



COORDINATION

Vichian Laohakosol, Vorrapan Chandee



In IMO 2015, the Coordination Team consisted of the chief coordinator (Vichian Laohakosol), six problem captains and 80 coordinators, 17 of whom came from outside Thailand, i.e. Canada, Colombia, Germany, Hong Kong, Hungary, Italy, Korea, Russia, South Africa, Sweden, Ukrain, UK, and USA. With coordinators from the four corners of the world, around 20 different languages were spoken among them, and they helped one another in translating exam scripts. Almost all coordinators were recruited from the following three sources, Thai mathematicians from universities in Thailand, IMO veterans (both Thais and foreigners), and coordinators from IMO 2014 in South Africa. Dirk Laurie (the chief coordinator of IMO 2014) helped to initially recruit coordinators from IMO 2014 and shared his experiences.

Many coordinators from the first group (Thai mathematicians) were inexperienced with

IMO questions. Hence they were trained during 2012-2015. They were divided into three teams (around 12-18 people each), and each team was trained for one year. They met every two months to discuss Olympiad questions, learned how to do marking schemes and beauty contests, and wrote exams for Thailand Mathematical Olympiad (TMO). At the end of the year, they also practiced coordinating at TMO, which was modeled after IMO.

The Coordination Team was divided into six units, one for each problem. The number of coordinators for each table depends on the difficulty of the questions. Since there were more coordinators than in previous years, problems 1, 2, 4 and 5 were assigned 16 coordinators (8 tables), and problems 3 and 6 were each assigned 8 coordinators (4 tables). Each table had two coordinators - one senior coordinator who is

more experienced in IMO (e.g. coordinators from previous IMOs and IMO veterans) and one junior coordinator. Ten top performing countries from the previous IMO were coordinated at Tables 1 and 2 for each question. Also, coordinators were assigned so that they would not coordinate the team from their respective native countries or countries of domicile. Here is the list of coordinator assignment.

Problem 1 (Combinatorics):



Coordinators: Stephan Wagner, Chariya Uiyasathian, Joseph Myers, Piyashat Sripratak, Setphan Neupert, Kittikorn Nakprasit, Chalermpong Worawannotai, Wongsakorn Charoenpanitseri, Wuttisak Trongsirawat, Teeraphong Phongpattanacharoen, Paisan Nakmahachalasint, Wipawee Tangjai, Pongpol Ruankong, Yusuf Chebao, Natee Pitiwan, Thitidej Tularak

Problem 2 (Number Theory):



Coordinators: Warut Suksompong, Sawian Jaidee, Nipun Pitimanaaree, Aniruth Ponon, Jongwon Lee, Ouamporn Phuksuwan, Xiannan Li, Vorrapan Chandee, Sehyun Ji, Tuangrat Chaichana, Wijit Yangjit, Totsaporn Thongjunthuk, Tat Win Leung, Boonrod Yuttanan, Carlos Eugenio Thompson Pinzón, Sineenuch Suwannaphichat

Problem 3 (Geometry):



Coordinators: Lisa Sauermann, Weerachai Neeranartvong, Géza Kós, Kritkorn Karntikoon, Panupong Pasupat, Yothin Rakvongthai, Wittawat Kositwattanarerk, Amarisa Chantasasiri

Problem 4 (Geometry):



Coordinators: Tirasana Kandhawit, Kijti Rodtes, Jana Madjarova, Kamthorn Chailuek, Gabriele Dalla Torre, Supap Kirtsaeng, Emerson Julián León Guerrero, Passawan Noppakaew, Wich Huengwattanakul, Ratnan Boonklurb, Tanat

Komolsiripakdi, Rasimate Maungchang, Penying Rochanakul, Sittisede Polwiang, Siripong Atipan, Wacharin Wichiramala

Problem 5 (Algebra):



Coordinators: Nic Heideman, Sawanya Sakuntasathien, Dmytro Mitin, Boonyong Sripopaew, Nithi Rungtanapirom, Ruth J. Skulkhu, Sorathan Chaturapruek, Sajee Pianskool, Nat Sothanapan, Parinya Sangiamsunthorn, Tonkid Chantarasm, Somphong Jitman, Sompong Chuysurichay, Nattapong Bosuwan, Gun Sunyeekhan, Prapanpong Pongsriam

Problem 6 (Combinatorics):



Coordinators: Ilya Bogdanov, Teeradej Kittipassorn, Zuming Feng, Dongryul Kim, Uwe Leck, Thorrarin Thansri, Sira Sriswasdi, Pasin Manurangsri

Coordinators arrived on 5 July, in time for their orientation in the same evening, from 20:00 to 22:00 hours. The topics covered in the orientation were:

- The principles and the dynamics of coordination (Jana Madjarova)
- How to deal with disputes (Nic Heideman)
- Marking schemes and mark allocation (Stephan Wagner)
- Logistics and facilities for coordination (Yotsanan Meemark)
- Coordinator Recruitment for IMO 2016 in Hong Kong (Tat Win Leung)

This orientation was inspired by that at IMO 2014, and participated by some of the same speakers (Jana, Nic and Stephan) who came to share their experiences.



From 6 to 9 July, coordinators worked on their problems, found alternative solutions, did marking schemes and had them approved by the Jury. However, on 10 July, due to unexpected circumstances, the exam script for 11 July (problems 4-6) had to be changed. The problem captains and the coordinators for these questions promptly worked very hard on marking schemes of the new problems and got them approved right after the Q&A session after day 2 exam.

On 10 July at 20:00 hours, coordinators of problems 1-3 received files of exams for marking. Coordinators of problems 4-6 received their files on 11 July at 20:00 hours. To have enough time to mark, coordinators of problems 1-3 and 6 started coordinating on 12 July at 13:00 hours. Due to the difficulty of problem 6, few students did it, and so coordinators could finish grading although they received the scripts only the night before. For problems 4-5, coordinators started coordinating on 13 July at 9:00 hours. Each coordination session lasted 30 minutes. During the session, the problem captain would be summoned in case of disagreement. He or she would look at the solution and discuss with the team leader. However, if the problem remained unresolved, the team leader could speak to the chief coordinator. In case that a satisfactory conclusion could not be reached, the issue would be presented to the Jury meeting. If the coordination was not finished,

another session could be scheduled at the end of the day. Most coordination went smoothly and according to schedule. In fact, all coordination was completed before the excursion on 14 July in the afternoon.

Finally, the Coordination Team would like to thank everyone who was behind the scene to make it possible for coordinators to work smoothly, enjoyably and successfully at IMO 2015. In particular, POSN for the great support to the training of Thai coordinators, Wichitra Upakarnitikaset who played a big role in securing travel expenses for coordinators from abroad, IT chief Panat Guayjarempanishk for his tremendous help in scheduling coordination sessions, all IT staff who worked very efficiently on scanning exam papers and delivering them to the Coordination Team, and, last but not least, IPST and Chiang Mai University staff for the nice working environment, comfortable lodging and smooth travel.



INFORMATION TECHNOLOGY SUPPORT

Panat Guayjarenpnanishk, Parkpoom Phetpradap



The Information Technology Support Team was charged with the following main duties with regard to IMO 2015:

- Providing IT support to the Problem Selection Committee, the International Jury Executive Committee, and the Coordination Team both before and during the IMO.
- Setting up IT equipment, in collaboration with the local host from Chiang Mai University, in the meeting rooms of the Jury and the Coordination Team, in the coordination room, computer room, and server room and standing by for any IT assistance that might be needed in the course of the meetings.
- Providing IT services to support the Beauty Contest, translation of problems, coordination, recording students' score, and blind medal cutting using the IMO system developed by Matjaž Željko, IMO IT support.
- Providing IT support to Question and Answer Session (Q&A): For both days, the Jury attended the Q&A sessions at the examination venue on another floor of the same building. During the Q&A, original questions were submitted in writing to the Jury for answer by associated leaders, then returned to the students. Both the written questions and answers were photocopied for backup in case of loss or errors.

- **Scanning students' papers:** Our own system for scanning student papers has been developed. The system has been tested in the Thailand Mathematical Olympiad (TMO) for the past three years and have proved to be as effective as the system used in previous IMOs. With the system, the cause of error can be identified once that error is detected. The scanned files are kept in local computers. Once the scanning process is complete, the files are transferred to coordinators via flash drives. There were only minor problems such as
 - (i) some students writings were faded, so the quality of scanned files are low;
 - (ii) some students wrote on back pages of answer sheets causing longer scanning time.

Finally, the IT Support Team would like to thank Matjaž Željko, Wacharin Wichiramala, Kridsada Narong, Parkpoom Phetpradap, Yothin Rakvongthai and all Chiang Mai University IT staff for their contribution to smooth and successful service at IMO 2015; and to POSN and IPST for their support in the IT staff training.



OPENING AND CLOSING CEREMONIES



The Opening Ceremony

The opening ceremony was held at Chiang Mai University Convention Hall on Thursday, 9 July 2015 (9.00-11.30 a.m.). The main hall itself was decorated with beautiful flowers especially orchids in a forest theme. Additional decorative umbrellas, well-known local craft, and purple elephant mascot of Chiang Mai University provided a touch of Chiang Mai Province. Northern Thai dance greeted contestants, deputy leaders, observers B & C, and other guests upon arrival before passing through security check-point in the main hall while leaders, academic



members and observers A were separately escorted to the second floor.

Her Royal Highness Princess Maha Chakri Sirindhorn graciously presided over the IMO



2015 opening ceremony. First, Assoc. Prof. Dr. Sampan Singharajwarapan, the Dean of Faculty of Science, Chiang Mai University (CMU) and Assoc. Prof. Suwan Kusamran of the Administrative Committee of the Promotion of Academic Olympiad and Development of Science Education Foundation under the Patronage of Her Royal Highness Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra (POSN) presented to HRH Princess Maha Chakri Sirindhorn the 56th IMO Program booklet and package. Then, HRH Princess Maha Chakri Sirindhorn bestowed plaques of appreciation to three platinum sponsors, namely Chevron Thailand Exploration and Production Limited, Government Savings Bank, and The Viriyah Insurance Public Company Limited.

Next was the parade of country teams in alphabetical order to the accompaniment of musical compositions of His Majesty the King Bhumibol Adulyadej. As host country, Thailand team was the last. All teams comprising the contestants and deputy leaders, some in national gowns, marched upon the stage and proudly displayed their national flags. At this juncture, the President of Chiang Mai University, Assoc. Prof.

Niwes Nantachit, welcomed the participants followed by screening of a video presentation in celebration of HRH Princess Maha Chakri Sirindhorn's 60th birth anniversary and to honor her significant contribution to Thailand in the area of Science and Technology. The chairman of IMO Advisory Board (Dr. Geoff Smith) humbly delivered introductory remarks and read the IMO Oath on behalf of all country teams, followed by a welcome message and a report by the Deputy Minister of Education (Dr. Krissanapong Kirtikara).

Finally, HRH Princess Maha Chakri Sirindhorn delivered opening address and declared IMO 2015 open. The IMO flag was then raised on the stage by two CMU Mathematics majors in Chiang Mai University uniform.





The Closing Ceremony and Farewell Party

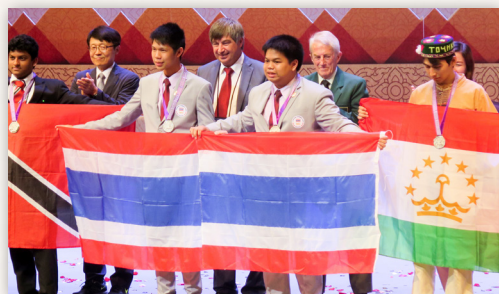


The closing ceremony took place on Wednesday, 15 July 2015 in Kad Theatre, located in Kad Suan Kaew Shopping Centre, where the contestants were seated by 3.00 p.m. Winning contestants were seated in order of medals to be awarded to them. The ceremony began with a video presentation of IMO 2015 activities, followed

by IMO 2015 summary report delivered by Assoc. Prof. Dr. Sampan Singharajwarapan, Dean of Faculty of Science, Chiang Mai University. The Deputy Minister of Education, Dr. Krissanapong Kirtikara, then presented plaques of appreciation to silver and bronze sponsors. The proceedings were pleasantly punctuated by a blend of Thai dance and music, featuring victory drum performance to celebrate the success of all contestants, and charming dance of flowers performed by five female dancers dressed in IMO colors: yellow, blue, green, red and black.

Then came the moment all participants were waiting for. The names of 126 Honorable Mention Awardees along with the names of their respective countries appeared on





the screen. Then the IMO results were announced starting with the names of 143 Bronze Medal recipients who were called, 20 at a time, to receive their medals from the IMO 2015 coordinators and academic members. 100 Silver Medals were presented by IMO Advisory Board members, IMO Foundation Director and IMO lecturer, and 39 Gold Medals, by eight distinguished guests from POSN, IPST, Chiang Mai City and Chiang Mai University. Each medal recipient proudly posed for photographs with his or her medal and national flag on the stage. Finally, amidst a big round of applause, the Deputy Minister of Education presented a special award to Zhuo Qun (Alex) Song from Canada, who had achieved a perfect score, with his fifth gold medal that placed him at the first position in the IMO Hall of Fame.

Once the host of IMO 2016 had been officially announced, Thailand representatives



(Prof. Dr. Montri Chulavatnatol, Chairman of IPST Governing Board) and the Dean of Faculty of Science, CMU handed the IMO flag to Hong Kong representative Prof. Kar Ping Shum, Chairman of the International Mathematical Olympiad Hong Kong Committee. All contestants from Thailand and Hong Kong lined up next to their country representatives. The Hong Kong representative used this opportunity to invite all participants to IMO 2016 in Hong Kong followed by an attractive video presentation. To wrap up the closing ceremony, the Deputy Minister of Education of Thailand delivered a congratulatory speech. Before heading to a farewell dinner at Ban Lan Tong Hall, located just one floor below, the participants took photographs and congratulated their friends and winning contestants from other countries.

Upon entering Ban Lan Tong Hall, Pang Suan Kaew Hotel, the participants were





given floral garland as a sign of welcome by ladies dressed in Thai costumes. The farewell dinner offered in addition to typical buffet an ambience of northern Thai market where participants can select and taste northern Thai dishes of their own choice. After the opening speech by the Dean of Faculty of Science, CMU stage performance began with elegant parade of folkloric princesses followed by spectacular Thai dances. A showstopper was the performance using specially designed gold rectangular umbrellas that were arranged to read “IMO

2015”. During intervals were interviews by the Masters of ceremony in elegant Thai costumes with representatives from each continent, contestants from the country winning the most gold medals, and the contestant with perfect score.

The Golden Microphone is awarded at the closing banquet of the International Mathematical Olympiad to the Leader who made the most speeches to the Jury. This year the award was given to Dan Carmon, Israel team leader.

Despite the competition, the contestants have made new friends across geographical borders. They exchanged souvenirs and hugs and bid farewell at the end of the lovely evening. As they parted ways, they took with them friendship and fond memories of IMO 2015.



EXCURSIONS AND SPECIAL ACTIVITIES

Somchai Sriyab, Watchareepan Atiponrat



Excursion for Students and Observers C

Excursions were organized for students on 12 and 13 July after the examination had finished. The program included a visit to Mae Sa Elephant Camp, Wat Phra That Doi Suthep, Huai Hong Khrai Royal Development Study Center, and Bo Sang Handicraft Center. The students enjoyed elephant shows and observed them bathing at the elephant camp. Wat Phra That Doi Suthep is an iconic temple in Chiang Mai located on top of Doi Suthep mountain at 3,520 feet above sea level. Here, the golden pagoda glitters and reflects the first rays of the morning sun as visitors soak up the panoramic views of Chiang Mai town and surrounding countryside. Huai Hong Khrai

Royal Development Study Center, initiated in 1982 by His Majesty the King to improve the local environmental condition, tells of how the denuded forest became once again a lush green forest. At Bo Sang Handicraft Center, students watched the entire process of making and painting Saa paper umbrellas by hand.





Excursion for Leaders, Deputy Leaders, Observers A and B

Excursions for all IMO staff were organized for 10 and 14 July. On the first day, leaders and observers A went to Mae Taman Elephant Camp while the deputy leaders and observers B went to Mae Sa Elephant Camp. All of them enjoyed watching elephants playing music, dancing, playing football, logging and painting. An excursion to Chiang Mai landmarks took place on 14 July when the group visited Wat Phra That Doi Suthep and Wat Chedi Luang. The latter is a Lanna-style pagoda and the tallest of old structures in Chiang Mai.



Recreation

During IMO 2015, a spacious hall located on the first floor of Lotus Pang Suan Keaw Hotel was earmarked for competitors' leisure activities. The hall was equipped with tables and chairs for those who wanted to chat or discuss problems. Playing card sets, chess sets, and six table tennis tables were available as well. To meet the actual demand for playing cards, additional sets were provided. It appeared that the IMO participants enjoyed the limitless use of this ad hoc recreational hall. Yet, the best and the most successful offer was the 2-day comprehensive Muay Thai courses after the competition for the large number of enthusiasts who were reportedly satisfied with the relatively short experience.

Newsletter

Starting from the contestants' arrival to their departure, from 9 to 15 July, seven issues of IMO newsletter were published, each comprising eight pages of contents including math articles, activity news and photos, games, cartoons and competition results. The newsletter was made available free of charge to all IMO 2015 participants. It served as both an information source of event and activities as well as a memento.

IMO LECTURES

The IMO lectures took place in the morning of 14 July 2015 at Lotus Hotel Pang Suan Kaew. It was a rare opportunity for the young contestants to hear world-renown mathematicians: Professor Ken Ono and Professor Ravi Vakil. These top-notch mathematicians delivered lively and engaging talks and the contestants enthusiastically reciprocated with inspiring ideas.

Title: “Ramanujan’s legacy in mathematics and film”

Speaker : KEN ONO



Ken Ono is currently the Asa Griggs Candler Professor of Mathematics at Emory University. His contribution includes several monographs and over 140 research and popular articles in number theory, combinatorics, and algebra. He is considered to be an expert in the theory of integer partitions, modular forms and the fields of interest to Srinivasa Ramanujan. In April 2000 he received the Presidential Career Award (PECASE) from Bill Clinton in a ceremony at the White House, and in June 2005 he received the National Science Foundation Director’s Distinguished Teaching

Scholar Award at the National Academy of Science.

Abstract : Srinivasa Ramanujan is one of the most enigmatic figures in the history of mathematics. He was a self-trained amateur mathematician whose ideas befuddled the accumulated wisdom of western European mathematicians in the early 20th century. His legacy has played a central role in the development of many of the deepest subjects in arithmetic geometry and number theory. Ramanujan tragically died at the early age of 32. Ramanujan’s story will be retold as a major Hollywood movie in 2015 with Dev Patel (of Slumdog Millionaire fame) playing Ramanujan and Jeremy Irons playing G. H. Hardy, Ramanujan’s mentor. The speaker spent much of this past summer working on the film in a variety of roles in preproduction and on-location filming. The speaker will discuss the mathematical legacy of Ramanujan and will also tell stories about the filming of “The Man Who Knew Infinity”.

Title: “The Mathematics of Doodling”

Speaker : RAVI VAKIL



Ravi Vakil is currently a Professor of Mathematics and the Robert K. Packard University Fellow at Stanford. He is an algebraic geometer, whose work touches on topology, string theory, applied mathematics, combinatorics, number theory, and more. He won a silver medal and two gold medals (once with a perfect score) at the International Mathematical Olympiad. He was named Putnam Fellow (the top award in the US/Canadian undergraduate competition) in each of his four undergraduate years. He received his Ph.D. from Harvard, and taught at Princeton and MIT before moving to Stanford.

Abstract : Doodling has many mathematical aspects: patterns, shapes, numbers, and more. Not surprisingly, there is often some sophisticated and fun mathematics buried inside common doodles. The speaker begins by doodling, and will see where it takes. It looks like play, but it reflects what mathematics is really about: finding patterns in nature, explaining them, and extending them. By the end, we will have seen some important notions in geometry, topology, physics, and elsewhere; some fundamental ideas guiding the development of mathematics over the course of the last century; and ongoing work continuing today.



IMO VOLUNTEER SELECTION PROCEDURE

Thaned Rojsiraphisal

The Guide Selection Committee for IMO 2015 conducted its first meeting in January 2015 to outline the tasks and prepare a preliminary schedule. The selection process involved applications review, interview and recruitment, and orientation for the selected guides. The procedures are described in further details below.

Application Review

The announcement for guide recruitment was publicized through various media including letters, radio, television, social networks (Facebook, webpages), personal contacts, etc. Applicants applied directly via online submission thanks to “Google docs”. More than four hundred applications were received worldwide.

Recruitment

Applicants were interviewed through the internet (via online video conference) and in person. A series of questions/situations were given during the interview to assess applicants’ attitude and suitability for the duty. As a result, 112 candidates were

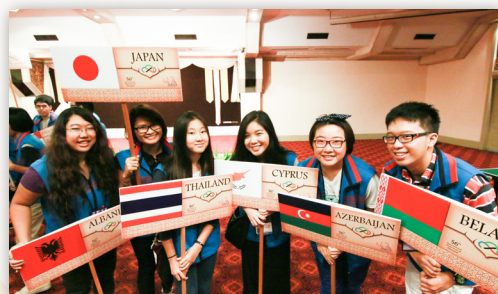
selected who have fluency in at least one of the following foreign languages; English, Spanish, French, German, Dutch, Chinese, Korean, and Japanese. Due to a large variety of contestants’ languages, it was not possible to find a guide for each and every language, however, the Guide Selection Committee did its best to recruit the most suitable guide for every team.

Guide Orientation

Prior to participants’ arrival in Chiang Mai, experienced guides share with new recruits insights and tips based on their experience with previous events. As the IMO guides were expected to escort the contestants to all activities throughout the event, they were provided with information and schedules of events as well as their duties and responsibilities at different moments.

Guide on Duty

Guides and staff were kept abreast of the latest by either phone or private group chat through which information was dispatched instantaneously. Arrival day was one of the



most exciting and long-awaited for all guides and staff. Some guides were very anxious and excited to meet their teams at the airport; they became acquainted quickly in most cases.

Throughout the event, the guides accompanied the teams when they had to take local transport or find the exam room or the venues of other activities. Many guides were so concerned about the well-being of the team under their charge that they carried snacks on them for their teams. After two

energy-sapping test days, the guides were available to assist the contestants during sightseeing and shopping or to join them at table tennis, card games, chess, and even Muay Thai class, a favorite among the contestants, which were booked up almost as soon as it was announced! Despite their exhaustion, IMO 2015 staff and guides were full of joy and felt honored to represent Thailand as the host of IMO 2015 to serve contestants from around the world.



PROGRAM DETAILS

Day 1, Friday 3 July: Early arrivals

Leaders	
12.00	Lunch
18.00	Dinner

Day 2, Saturday 4 July: Arrival of Leaders

Leaders	
07.00	Breakfast
09.00-21.00	Registration
	Shortlisted problems handout
09.00-16.30	IMO AB meeting
12.00	Lunch
17.30	Dinner
20.30	Jury meeting

Day 3, Sunday 5 July

Leaders	
07.00	Breakfast
09.00	Jury meeting
12.00	Lunch
13.00	Shortlisted problems with solutions handout
14.00	Jury meeting
17.00	Dinner
19.00	Jury meeting

Day 4, Monday 6 July

Leaders	
07.00	Breakfast
09.00	Jury meeting
12.00	Lunch
14.00	Jury meeting
17.00	Dinner
19.00	Jury meeting

Day 5, Tuesday 7 July

Leaders	
07.00	Breakfast
09.00	Jury meeting
12.00	Lunch
14.00	Jury meeting
17.00	Dinner
19.00	Jury meeting

Day 6, Wednesday 8 July: Arrival of Deputy Leaders and Contestants

Leaders		Deputy Leaders and Contestants	
07.00	Breakfast	09.00-21.00	Registration
09.00	Jury meeting	12.00	Lunch
12.00	Lunch	17.30	Dinner
14.00	Jury meeting		
17.00	Dinner		
19.00	Jury meeting		

Day 7, Thursday 9 July

Leaders		Deputy Leaders and Contestants	
06.00	Breakfast	06.00	Breakfast
07.00	Depart for Opening ceremony	07.00	Depart for Opening ceremony
10.00-12.00	Opening ceremony	10.00-12.00	Opening ceremony
12.30	Lunch	12.30	Lunch
17.00	Dinner	17.30	Dinner

Day 8, Friday 10 July

Leaders		Deputy Leaders		Contestants	
06.00	Breakfast	07.00	Breakfast	07.00	Breakfast
07.30	Depart for Q&A session	08.30-13.00	Excursion (lunch included)	09.00-13.30	Contest (Paper I)
09.00	Q&A session	17.30	Dinner	13.30	Lunch
10.30-18.00	Excursion (lunch included)			17.30	Dinner
18.30	Welcome banquet				
20.30-22.00	Scripts of first contest day hand out				

Day 9, Saturday 11 July

Leaders		Deputy Leaders		Contestants	
06.00	Breakfast	07.00	Breakfast	07.00	Breakfast
07.30	Depart for Q&A session	09.00	Move to coordination site	09.00-13.30	Contest (Paper II)
09.00	Q&A session	12.00	Lunch	13.30	Lunch
12.00	Lunch	17.30	Dinner	17.30	Dinner
17.30	Dinner				
20.30-22.00	Scripts of first contest day hand out				

Day 10, Sunday 12 July

Leaders and Deputy Leaders		Contestants	
07.00	Breakfast	07.00	Breakfast
12.00	Lunch	08.30-17.00	Excursion (lunch included)
13.30	Coordination	17.30	Dinner
17.30	Dinner		

Day 11, Monday 13 July

Leaders and Deputy Leaders		Contestants	
07.00	Breakfast	07.00	Breakfast
09.00	Coordination	08.30-17.00	Excursion (lunch included)
12.00	Lunch	17.30	Dinner
13.30	Coordination		
18.00	Dinner		

Day 12, Tuesday 14 July

Leaders and Deputy Leaders		Contestants	
07.00	Breakfast	07.00	Breakfast
09.00	Coordination	09.00-12.00	IMO Lectures
12.00	Lunch	12.00	Lunch
13.00-17.00	Excursion	17.30	Dinner
17.30	Dinner		
19.00	Final jury meeting		

Day 13, Wednesday 15 July

Leaders and Deputy Leaders		Contestants	
07.00	Breakfast	07.00	Breakfast
12.00	Lunch	12.00	Lunch
14.00	Depart for Closing ceremony	15.00-17.00	Closing ceremony
15.00-17.00	Closing ceremony	17.30-21.00	Farewell party
17.30-21.00	Farewell party		

Day 14, Thursday 16 July: Departures

Leaders and Deputy Leaders		Contestants	
07.00	Breakfast	07.00	Breakfast
12.00	Lunch	12.00	Lunch
	Departure		Departure

GENERAL REGULATIONS

1. General

- 1.1 The International Mathematical Olympiad (IMO) is governed by these General Regulations together with the Annual Regulations which specify details specific to each IMO or required by national law. The Annual Regulations take precedence over the General Regulations.
- 1.2 An IMO takes place on dates and in a country or territory (the “Host Country”) specified in the Annual Regulations.
- 1.3 A “Host Organisation” specified in the Annual Regulations has overall responsibility for the organisation of an IMO. The Host Organisation is responsible for ensuring that the arrangements for that IMO support the aims of the IMO and competition in the spirit of fair play. The Host Organisation may approve extensions of the deadlines specified in the Annual Regulations.
- 1.4 The aims of the IMO are:
 - to discover, encourage and challenge mathematically gifted young people in all countries;
 - to foster friendly international relationships among mathematicians of all countries;
 - to create an opportunity for the exchange of information on school syllabuses and practices throughout the world;
 - to promote mathematics generally.
- 1.5 The IMO Advisory Board is governed by the Regulations and Responsibilities of the IMO Advisory Board (IMOAB) and the Rules Associated with the Election of Members to the IMO Advisory Board; those documents may be amended by resolution of the Jury (see clause 4). In particular, the IMO Advisory Board:
 - makes recommendations to the Jury regarding future IMOs;
 - acts on behalf of the Jury between IMOs.
- 1.6 The General Regulations may be amended, for future IMOs, by resolution of the Jury.
- 1.7 The Annual Regulations for an IMO must be approved by the IMO Advisory Board.

2. Participation

- 2.1 Participation in an IMO is by invitation only. Each invited country (or territory in some exceptional cases approved by the IMO Advisory Board) is entitled to send a team consisting of up to six contestants (the “Contestants”), a Leader, and a Deputy Leader, to be known collectively as the participants (the “Participants”). Countries and

territories participating in an IMO are referred to below as “Countries”. An invitation to participate in an IMO does not confer any form of political recognition by the IMO, the IMOAB or the Host Country.

2.2 A Country’s Contestants should normally be citizens or residents of that Country, and should be selected through that Country’s national Mathematical Olympiad or equivalent selection programme. Contestants must not have formally enrolled at a university or any other equivalent post-secondary institution, and they must have been born less than twenty years before the day of the second Contest paper.

2.3 Observers, including family members, (the “Observers”) may apply to accompany the Participants. Observers may be:

- Observer A, accompanying the Leader and residing at or near the Leaders’ sites;
- Observer B, accompanying the Deputy Leader and residing at or near the Deputy Leaders’ sites;
- Observer C, accompanying the contestants and residing at their site.

The Annual Regulations specify the charges for Observers and the deadlines for payment of such charges. Since extra accommodation is limited, no guarantee is given that applications to accompany the Participants will be successful. Members of the IMO Advisory Board who are not Leaders may

attend as Observers A; the Host Organisation may, but is not obliged to, waive the charges for them. The Host Organisation should waive the charges for one Observer A and one Observer B from the Host Country for the following year’s IMO.

2.4 The official programme (the “Official Programme”) as referred to below is the programme and outline itinerary for an IMO and associated events. The Host Organisation reserves the right to amend or revise the Official Programme in whole or part. If it becomes necessary to make any significant changes, Participants and Observers of the invited Countries must be notified. Before the Host Organisation makes significant changes, the changes should be approved by the IMO Advisory Board.

- The Official Programme contains, among other things, details of accommodation arrangements (including food) for Participants and Observers and the venues for various official events associated with an IMO. The detailed Official Programme may not be disclosed until arrival.

2.5 Each invited Country wishing to participate in an IMO must confirm their participation online (www.imo-official.org/registration) using the username and password provided by the Host Organisation, no later than the date specified in the Annual Regulations. This also confirms that the Leader agrees to abide by the General Regulations and the Annual

Regulations for that IMO. Participants, Observers and their travel details must be registered by the dates specified in the Annual Regulations.

- 2.6 Leaders and Deputy Leaders are responsible for the conduct of the Contestants, and for the avoidance of doubt the Leaders and Deputy Leaders are acting in loco parentis for their Contestants except where the Host Organisation has been notified in writing that an Observer has been nominated to act in loco parentis.

- 2.7 Leaders and Deputy Leaders must ensure that their Contestants know and fully understand clause 5 of these Regulations. They must also make it clear that any Contestant who violates any of these

Regulations may be liable to disqualification from an IMO. In order to avoid any trouble or accident, Leaders and Deputy Leaders must also fully inform their Contestants of the information for Contestants provided by the Host Organisation.

- 2.8 The Host Organisation should invite a team from each Country that has participated in any of the three previous IMOs. In special cases the IMO Advisory Board should specify the Countries to be invited, taking into account financial and accommodation constraints and the following guidelines:

- where two or more Countries that have each participated in past IMOs unite to form one country or territory, one team

from the united Country should be invited;

- where a Country that has participated in past IMOs breaks up to become a number of separate countries or territories, each of the new countries or territories should be invited to send a team to the IMO, but no invitation should be sent to the former Country that has now been divided (there should not be 'double representation').

- 2.9 A country or territory that has not participated in any of the three previous IMOs may be invited to send a team, or to send an Observer with a view to sending a team to the following IMO, with the approval of the IMO Advisory Board and the Host Countries for the following two IMOs.

3. Responsibility for Accommodation and Expenses

- 3.1 The official arrival and departure sites are specified in the Annual Regulations.
- 3.2 The Host Organisation covers all official expenses for Participants and Observers, including accommodation, meals, transport between the official arrival and departure sites and the accommodation sites, as well as other necessary transport between the accommodation sites and other venues on the Official Programme for all the Participants and Observers.
- 3.3 Other than in respect of the provision of accommodation, meals

and transport during the Official Programme as detailed in sub-clause 3.1, the Host Organisation is not liable under any circumstances for any costs or expenses whatsoever or howsoever incurred by any Participant or Observer in connection with an IMO. In particular, the Host Organisation is not liable for any expenses derived from:

- spending extra days in the Host Country outside the periods specified in the Annual Regulations;
- travel to and from the Host Country incurred by Participants or Observers;
- travel within the Host Country prior to arrival at the chosen official arrival site or following departure from the chosen official departure site incurred by Participants or Observers.

3.4 All Participants and Observers are responsible for obtaining full accident, health and travel insurance. It is the Leader's responsibility to confirm online (www.imo-official.org/registration) using the username and password provided by the Host Organisation that this condition has been met for all Participants and Observers of his or her team.

3.5 The Host Organisation must offer opportunities to Participants and Observers for excursions and/or cultural trips but is under no obligation to organise specific activities.

3.6 The Annual Regulations specify whether accommodation is in

shared or single rooms. Where accommodation is in shared rooms, the Annual Regulations may permit application to be made for a single room, and specify the charges for accommodation in single rooms and the deadlines for payment of such charges. Since extra accommodation is limited, no guarantee is given that such applications will be successful. No charge is made for single rooms for members of the IMO Advisory Board who are Leaders.

4. Proposals for Problems

4.1 Each participating Country other than the Host Country is expected to submit up to six proposed problems, with solutions, to be received by the Problem Selection Committee no later than the date specified in the Annual Regulations. Only the Leader may submit the proposals, following a secure procedure.

4.2 The proposals should, as far as possible, cover various fields of pre-university mathematics and be of varying degrees of difficulty. They should be new and may not have been suggested for or used in any other mathematics competition.

4.3 The proposals must only be written in English, French, German, Russian or Spanish. The proposals and solutions should be accompanied by their English versions.

5. Contest Regulations

5.1 The contest element of an IMO (the "Contest") takes place on two

consecutive days specified in the Annual Regulations, neither of which should normally be a Friday, Saturday or Sunday, under the direction of the Chief Invigilator appointed by the Host Organisation. On each day of the Contest the examination starts in the morning and lasts for four and a half hours. Each of the two examination papers consists of three problems.

- 5.2 Each Contestant may receive the problems in one or two languages, previously requested on the registration form, provided that the Jury (as defined in sub-clause 6.1) has approved the relevant translation.
- 5.3 Each Contestant must work independently and submit solutions in his/her own language. The solutions must be written on answer forms provided by the Host Organisation. Contestants must write on only one side of each answer form.
- 5.4 The only instruments permitted in the Contest are writing and drawing instruments, such as rulers and compasses. In particular, books, papers, tables, calculators, protractors, computers and communication devices are not allowed into the examination room.
- 5.5 The Jury, Observers and any others who have any knowledge of the problems and solutions before the examinations must do their utmost to ensure that no Contestant has any information, direct or indirect, about any proposed problem. They must also ensure that all Contest

problems and solutions are kept strictly confidential until after the entire Contest has finished. They are barred, from the moment of their arrival at the Jury site until the conclusion of the second examination, from having any external communication with Contestants, Deputy Leaders and Observers B and C.

However, if such communication becomes necessary because of an emergency, the Host Organisation must provide proper assistance. Similarly, Contestants, Deputy Leaders and Observers B and C are barred from contacting Leaders and Observers A during the same period of time. Information about arrivals, delays and similar messages are to be directed exclusively to the published IMO office and may be forwarded by the office to the Leaders upon request.

- 5.6 The total number of prizes (first, second and third) must be approved by the Jury and should not normally exceed half the total number of Contestants. The numbers of first, second and third prizes must be approximately in the ratio 1:2:3.
- 5.7 Special prizes may be awarded for solutions considered outstanding by the Jury. Proposals for such special prizes are put forward by the Chief Coordinator appointed by the Host Organisation.
- 5.8 The prizes are awarded at the Closing Ceremony. Each Contestant who has not received a first, second or third prize receives a Certificate of

Honourable Mention if he/she has received seven points for the solution of at least one problem.

- 5.9 Each Participant and Observer receives a Certificate of Participation.

6. Jury Regulations

- 6.1 The “Jury” consists of all Leaders, together with a Chair. A Leader may be replaced by his/her Deputy Leader in an emergency (subject to the prior approval and consent of the Chair of the Jury). Members of the IMO Advisory Board who are not already members of the Jury, members of the Problem Selection Committee and the Coordinators (as defined in clause 7 below) may also attend meetings of the Jury as observers. Observers may attend meetings of the Jury only with the permission of the Chair of the Jury, but are not entitled to speak or vote. However, they may exceptionally speak at the explicit request of the Chair of the Jury. Deputy Leaders may attend, as observers, meetings of the Jury held after the Contest.
- 6.2 Only Leaders may vote in the decisions of the Jury and each Leader has one vote. A motion is carried by a simple majority of those voting. In the event of a tie, the Chair has a casting vote.
- 6.3 The Jury may appoint sub-committees to consider specific matters.
- 6.4 The meetings of the Jury are conducted principally in English. The Chair should request a translation

into some of the official languages (French, German, Russian and Spanish) as needed.

- 6.5 In reference to clause 4, the Problem Selection Committee appointed by the Host Organisation selects a number of submitted problem proposals to form the Problem Shortlist of an IMO (“Shortlist”). Each Leader receives the Shortlist for him/herself and his or her Observers A upon arrival at the Jury site.
- 6.6 The Shortlist has to be kept strictly confidential until the conclusion of the following International Mathematical Olympiad.
- 6.7 Before the Contest the Jury
- verifies that all Contestants comply with the prescribed conditions for participation;
 - selects the Contest problems from the Shortlist;
 - prepares and approves the official versions of the Contest problems in English, French, German, Russian and Spanish;
 - approves the translations of the Contest problems into all required languages;
 - approves the marking schemes that have been prepared under the direction of the Chief Coordinator.
- 6.8 On each day of the Contest, the Jury considers written questions raised by Contestants during the first half hour of the Contest and decides on replies.
- 6.9 After the Contest, the Jury

- receives and approves a report made by the Chief Invigilator on the conduct of the examinations;
- receives a report from the Chief Coordinator on any unresolved disputes which may have arisen during coordination (as in sub-clause 7.5) and determines the appropriate scores;
- approves the scores of all Contestants;
- decides winners of first, second and third prizes;
- considers and makes decisions on all proposals to award special prizes;
- considers matters raised about future International Mathematical Olympiads.

6.10 Any allegation or suspicion of a violation of the Regulations generally must be reported to the Chair of the Jury. If he/she considers there is a *prima facie* case, he/she must form a committee to investigate further. The committee must report its findings to the Jury. The Jury must decide whether a violation has occurred and, if it decides that one has, then it must decide what sanction, if any, to apply. Possible sanctions include the disqualification of an individual Contestant or an entire team from the competition. The decision of the Jury is final.

7. Coordination

7.1 Coordination is the process where the official scores of each Contestant are determined in a homogeneous,

fair and transparent manner. Leaders of each country must submit the papers of their Contestants to a coordination group provided by the Host Organisation. The coordination group consists of a Chief Coordinator and, for each problem, a Problem Captain and a group of Coordinators for that problem.

- 7.2 For each problem, each Contestant receives an integer score out of a maximum of seven points.
- 7.3 Prior to coordination, Contestants' solutions are assessed by Leaders and Deputy Leaders, and, independently, by Coordinators, in accordance with the marking schemes approved by the Jury.
- 7.4 Each coordination session involves two Coordinators provided by the Host Organisation and representatives of the relevant Country. Two representatives, normally the Leader and Deputy Leader, are permitted to participate actively in any one session. With the approval of the Chief Coordinator, one further representative or Coordinator may be present to observe the coordination process but cannot take any active part in it.
- 7.5 The Leader and the designated Coordinators should agree on the scores for each Contestant. These scores are recorded on official forms and signed by the Leader and the Coordinators. If the Leader and the Coordinators fail to agree on a score for a Contestant, the matter is first referred to the Problem Captain

for that problem, provided by the Host Organisation. If there is still no agreement, the matter is referred to the Chief Coordinator. If the Leader and Chief Coordinator then fail to agree on a score, the Chief Coordinator reports the matter to the Jury with a recommendation as to what the score should be. The Jury then determines the score.

- 7.6 If, during a coordination session, the designated Coordinators consider that an irregularity may have occurred, they must immediately refer the matter to the Chief Coordinator. Unless he/she is satisfied that there is no case to answer, he/she must report the situation to the Chair of the Jury (see sub-clause 6.10).
- 7.7 For each problem, solutions by Contestants from the Host Country are coordinated by the Leader and Deputy Leader of the Country that submitted the problem, with the assistance of the Problem Captain for that problem.

8. Entire Agreement and Understanding

- 8.1 The Participants and Observers acknowledge that these Regulations, and the documents referred to herein, constitute the full agreement and understanding of their parties and supersede any previous discussions or representations made by or on the behalf of the Host Organisation in respect of an IMO.

9. Force Majeure

- 9.1 In these Regulations, “force majeure” means any cause preventing the Host Organisation from performing any or all of its obligations that arises from or is attributable to acts, events, omissions or accidents beyond the reasonable control of the party so prevented, including without limitation strikes, lock-outs or other industrial disputes (whether involving the workforce of the party so prevented or of any other party), act of God, war, riot, civil commotion, malicious damage, compliance with any law or governmental order, rule, regulation or direction, accident, breakdown of plant or machinery, earthquake, typhoon, fire, flood, storm, or default of suppliers or sub-contractors.
- 9.2 If the Host Organisation is prevented from or delayed in performing any of its obligations to the Participants and Observers under these Regulations by force majeure, it has no liability in respect of the performance of those obligations affected by the force majeure events, both during the continuation of such events and for such time after they cease as is necessary for the Host Organisation to recommence its affected operations in order for it to perform its obligations.

ANNUAL REGULATIONS FOR IMO 2015

For the purposes of these regulations all amounts in dollars mean American dollars.

- A.1** The Host Country for the 56th International Mathematical Olympiad (IMO 2015) is Thailand.
- A.2** The Host Organisation for IMO 2015 is the Institute for the Promotion of Teaching Science and Technology (IPST), Chiang Mai University, the Mathematical Association of Thailand under the Patronage of His Majesty the King, and the Promotion of Academic Olympiad and Development of Science Education Foundation under the Patronage of Her Royal Highness Princess Galyani Vadhana Krom Luang Naradhiwas Rajanagarindra (POSN).
- A.3** The Official Programme for Leaders and Observers A begins on 4 July 2014 and ends on 16 July 2015. Leaders and Observers A may arrive on 3 July 2015 on payment for the extra day of 350 dollars for a single room and 240 dollars for a shared double room.
- A.4** The Official Programme for Deputy Leaders, Contestants and Observers B and C begins on 8 July 2015 and ends on 16 July 2015.
- A.5** The Contest papers for IMO 2015 will be written on 10 July and 11 July 2015. All Contestants must have been born on or after 12 July 1995.
- A.6** Participation must be confirmed online no later than 15 February 2015.
- A.7** Registration of Leaders, Deputy Leaders, Observers, and the number of Contestants must be completed online no later than 19 April 2015.
- A.8** Registration of Contestants must be completed online no later than 31 May 2015.
- A.9** Registration of travel details of Participants and Observers must be completed online no later than 15 June 2015.
- A.10** The official arrival and departure site is Chiang Mai.

A.11 Accommodation is in shared rooms. Leaders and Deputy Leaders may apply for a single room. The deadline for receipt of such an application is 19 April 2015. Since extra accommodation is limited, no guarantee is given that such applications will be successful. For those applications that are notified as being successful, full payment of the following charges must be made in cleared funds by 31 May 2015.

- A single room for a Leader: 900 dollars
- A single room for a Deputy Leader: 600 dollars

Applications received without the full payment of the charges are rejected. No refunds are given.

A.12 Applications for Observers to accompany the participants must be made by 19 April 2015. For those applications that are notified as being successful, full payment of the following charges must be made in cleared funds by 31 May 2015.

- Observer A (accompanying the Leader): 3000 dollars for a shared room; 3900 dollars for a single room

- Observer B (accompanying the Deputy Leader): 2200 dollars for a shared room; 2800 dollars for a single room
- Observer C (accompanying the contestants): 2200 dollars for a shared room; 2800 dollars for a single room

Applications received without the full payment of the charges are rejected. No refunds are given. Consideration is given to applications from Observers wishing to attend and observe IMO 2015 for only part of the period of the Official Programme and in such cases, the charges, accommodation, and all other relevant arrangements have to be negotiated with the Institute for the Promotion of Teaching Science and Technology (IPST).

A.13 Proposals for problems must be received by 31 March 2015. Proposals must be submitted via the portal at the IMO official website.

PROBLEMS AND SOLUTIONS

Language: **English**Day: **1**

Friday, July 10, 2015

Problem 1. We say that a finite set $\mathcal{S}$ of points in the plane is *balanced* if, for any two different points A and B in $\mathcal{S}$, there is a point C in $\mathcal{S}$ such that $AC = BC$. We say that $\mathcal{S}$ is *centre-free* if for any three different points A , B and C in $\mathcal{S}$, there is no point P in $\mathcal{S}$ such that $PA = PB = PC$.

- (a) Show that for all integers $n \geq 3$, there exists a balanced set consisting of n points.
- (b) Determine all integers $n \geq 3$ for which there exists a balanced centre-free set consisting of n points.

Problem 2. Determine all triples (a, b, c) of positive integers such that each of the numbers

$$ab - c, \quad bc - a, \quad ca - b$$

is a power of 2.

(A power of 2 is an integer of the form 2^n , where n is a non-negative integer.)

Problem 3. Let ABC be an acute triangle with $AB > AC$. Let Γ be its circumcircle, H its orthocentre, and F the foot of the altitude from A . Let M be the midpoint of BC . Let Q be the point on Γ such that $\angle HQA = 90^\circ$, and let K be the point on Γ such that $\angle HKQ = 90^\circ$. Assume that the points A , B , C , K and Q are all different, and lie on Γ in this order.

Prove that the circumcircles of triangles KQH and FKM are tangent to each other.

Language: **English**Day: **2**

Saturday, July 11, 2015

Problem 4. Triangle ABC has circumcircle Ω and circumcentre O . A circle Γ with centre A intersects the segment BC at points D and E , such that B, D, E and C are all different and lie on line BC in this order. Let F and G be the points of intersection of Γ and Ω , such that A, F, B, C and G lie on Ω in this order. Let K be the second point of intersection of the circumcircle of triangle BDF and the segment AB . Let L be the second point of intersection of the circumcircle of triangle CGE and the segment CA .

Suppose that the lines FK and GL are different and intersect at the point X . Prove that X lies on the line AO .

Problem 5. Let $\mathbb{R}$ be the set of real numbers. Determine all functions $f: \mathbb{R} \rightarrow \mathbb{R}$ satisfying the equation

$$f(x + f(x + y)) + f(xy) = x + f(x + y) + yf(x)$$

for all real numbers x and y .

Problem 6. The sequence $a_1, a_2, \dots$ of integers satisfies the following conditions:

- (i) $1 \leq a_j \leq 2015$ for all $j \geq 1$;
- (ii) $k + a_k \neq \ell + a_\ell$ for all $1 \leq k < \ell$.

Prove that there exist two positive integers b and N such that

$$\left| \sum_{j=m+1}^n (a_j - b) \right| \leq 1007^2$$

for all integers m and n satisfying $n > m \geq N$.

SOLUTIONS

Problem 1. We say that a finite set $\mathcal{S}$ of points in the plane is *balanced* if, for any two different points A and B in $\mathcal{S}$, there is a point C in $\mathcal{S}$ such that $AC = BC$. We say that $\mathcal{S}$ is *centre-free* if for any three different points A, B and C in $\mathcal{S}$, there is no point P in $\mathcal{S}$ such that $PA = PB = PC$.

- Show that for all integers $n \geq 3$, there exists a balanced set consisting of n points.
- Determine all integers $n \geq 3$ for which there exists a balanced centre-free set consisting of n points.

(Netherlands)

Answer for part (b). All odd integers $n \geq 3$.

Solution.

Part (a). Assume that n is odd. Consider a regular n -gon. Label the vertices of the n -gon as $A_1, A_2, \dots, A_n$ in counter-clockwise order, and set $\mathcal{S} = \{A_1, \dots, A_n\}$. We check that $\mathcal{S}$ is balanced. For any two distinct vertices A_i and A_j , let $k \in \{1, 2, \dots, n\}$ be the solution of $2k \equiv i + j \pmod{n}$. Then, since $k - i \equiv j - k \pmod{n}$, we have $A_i A_k = A_j A_k$, as required.

Now assume that n is even. Consider a regular $(3n - 6)$ -gon, and let O be its circumcenter. Again, label its vertices as $A_1, \dots, A_{3n-6}$ in counter-clockwise order, and choose $\mathcal{S} = \{O, A_1, A_2, \dots, A_{n-1}\}$. We check that $\mathcal{S}$ is balanced. For any two distinct vertices A_i and A_j , we always have $OA_i = OA_j$. We now consider the vertices O and A_i . First note that the triangle $OA_i A_{n/2-1+i}$ is equilateral for all $i \leq \frac{n}{2}$. Hence, if $i \leq \frac{n}{2}$, then we have $OA_{n/2-1+i} = A_i A_{n/2-1+i}$; otherwise, if $i > \frac{n}{2}$, then we have $OA_{i-n/2+1} = A_i A_{i-n/2+1}$. This completes the proof.

An example of such a construction when $n = 10$ is shown in Figure 1.

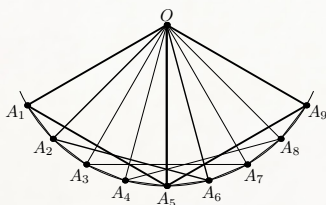


Figure 1

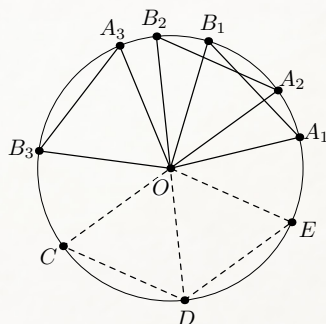


Figure 2

Comment (a). There are many ways to construct an example by placing equilateral triangles in a circle. Here we present one general method.

Let O be the center of a circle and let $A_1, B_1, \dots, A_k, B_k$ be distinct points on the circle such that the triangle OA_iB_i is equilateral for each i . Then $\mathcal{S} = \{O, A_1, B_1, \dots, A_k, B_k\}$ is balanced. To construct a set of even cardinality, put extra points C, D, E on the circle such that triangles OCD and ODE are equilateral (see Figure 2). Then $\mathcal{S} = \{O, A_1, B_1, \dots, A_k, B_k, C, D, E\}$ is balanced.

Part (b). We now show that there exists a balanced, centre-free set containing n points for all odd $n \geq 3$, and that one does not exist for any even $n \geq 3$.

If n is odd, then let $\mathcal{S}$ be the set of vertices of a regular n -gon. We have shown in part (a) that $\mathcal{S}$ is balanced. We claim that $\mathcal{S}$ is also centre-free. Indeed, if P is a point such that $PA = PB = PC$ for some three distinct vertices A, B and C , then P is the circumcenter of the n -gon, which is not contained in $\mathcal{S}$.

Now suppose that $\mathcal{S}$ is a balanced, centre-free set of even cardinality n . We will derive a contradiction. For a pair of distinct points A, B in $\mathcal{S}$, we say that a point C in $\mathcal{S}$ is *associated* with the pair $\{A, B\}$ if $AC = BC$. Since there are $\frac{n(n-1)}{2}$ pairs of points, there exists a point P in $\mathcal{S}$ which is associated with at least $\lceil \frac{n(n-1)/2}{n} \rceil = \frac{n}{2}$ pairs. Note that none of these $\frac{n}{2}$ pairs can contain P , so that the union of these $\frac{n}{2}$ pairs consists of at most $n - 1$ points. Hence there exist two such pairs that share a point. Let these two pairs be $\{A, B\}$ and $\{A, C\}$. Then $PA = PB = PC$, which is a contradiction.

Comment (b). We can rephrase the argument in graph theoretic terms as follows. Let $\mathcal{S}$ be a balanced, centre-free set consisting of n points. For any pair of distinct vertices $A, B \in \mathcal{S}$ and for any $C \in \mathcal{S}$ such that $AC = BC$, draw directed edges $A \rightarrow C$ and $B \rightarrow C$. Then all pairs of vertices generate altogether at least $n(n-1)$ directed edges; since the set is centre-free, these edges are distinct. So we must obtain a graph in which any two vertices are connected in both directions. Now, each vertex has exactly $n-1$ incoming edges, which means that $n-1$ is even. Hence n is odd.

Problem 2. Determine all triples (a, b, c) of positive integers such that each of the numbers

$$ab - c, \quad bc - a, \quad ca - b$$

is a power of 2.

(A power of 2 is an integer of the form 2^n , where n is a non-negative integer.)

(Serbia)

Answer. There are sixteen such triples, namely $(2, 2, 2)$, the three permutations of $(2, 2, 3)$, and the six permutations of each of $(2, 6, 11)$ and $(3, 5, 7)$.

Solution 1. It can easily be verified that these sixteen triples are as required. Now let (a, b, c) be any triple with the desired property. If we would have $a = 1$, then both $b - c$ and $c - b$ were powers of 2, which is impossible since their sum is zero; because of symmetry, this argument shows $a, b, c \geq 2$.

Case 1. Among a, b , and c there are at least two equal numbers.

Without loss of generality we may suppose that $a = b$. Then $a^2 - c$ and $a(c - 1)$ are powers of 2. The latter tells us that actually a and $c - 1$ are powers of 2. So there are non-negative integers α and γ with $a = 2^\alpha$ and $c = 2^\gamma + 1$. Since $a^2 - c = 2^{2\alpha} - 2^\gamma - 1$ is a power of 2 and thus incongruent to -1 modulo 4, we must have $\gamma \leq 1$. Moreover, each of the terms $2^{2\alpha} - 2$ and $2^{2\alpha} - 3$ can only be a power of 2 if $\alpha = 1$. It follows that the triple (a, b, c) is either $(2, 2, 2)$ or $(2, 2, 3)$.

Case 2. The numbers a, b , and c are distinct.

Due to symmetry we may suppose that

$$2 \leq a < b < c. \quad (1)$$

We are to prove that the triple (a, b, c) is either $(2, 6, 11)$ or $(3, 5, 7)$. By our hypothesis, there exist three non-negative integers α, β , and γ such that

$$bc - a = 2^\alpha, \quad (2)$$

$$ac - b = 2^\beta, \quad (3)$$

$$\text{and } ab - c = 2^\gamma. \quad (4)$$

Evidently we have

$$\alpha > \beta > \gamma. \quad (5)$$

Depending on how large a is, we divide the argument into two further cases.

Case 2.1. $a = 2$.

We first prove that $\gamma = 0$. Assume for the sake of contradiction that $\gamma > 0$. Then c is even by (4) and, similarly, b is even by (5) and (3). So the left-hand side of (2) is congruent to 2 modulo 4, which is only possible if $bc = 4$. As this contradicts (1), we have thereby shown that $\gamma = 0$, i.e., that $c = 2b - 1$.

Now (3) yields $3b - 2 = 2^\beta$. Due to $b > 2$ this is only possible if $\beta \geq 4$. If $\beta = 4$, then we get $b = 6$ and $c = 2 \cdot 6 - 1 = 11$, which is a solution. It remains to deal with the case $\beta \geq 5$. Now (2) implies

$$9 \cdot 2^\alpha = 9b(2b - 1) - 18 = (3b - 2)(6b + 1) - 16 = 2^\beta(2^{\beta+1} + 5) - 16,$$

and by $\beta \geq 5$ the right-hand side is not divisible by 32. Thus $\alpha \leq 4$ and we get a contradiction to (5).

Case 2.2. $a \geq 3$.

Pick an integer $\vartheta \in \{-1, +1\}$ such that $c - \vartheta$ is not divisible by 4. Now

$$2^\alpha + \vartheta \cdot 2^\beta = (bc - a\vartheta^2) + \vartheta(ca - b) = (b + a\vartheta)(c - \vartheta)$$

is divisible by 2^β and, consequently, $b + a\vartheta$ is divisible by $2^{\beta-1}$. On the other hand, $2^\beta = ac - b > (a - 1)c \geq 2c$ implies in view of (1) that a and b are smaller than $2^{\beta-1}$. All this is only possible if $\vartheta = 1$ and $a + b = 2^{\beta-1}$. Now (3) yields

$$ac - b = 2(a + b), \quad (6)$$

whence $4b > a + 3b = a(c - 1) \geq ab$, which in turn yields $a = 3$.

So (6) simplifies to $c = b + 2$ and (2) tells us that $b(b + 2) - 3 = (b - 1)(b + 3)$ is a power of 2. Consequently, the factors $b - 1$ and $b + 3$ are powers of 2 themselves. Since their difference is 4, this is only possible if $b = 5$ and thus $c = 7$. Thereby the solution is complete.

Solution 2. As in the beginning of the first solution, we observe that $a, b, c \geq 2$. Depending on the parities of a , b , and c we distinguish three cases.

Case 1. The numbers a , b , and c are even.

Let 2^A , 2^B , and 2^C be the largest powers of 2 dividing a , b , and c respectively. We may assume without loss of generality that $1 \leq A \leq B \leq C$. Now 2^B is the highest power of 2 dividing $ac - b$, whence $ac - b = 2^B \leq b$. Similarly, we deduce $bc - a = 2^A \leq a$. Adding both estimates we get $(a + b)c \leq 2(a + b)$, whence $c \leq 2$. So $c = 2$ and thus $A = B = C = 1$; moreover, we must have had equality throughout, i.e., $a = 2^A = 2$ and $b = 2^B = 2$. We have thereby found the solution $(a, b, c) = (2, 2, 2)$.

Case 2. The numbers a , b , and c are odd.

If any two of these numbers are equal, say $a = b$, then $ac - b = a(c - 1)$ has a nontrivial odd divisor and cannot be a power of 2. Hence a , b , and c are distinct. So we may assume without loss of generality that $a < b < c$.

Let α and β denote the non-negative integers for which $bc - a = 2^\alpha$ and $ac - b = 2^\beta$ hold. Clearly, we have $\alpha > \beta$, and thus 2^β divides

$$a \cdot 2^\alpha - b \cdot 2^\beta = a(bc - a) - b(ac - b) = b^2 - a^2 = (b + a)(b - a).$$

Since a is odd, it is not possible that both factors $b + a$ and $b - a$ are divisible by 4. Consequently, one of them has to be a multiple of $2^{\beta-1}$. Hence one of the numbers $2(b + a)$ and $2(b - a)$ is divisible by 2^β and in either case we have

$$ac - b = 2^\beta \leq 2(a + b). \quad (7)$$

This in turn yields $(a - 1)b < ac - b < 4b$ and thus $a = 3$ (recall that a is odd and larger than 1). Substituting this back into (7) we learn $c \leq b + 2$. But due to the parity $b < c$ entails that $b + 2 \leq c$ holds as well. So we get $c = b + 2$ and from $bc - a = (b - 1)(b + 3)$ being a power of 2 it follows that $b = 5$ and $c = 7$.

Case 3. Among a , b , and c both parities occur.

Without loss of generality, we suppose that c is odd and that $a \leq b$. We are to show that (a, b, c) is either $(2, 2, 3)$ or $(2, 6, 11)$. As at least one of a and b is even, the expression $ab - c$ is odd; since it is also a power of 2, we obtain

$$ab - c = 1. \quad (8)$$

If $a = b$, then $c = a^2 - 1$, and from $ac - b = a(a^2 - 2)$ being a power of 2 it follows that both a and $a^2 - 2$ are powers of 2, whence $a = 2$. This gives rise to the solution $(2, 2, 3)$.

We may suppose $a < b$ from now on. As usual, we let $\alpha > \beta$ denote the integers satisfying

$$2^\alpha = bc - a \quad \text{and} \quad 2^\beta = ac - b. \quad (9)$$

If $\beta = 0$ it would follow that $ac - b = ab - c = 1$ and hence that $b = c = 1$, which is absurd. So β and α are positive and consequently a and b are even. Substituting $c = ab - 1$ into (9) we obtain

$$2^\alpha = ab^2 - (a + b), \quad (10)$$

$$\text{and} \quad 2^\beta = a^2b - (a + b). \quad (11)$$

The addition of both equations yields $2^\alpha + 2^\beta = (ab - 2)(a + b)$. Now $ab - 2$ is even but not divisible by 4, so the highest power of 2 dividing $a + b$ is $2^{\beta-1}$. For this reason, the equations (10) and (11) show that the highest powers of 2 dividing either of the numbers ab^2 and a^2b is likewise $2^{\beta-1}$. Thus there is an integer $\tau \geq 1$ together with odd integers A , B , and C such that $a = 2^\tau A$, $b = 2^\tau B$, $a + b = 2^{3\tau} C$, and $\beta = 1 + 3\tau$.

Notice that $A + B = 2^{2\tau} C \geq 4C$. Moreover, (11) entails $A^2B - C = 2$. Thus $8 = 4A^2B - 4C \geq 4A^2B - A - B \geq A^2(3B - 1)$. Since A and B are odd with $A < B$, this is only possible if $A = 1$ and $B = 3$. Finally, one may conclude $C = 1$, $\tau = 1$, $a = 2$, $b = 6$, and $c = 11$. We have thereby found the triple $(2, 6, 11)$. This completes the discussion of the third case, and hence the solution.

Comment. In both solutions, there are many alternative ways to proceed in each of its cases. Here we present a different treatment of the part “ $a < b$ ” of Case 3 in Solution 2, assuming that (8) and (9) have already been written down:

Put $d = \gcd(a, b)$ and define the integers p and q by $a = dp$ and $b = dq$; notice that $p < q$ and $\gcd(p, q) = 1$. Now (8) implies $c = d^2pq - 1$ and thus we have

$$\begin{aligned} 2^\alpha &= d(d^2pq^2 - p - q) \\ \text{and } 2^\beta &= d(d^2p^2q - p - q). \end{aligned} \quad (12)$$

Now 2^β divides $2^\alpha - 2^\beta = d^3pq(q - p)$ and, as p and q are easily seen to be coprime to $d^2p^2q - p - q$, it follows that

$$(d^2p^2q - p - q) \mid d^2(q - p). \quad (13)$$

In particular, we have $d^2p^2q - p - q \leq d^2(q - p)$, i.e., $d^2(p^2q + p - q) \leq p + q$. As $p^2q + p - q > 0$, this may be weakened to $p^2q + p - q \leq p + q$. Hence $p^2q \leq 2q$, which is only possible if $p = 1$.

Going back to (13), we get

$$(d^2q - q - 1) \mid d^2(q - 1). \quad (14)$$

Now $2(d^2q - q - 1) \leq d^2(q - 1)$ would entail $d^2(q + 1) \leq 2(q + 1)$ and thus $d = 1$. But this would tell us that $a = dp = 1$, which is absurd. This argument proves $2(d^2q - q - 1) > d^2(q - 1)$ and in the light of (14) it follows that $d^2q - q - 1 = d^2(q - 1)$, i.e., $q = d^2 - 1$. Plugging this together with $p = 1$ into (12) we infer $2^\beta = d^3(d^2 - 2)$. Hence d and $d^2 - 2$ are powers of 2. Consequently, $d = 2$, $q = 3$, $a = 2$, $b = 6$, and $c = 11$, as desired.

Problem 3. Let ABC be an acute triangle with $AB > AC$. Let Γ be its circumcircle, H its orthocentre, and F the foot of the altitude from A . Let M be the midpoint of BC . Let Q be the point on Γ such that $\angle AQH = 90^\circ$ and let K be the point on Γ such that $\angle QKH = 90^\circ$. Assume that the points A, B, C, K and Q are all different, and lie on Γ in this order.

Prove that the circumcircles of triangles KQH and FKM are tangent to each other.

(Ukraine)

Solution 1. Let A' be the point diametrically opposite to A on Γ . Since $\angle AQA' = 90^\circ$ and $\angle AQH = 90^\circ$, the points Q, H , and A' are collinear. Similarly, if Q' denotes the point on Γ diametrically opposite to Q , then K, H , and Q' are collinear. Let the line AHF intersect Γ again at E ; it is known that M is the midpoint of the segment HA' and that F is the midpoint of HE . Let J be the midpoint of HQ' .

Consider any point T such that TK is tangent to the circle KQH at K with Q and T lying on different sides of KH (see Figure 1). Then $\angle HKT = \angle HQK$ and we are to prove that $\angle MKT = \angle CFK$. Thus it remains to show that $\angle HQK = \angle CFK + \angle HKM$. Due to $\angle HQK = 90^\circ - \angle Q'HA'$ and $\angle CFK = 90^\circ - \angle KFA$, this means the same as $\angle Q'HA' = \angle KFA - \angle HKM$. Now, since the triangles KHE and AHQ' are similar with F and J being the midpoints of corresponding sides, we have $\angle KFA = \angle HJA$, and analogously one may obtain $\angle HKM = \angle JQH$. Thereby our task is reduced to verifying

$$\angle Q'HA' = \angle HJA - \angle JQH.$$

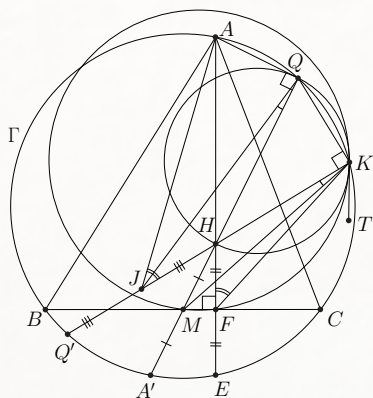


Figure 1

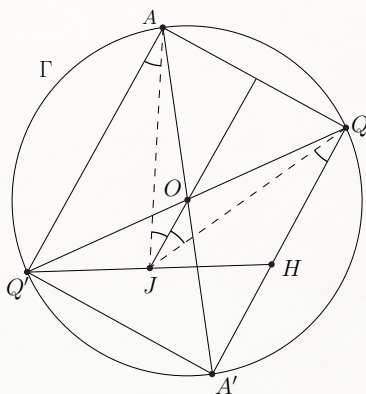


Figure 2

To avoid confusion, let us draw a new picture at this moment (see Figure 2). Owing to $\angle Q'HA' = \angle JQH + \angle HJQ$ and $\angle HJA = \angle QJA + \angle HJQ$, we just have to show that $2\angle JQH = \angle QJA$. To this end, it suffices to remark that $AQA'Q'$ is a rectangle and that J , being defined to be the midpoint of HQ' , has to lie on the mid parallel of QA' and $Q'A$.

Solution 2. We define the points A' and E and prove that the ray MH passes through Q in the same way as in the first solution. Notice that the points A' and E can play analogous roles to the points Q and K , respectively: point A' is the second intersection of the line MH with Γ , and E is the point on Γ with the property $\angle HEA' = 90^\circ$ (see Figure 3).

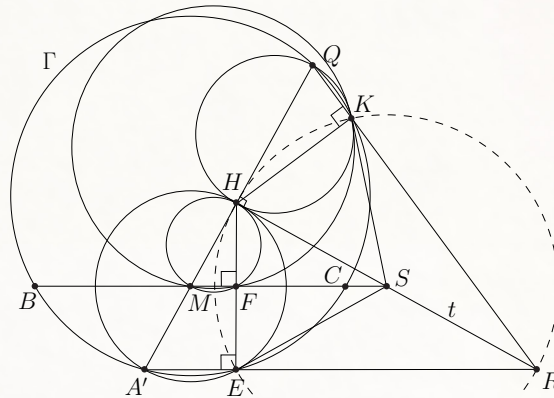


Figure 3

In the circles KQH and $EA'H$, the line segments HQ and HA' are diameters, respectively; so, these circles have a common tangent t at H , perpendicular to MH . Let R be the radical center of the circles ABC , KQH and $EA'H$. Their pairwise radical axes are the lines QK , $A'E$ and the line t ; they all pass through R . Let S be the midpoint of HR ; by $\angle QKH = \angle HEA' = 90^\circ$, the quadrilateral $HERK$ is cyclic and its circumcentre is S ; hence we have $SK = SE = SH$. The line BC , being the perpendicular bisector of HE , passes through S .

The circle HMF also is tangent to t at H ; from the power of S with respect to the circle HMF we have

$$SM \cdot SF = SH^2 = SK^2.$$

So, the power of S with respect to the circles KQH and FKM is SK^2 . Therefore, the line segment SK is tangent to both circles at K .

Problem 4. Triangle ABC has circumcircle Ω and circumcentre O . A circle Γ with centre A intersects the segment BC at points D and E , such that B, D, E and C are all different and lie on line BC in this order. Let F and G be the points of intersection of Γ and Ω , such that A, F, B, C and G lie on Ω in this order. Let K be the second point of intersection of the circumcircle of triangle BDF and the segment AB . Let L be the second point of intersection of the circumcircle of triangle CEG and the segment CA .

Suppose that the lines FK and GL are different and intersect at the point X . Prove that X lies on the line AO .

(Greece)

Solution 1. It suffices to prove that the lines FK and GL are symmetric about AO . Now the segments AF and AG , being chords of Ω with the same length, are clearly symmetric with respect to AO . Hence it is enough to show

$$\angle KFA = \angle AGL. \quad (1)$$

Let us denote the circumcircles of BDF and CEG by ω_B and ω_C , respectively. To prove (1), we start from

$$\angle KFA = \angle DFG + \angle GFA - \angle DFK.$$

In view of the circles ω_B , Γ , and Ω , this may be rewritten as

$$\angle KFA = \angle CEG + \angle GBA - \angle DBK = \angle CEG - \angle CBG.$$

Due to the circles ω_C and Ω , we obtain $\angle KFA = \angle CLG - \angle CAG = \angle AGL$. Thereby the problem is solved.

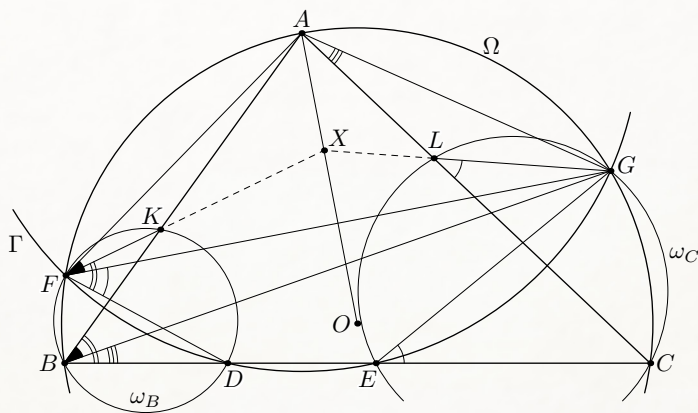


Figure 1

Solution 2. Again, we denote the circumcircle of $BDKF$ by ω_B . In addition, we set $\alpha = \angle BAC$, $\varphi = \angle ABF$, and $\psi = \angle EDA = \angle AED$ (see Figure 2). Notice that $AF = AG$ entails $\varphi = \angle GCA$, so all three of α , φ , and ψ respect the “symmetry” between B and C of our configuration. Again, we reduce our task to proving (1).

This time, we start from

$$2\angle KFA = 2(\angle DFA - \angle DFK).$$

Since the triangle AFD is isosceles, we have

$$\angle DFA = \angle ADF = \angle EDF - \psi = \angle BFD + \angle EBF - \psi.$$

Moreover, because of the circle ω_B we have $\angle DFK = \angle CBA$. Altogether, this yields

$$2\angle KFA = \angle DFA + (\angle BFD + \angle EBF - \psi) - 2\angle CBA,$$

which simplifies to

$$2\angle KFA = \angle BFA + \varphi - \psi - \angle CBA.$$

Now the quadrilateral $AFBC$ is cyclic, so this entails $2\angle KFA = \alpha + \varphi - \psi$.

Due to the “symmetry” between B and C alluded to above, this argument also shows that $2\angle AGL = \alpha + \varphi - \psi$. This concludes the proof of (1).

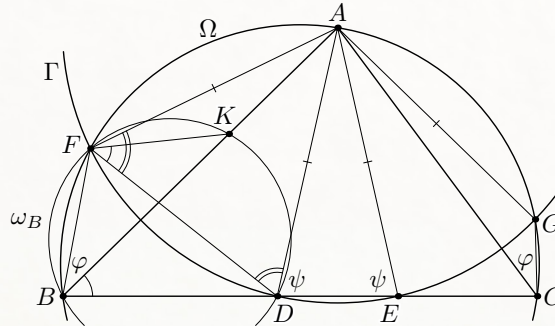


Figure 2

Comment 1. As the first solution shows, the assumption that A be the centre of Γ may be weakened to the following one: The centre of Γ lies on the line OA . The second solution may be modified to yield the same result.

Comment 2. It might be interesting to remark that $\angle GDK = 90^\circ$. To prove this, let G' denote the point on Γ diametrically opposite to G . Because of $\angle KDF = \angle KBF = \angle AGF = \angle G'DF$, the points D , K , and G' are collinear, which leads to the desired result. Notice that due to symmetry we also have $\angle LEF = 90^\circ$.

Moreover, a standard argument shows that the triangles AGL and BGE are similar. By symmetry again, also the triangles AFK and CDF are similar.

There are several ways to derive a solution from these facts. For instance, one may argue that

$$\begin{aligned}\angle KFA &= \angle BFA - \angle BFK = \angle BFA - \angle EDG' = (180^\circ - \angle AGB) - (180^\circ - \angle G'GE) \\ &= \angle AGE - \angle AGB = \angle BGE = \angle AGL.\end{aligned}$$

Comment 3. The original proposal did not contain the point X in the assumption and asked instead to prove that the lines FK , GL , and AO are concurrent. This differs from the version given above only insofar as it also requires to show that these lines cannot be parallel. The Problem Selection Committee removed this part from the problem intending to make it thus more suitable for the Olympiad.

For the sake of completeness, we would still like to sketch one possibility for proving $FK \nparallel AO$ here. As the points K and O lie in the angular region $\angle FAG$, it suffices to check $\angle KFA + \angle FAO < 180^\circ$. Multiplying by 2 and making use of the formulae from the second solution, we see that this is equivalent to $(\alpha + \varphi - \psi) + (180^\circ - 2\varphi) < 360^\circ$, which in turn is an easy consequence of $\alpha < 180^\circ$.

Problem 5. Let $\mathbb{R}$ be the set of real numbers. Determine all functions $f: \mathbb{R} \rightarrow \mathbb{R}$ satisfying the equation

$$f(x + f(x + y)) + f(xy) = x + f(x + y) + yf(x) \quad (1)$$

for all real numbers x and y .

(Albania)

Answer. There are two such functions, namely the identity function and $x \mapsto 2 - x$.

Solution. Clearly, each of the functions $x \mapsto x$ and $x \mapsto 2 - x$ satisfies (1). It suffices now to show that they are the only solutions to the problem.

Suppose that f is any function satisfying (1). Then setting $y = 1$ in (1), we obtain

$$f(x + f(x + 1)) = x + f(x + 1); \quad (2)$$

in other words, $x + f(x + 1)$ is a fixed point of f for every $x \in \mathbb{R}$.

We distinguish two cases regarding the value of $f(0)$.

Case 1. $f(0) \neq 0$.

By letting $x = 0$ in (1), we have

$$f(f(y)) + f(0) = f(y) + yf(0).$$

So, if y_0 is a fixed point of f , then substituting $y = y_0$ in the above equation we get $y_0 = 1$. Thus, it follows from (2) that $x + f(x + 1) = 1$ for all $x \in \mathbb{R}$. That is, $f(x) = 2 - x$ for all $x \in \mathbb{R}$.

Case 2. $f(0) = 0$.

By letting $y = 0$ and replacing x by $x + 1$ in (1), we obtain

$$f(x + f(x + 1) + 1) = x + f(x + 1) + 1. \quad (3)$$

From (1), the substitution $x = 1$ yields

$$f(1 + f(y + 1)) + f(y) = 1 + f(y + 1) + yf(1). \quad (4)$$

By plugging $x = -1$ into (2), we see that $f(-1) = -1$. We then plug $y = -1$ into (4) and deduce that $f(1) = 1$. Hence, (4) reduces to

$$f(1 + f(y + 1)) + f(y) = 1 + f(y + 1) + y. \quad (5)$$

Accordingly, if both y_0 and $y_0 + 1$ are fixed points of f , then so is $y_0 + 2$. Thus, it follows from (2) and (3) that $x + f(x + 1) + 2$ is a fixed point of f for every $x \in \mathbb{R}$; i.e.,

$$f(x + f(x + 1) + 2) = x + f(x + 1) + 2.$$

Replacing x by $x - 2$ simplifies the above equation to

$$f(x + f(x - 1)) = x + f(x - 1).$$

On the other hand, we set $y = -1$ in (1) and get

$$f(x + f(x - 1)) = x + f(x - 1) - f(x) - f(-x).$$

Therefore, $f(-x) = -f(x)$ for all $x \in \mathbb{R}$.

Finally, we substitute (x, y) by $(-1, -y)$ in (1) and use the fact that $f(-1) = -1$ to get

$$f(-1 + f(-y - 1)) + f(y) = -1 + f(-y - 1) + y.$$

Since f is an odd function, the above equation becomes

$$-f(1 + f(y + 1)) + f(y) = -1 - f(y + 1) + y.$$

By adding this equation to (5), we conclude that $f(y) = y$ for all $y \in \mathbb{R}$.

Problem 6. The sequence $a_1, a_2, \dots$ of integers satisfies the following conditions:

- (i) $1 \leq a_j \leq 2015$ for all $j \geq 1$;
- (ii) $k + a_k \neq \ell + a_\ell$ for all $1 \leq k < \ell$.

Prove that there exist two positive integers b and N such that

$$\left| \sum_{j=m+1}^n (a_j - b) \right| \leq 1007^2$$

for all integers m and n satisfying $n > m \geq N$.

(Australia)

Solution 1. We visualize the set of positive integers as a sequence of points. For each n we draw an arrow emerging from n that points to $n + a_n$; so the *length* of this arrow is a_n . Due to the condition that $m + a_m \neq n + a_n$ for $m \neq n$, each positive integer receives at most one arrow. There are some positive integers, such as 1, that receive no arrows; these will be referred to as *starting points* in the sequel. When one starts at any of the starting points and keeps following the arrows, one is led to an infinite path, called its *ray*, that visits a strictly increasing sequence of positive integers. Since the length of any arrow is at most 2015, such a ray, say with starting point s , meets every interval of the form $[n, n + 2014]$ with $n \geq s$ at least once.

Suppose for the sake of contradiction that there would be at least 2016 starting points. Then we could take an integer n that is larger than the first 2016 starting points. But now the interval $[n, n + 2014]$ must be met by at least 2016 rays in distinct points, which is absurd. We have thereby shown that the number b of starting points satisfies $1 \leq b \leq 2015$. Let N denote any integer that is larger than all starting points. We contend that b and N are as required.

To see this, let any two integers m and n with $n > m \geq N$ be given. The sum $\sum_{i=m+1}^n a_i$ gives the total length of the arrows emerging from $m + 1, \dots, n$. Taken together, these arrows form b subpaths of our rays, some of which may be empty. Now on each ray we look at the first number that is larger than m ; let $x_1, \dots, x_b$ denote these numbers, and let $y_1, \dots, y_b$ enumerate in corresponding order the numbers defined similarly with respect to n . Then the list of differences $y_1 - x_1, \dots, y_b - x_b$ consists of the lengths of these paths and possibly some zeros corresponding to empty paths. Consequently, we obtain

$$\sum_{i=m+1}^n a_i = \sum_{j=1}^b (y_j - x_j),$$

whence

$$\sum_{i=m+1}^n (a_i - b) = \sum_{j=1}^b (y_j - n) - \sum_{j=1}^b (x_j - m).$$

Now each of the b rays meets the interval $[m+1, m+2015]$ at some point and thus $x_1 - m, \dots, x_b - m$ are b distinct members of the set $\{1, 2, \dots, 2015\}$. Moreover, since $m+1$ is not a starting point, it must belong to some ray; so 1 has to appear among these numbers, wherefore

$$1 + \sum_{j=1}^{b-1} (j+1) \leq \sum_{j=1}^b (x_j - m) \leq 1 + \sum_{j=1}^{b-1} (2016 - b + j).$$

The same argument applied to n and $y_1, \dots, y_b$ yields

$$1 + \sum_{j=1}^{b-1} (j+1) \leq \sum_{j=1}^b (y_j - n) \leq 1 + \sum_{j=1}^{b-1} (2016 - b + j).$$

So altogether we get

$$\begin{aligned} \left| \sum_{i=m+1}^n (a_i - b) \right| &\leq \sum_{j=1}^{b-1} ((2016 - b + j) - (j+1)) = (b-1)(2015 - b) \\ &\leq \left(\frac{(b-1) + (2015 - b)}{2} \right)^2 = 1007^2, \end{aligned}$$

as desired.

Solution 2. Set $s_n = n + a_n$ for all positive integers n . By our assumptions, we have

$$n + 1 \leq s_n \leq n + 2015$$

for all $n \in \mathbb{Z}_{>0}$. The members of the sequence $s_1, s_2, \dots$ are distinct. We shall investigate the set

$$M = \mathbb{Z}_{>0} \setminus \{s_1, s_2, \dots\}.$$

Claim. At most 2015 numbers belong to M .

Proof. Otherwise let $m_1 < m_2 < \dots < m_{2016}$ be any 2016 distinct elements from M . For $n = m_{2016}$ we have

$$\{s_1, \dots, s_n\} \cup \{m_1, \dots, m_{2016}\} \subseteq \{1, 2, \dots, n + 2015\},$$

where on the left-hand side we have a disjoint union containing altogether $n + 2016$ elements. But the set on the right-hand side has only $n + 2015$ elements. This contradiction proves our claim. $\square$

Now we work towards proving that the positive integers $b = |M|$ and $N = \max(M)$ are as required. Recall that we have just shown $b \leq 2015$.

Let us consider any integer $r \geq N$. As in the proof of the above claim, we see that

$$B_r = M \cup \{s_1, \dots, s_r\} \quad (1)$$

is a subset of $[1, r+2015] \cap \mathbb{Z}$ with precisely $b+r$ elements. Due to the definitions of M and N , we also know $[1, r+1] \cap \mathbb{Z} \subseteq B_r$. It follows that there is a set $C_r \subseteq \{1, 2, \dots, 2014\}$ with $|C_r| = b-1$ and

$$B_r = ([1, r+1] \cap \mathbb{Z}) \cup \{r+1+x \mid x \in C_r\}. \quad (2)$$

For any finite set of integers J we denote the sum of its elements by $\sum J$. Now the equations (1) and (2) give rise to two ways of computing $\sum B_r$ and the comparison of both methods leads to

$$\sum M + \sum_{i=1}^r s_i = \sum_{i=1}^r i + b(r+1) + \sum C_r,$$

or in other words to

$$\sum M + \sum_{i=1}^r (a_i - b) = b + \sum C_r. \quad (3)$$

After this preparation, we consider any two integers m and n with $n > m \geq N$. Plugging $r = n$ and $r = m$ into (3) and subtracting the estimates that result, we deduce

$$\sum_{i=m+1}^n (a_i - b) = \sum C_n - \sum C_m.$$

Since C_n and C_m are subsets of $\{1, 2, \dots, 2014\}$ with $|C_n| = |C_m| = b-1$, it is clear that the absolute value of the right-hand side of the above inequality attains its largest possible value if either $C_m = \{1, 2, \dots, b-1\}$ and $C_n = \{2016-b, \dots, 2014\}$, or the other way around. In these two cases we have

$$\left| \sum C_n - \sum C_m \right| = (b-1)(2015-b),$$

so in the general case we find

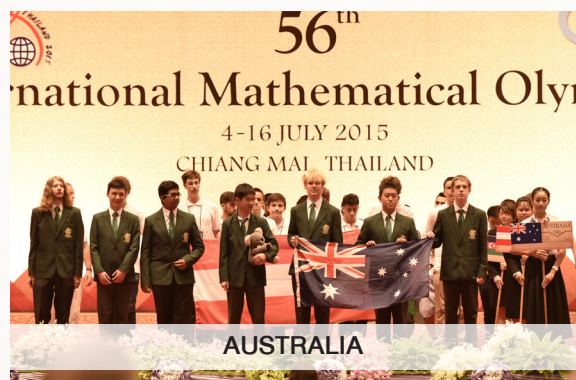
$$\left| \sum_{i=m+1}^n (a_i - b) \right| \leq (b-1)(2015-b) \leq \left(\frac{(b-1) + (2015-b)}{2} \right)^2 = 1007^2,$$

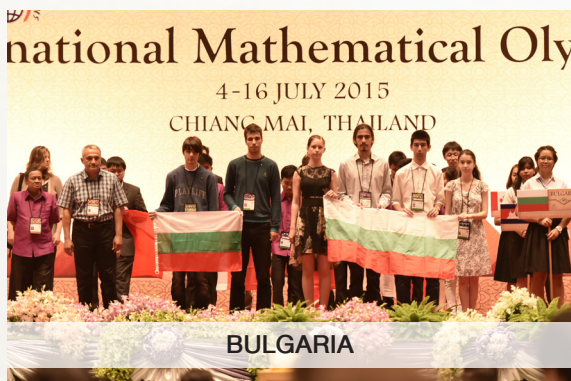
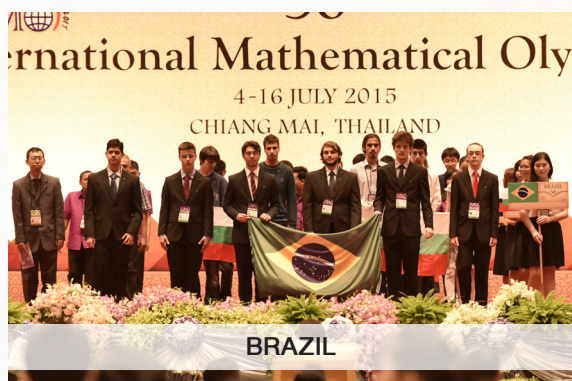
as desired.

Comment. The sets C_n may be visualized by means of the following process: Start with an empty blackboard. For $n \geq 1$, the following happens during the n^{th} step. The number a_n gets written on the blackboard, then all numbers currently on the blackboard are decreased by 1, and finally all zeros that have arisen get swept away.

It is not hard to see that the numbers present on the blackboard after n steps are distinct and form the set C_n . Moreover, it is possible to complete a solution based on this idea.

TEAMS PARADE





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COLOMBIA

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COSTA RICA

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CROATIA

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CUBA

International Mathematical Olympiad

4-16 JULY 2015

CHIANG MAI, THAILAND



CYPRUS

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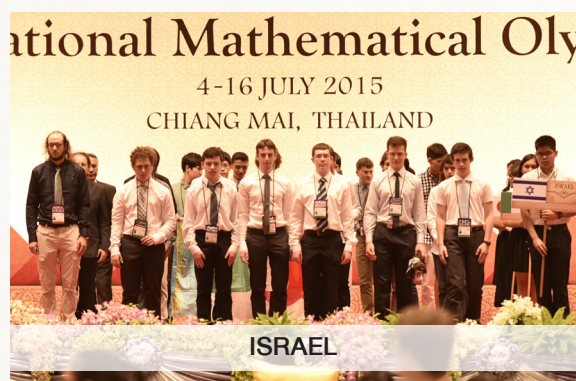
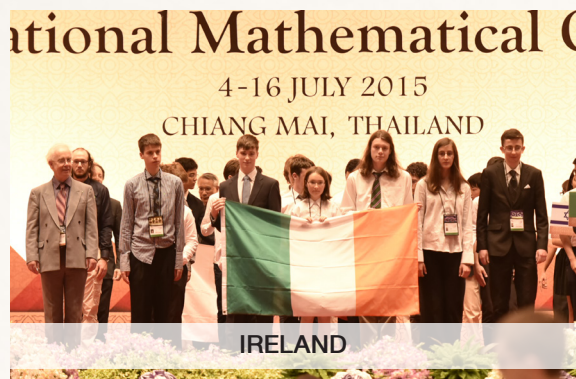
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CZECH REPUBLIC







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LATVIA

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LIECHTENSTEIN

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MEXICO

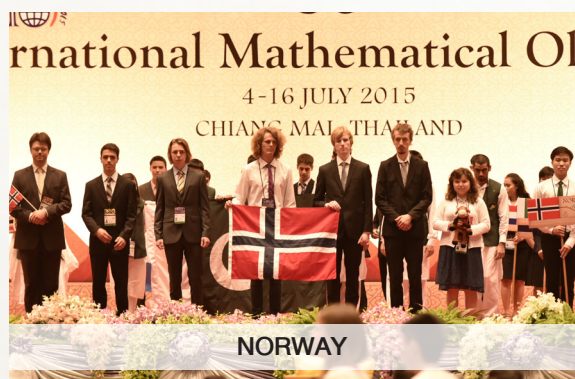
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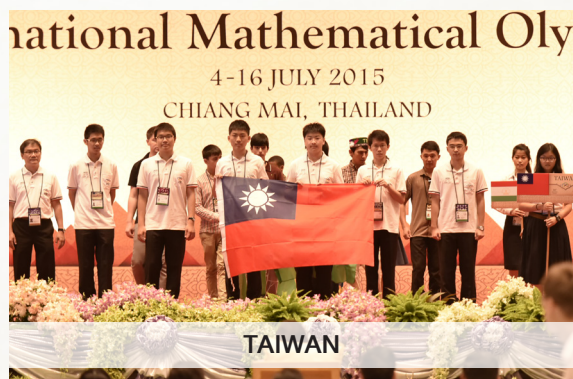


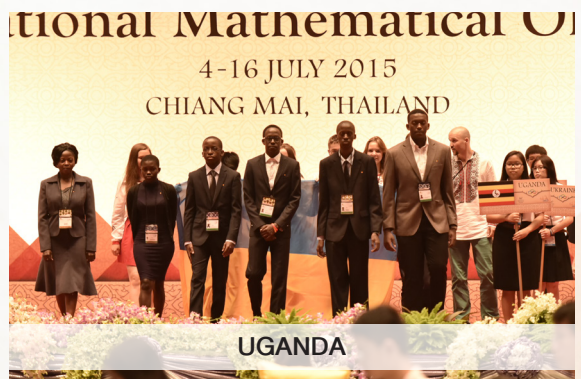
MONGOLIA











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UKRAINE

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UNITED KINGDOM

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UNITED STATES OF AMERICA

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URUGUAY



UZBEKISTAN

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VENEZUELA

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CHIANG MAI, THAILAND



VIETNAM

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THAILAND

TEAMS

Albania

Leader : Adrian Naço

Deputy : Fatos Kopliku

Contestant : Alboreno Voci, Gledis Kallço,
Endi Reka, Euxhen Hasanaj, Fjona Parllaku,
Ana Peçini

Observer A : Enkel Hysnelaj

Algeria

Leader : Abed-Seddik Bouchoucha

Deputy : Ali Atia

Contestant : Abdelmoukasit Sagueni, Souheib
Abdeldjalil Allout, Fayssal Saadi, Houssam Eddine
Boukhecham, Ilyes Hamdi, Yassine Hamdi

Argentina

Leader : Patricia Fauring

Deputy : Martín Mereb

Contestant : Agustín Marchionna, Lucas de
Amorin, Brian Pablo Morris Esquivel, Juan José
Pérez Guerra, Lisandro Filloy, Carla Crucianelli

Armenia

Leader : Tigran Margaryan

Deputy : Smbat Gogyan

Contestant : Grigor Keropyan, Hakob Tamazyan,
Albert Gevorgyan, Arsen Hambardzumyan,
Narek Khandanyan, Sergey Nersisyan

Australia

Leader : Angelo Di Pasquale

Deputy : Andrew Elvey Price

Contestant : Alexander Gunning, Ilia Kucherov,
Seyoon Ragavan, Yang Song, Kevin Xian,
Jeremy Yip

Observer A : Jo Cockwill, Mike Clapper

Observer C : Maaye Ragavan, Kumuthini
Ragavan, Sivagurunathan Ragavan

Austria

Leader : Robert Geretschläger

Deputy : Heinrich Josef Gstöttner

Contestant : Florian Fürnsinn, Josef Greilhuber,
Levi Haunschmid, Miklós Zsigmond Horváth,
Bruno Perreaux, Matthias Reich-Rohrwig

Azerbaijan

Leader : Fuad Garayev

Deputy : Elvin Mammadov

Contestant : Hasanli Farid, Mahammad Shirinov,
Mirali Ahmadli, Anar Huseynov, Tahir Nadirov,
Farman Dumanov

Observer A : Emin Amrullayev

Bangladesh

Leader : Mahbulul Alam Majumdar

Deputy : A A Munir Hasan

Contestant : Asif E Elahi, Adib Hasan,
Md Sanzeed Anwar, Sazid Akhter Turzo,
Md Sabbir Rahman, S M Nayeemul Islam

Belarus

Leader : Igor Voronovich

Deputy : Sergei Mazanik

Contestant : Andrei Asanau, Yahor Dubovik,
Aleksey Gaponenko, Yahor Laurenau, Valentin
Vityaz, Dmitry Voynov

Belgium

Leader : Bart Windels

Deputy : Philippe Niederkorn

Contestant : Wouter Andriessen, Simon
Roelandt, Art Waeterschoot, Corentin Bodart,
Pablo Bustillo Vazquez, Savinien Kreczman

Observer A : Ria Van Huffel

Bolivia

Leader : Jimmy Santamaria Torrez

Contestant : Amanda Nicole Iglesias Pacheco,
Victor Alvaro Gutierrez Kaisler, Kevin Alcides Terán
Mejía, Sebastian Pereira Flores, Enzo Ellery Salinas
Jerez

Bosnia and Herzegovina

Leader : Dina Kamber

Deputy : Marko Ćitić

Contestant : Milica Đukić, Demir Papić,
Zlatko Salko Lagumdžija, Neira Kurtović, Adisa
Bolić, Mirza Arnaut

Observer B : Admir Beširević

Botswana

Leader : Mmoloki Lekhutille

Deputy : Mathews Masole

Contestant : Ga Ram Park, Kebafilwe
Joseph Loiti, Tinashe Olekantse, Bamebotlhe
John, Sparsh Gautam, Temana Boyce
Bakaabatsile**Brazil**

Leader : Luciano Guimarães Monteiro De Castro

Deputy : Carlos Yuzo Shine

Contestant : Murilo Corato Zanarella, Pedro
Henrique Sacramento de Oliveira, Daniel Lima
Braga, Gabriel Toneatti Vercelli, João César
Campos Vargas, Rafael Filipe Dos Santos

Observer A : Edmilson Luis Rodrigues Motta

Observer B : Nelly Cristina Carvajal Flórez

Bulgaria

Leader : Peter Boyvalenkov

Deputy : Emil Kolev

Contestant : Lyuben Lichev, Denitsa Markova,
Aleksandar Cherganski, Violeta Naydenova,
Emiliyan Rogachev, Alexander Tenev**Cambodia**

Leader : Lin Sok

Deputy : Sovann Suon

Contestant : Mengsay Loem, David Taingngin,
Malineth Chea, Sophearak Choeng, Someta Sor,
Sereysopea Ung**Canada**

Leader : Jacob Tsimmerman

Deputy : Lindsey Shorser

Contestant : Yan (Bill) Huang, Michael Pang,
Zhuo Qun (Alex) Song, Kevin Sun, Alexander
Whatley, Jinhao (Hunter) Xu

Observer B : James Rickards

Chile

Leader : Hernan Burgos

Deputy : Víctor Cortes

Contestant : Nicolas Vilches, Marcelo Bernal

Observer B : Jorge Bernal

Colombia

Leader : María Elizabeth Losada

Deputy : Esteban González

Contestant : Daniel Cáceres, Juan Sebastian
Díaz, Nicolás De La Hoz, Pablo González,
Oscar Gómez, Jesús Caballero

Observer A : Isabella Mijares

Costa Rica

Leader : Luis Gómez

Deputy : Oscar Zamora Luna

Contestant : Daniel León Jiménez, Marco
Antonio Cabrera Aguilar, Kevin Gabriel Coto Mora,
Erick Arturo Cortés Gutiérrez, Marianne De
Bedout Mora, José Armando Chacón Rodríguez**Croatia**

Leader : Matija Bašić

Deputy : Kristina Ana Škreb

Contestant : Adrian Beker, Ivan Lazarić,
Lukas Novak, Petar Orlić, Daniel Paleka,
Kristijan Štefanec**Cuba**

Leader : Eduardo Miguel Pérez Almarales

Contestant : Humberto Riverón Valdés

Cyprus

Leader : Dimitrios Karantanos

Deputy : Theoklitos Paragiou

Contestant : Andreas Stavrou, Marios Voskou,
Stelios Stylianou, Angelos Pelecanos, Andreas
Economou, Christodoulos Chatzimiltis**Czech Republic**

Leader : Karel Horak

Deputy : Michal Rolínek

Contestant : Vojtěch Dvořák, Matěj Konečný,
Marian Poljak, Jan Soukup, Radovan Švarc,
Pavel Turek

Democratic People's Republic of Korea

Leader : Yong Chol Ham
Deputy : Ryong Gol Yom
Contestant : Songyong Choe, Il Myong Ri,
Jong Yol Ri, Song Hyok Kang, Myonghyok Ri,
Kum Song Jon

Denmark

Leader : Kirsten Rosenkilde
Deputy : Asbjørn Christian Nordentoft
Contestant : Alexander Mangulad Christgau,
Matias Frank Jensen, Emil Skovgaard Lund,
Eigil Fjeldgren Rischel, Stine Valgreen,
Mads Bach Villadsen

Ecuador

Leader : Julio Rivera
Deputy : Alfredo Sánchez
Contestant : Anthony Flores, Paolo Cuéllar,
Lisette Maingon, Sebastián Regalado,
Valerie Bustos, Joseph Tapia

El Salvador

Leader : Ernesto Americo Hidalgo Castellanos
Deputy : Jeanette Alejandra Fernández Rivera
Contestant : Rodrigo Alberto Vasquez
Posada, Gabriel Emiliano Carranza Menjivar,
Dennis Joaquin Diaz Diaz, Salvador Alonso
Figueroa Vasquez

Estonia

Leader : Urve Kangro
Deputy : Oleg Košik
Contestant : Joonas Kalda, Richard Luhtaru,
Oliver Nisumaa, Simmo Saan, Andres Unt,
Triinu Veeorg

Finland

Leader : Matti Lehtinen
Deputy : Joni Teräväinen
Contestant : Ella Anttila, Juuso Heinonen,
Tuukka Korhonen, Iiro Kumpulainen,
Kalle Luopajarvi, Ella Tamir
Observer A : Maisa Spangar

France

Leader : Pierre Bornsstein
Deputy : Vincent Jugé
Contestant : Vincent Bouis, Félix Breton, Colin
Davallo, Adrien Lemerrier, Florent Noisette,
Julien Portier

Georgia

Leader : George Chelidze
Deputy : Givi Nadibaidze
Contestant : Zauri Meshveliani, Alexandre
Saatashvili, Giorgi Khosroshvili, Davit Bezhnashvili,
Giorgi Kidiashvili, Saba Dzmanashvili
Observer B : Ushangi Goginava

Germany

Leader : Jürgen Prestin
Deputy : Eric Müller
Contestant : Christian Bernert, Nicolas Köcher,
Sebastian Meyer, Adrian Riekert, Jörn Stöhler,
Ferdinand Wagner

Ghana

Leader : Joel M. Dogoe
Deputy : Selorm Yao Ohene
Contestant : Alexander Bechtold, Nuneke Fafa
Esi Kwetey, Senyo Kofi Edzeani Ohene,
Nii Aryee Aryeetey, Kapila Kommareddy

Greece

Leader : Anargyros Fellouris
Deputy : Evangelos Zotos
Contestant : Christos Nestor Chachamis,
Panagiota Karatza, Dimitrios Chrysovalantis
Melas, Panagiotis Misiakos, Petros Ntounis,
Apostolos Panagiotopoulos

Hong Kong

Leader : Ka Ho Law
Deputy : Chi Hong Chow
Contestant : Wai Lam Cheung, Man Yi Kwok,
Shun Ming Samuel Lee, Kam Chuen Tung,
John Michael Wu, Hoi Wai Yu
Observer A : Pak Leung Lee, Kar Ping Shum,
Lee Hing Cheung, Mi Yine Wei,
Philly Suk Yee Ching
Observer B : Yang Wang, Wing Lung Lee,
Sze Wan Emily Sum,
Kwan Yuk Tsui, Kwong Chiu Mui,
Kar Yan Tam, Kin Tak Leung, Chun Yue Lee

Hungary

Leader : József Pelikán

Deputy : Sándor Dobos

Contestant : Zsuzsanna Baran, Márk Di Giovanni,
Zsombor Fehér, Barnabás Janzer, Barnabás
Szabó, Kada Williams**Iceland**

Leader : Marteinn Pór Harðarson

Deputy : Jóhanna Katrín Eggertsdóttir

Contestant : Garðar Andri Sigurðsson,
Dagur Tómas Ásgeirsson, Hjalti Pór Ísleifsson,
Jóhann Ólafur Sveinbjarnarson, Atli Fannar
Franklín, Elvar Wang Atlason**India**

Leader : Chudamani Pranesachar

Deputy : Rajendra Pawale

Contestant : Soumik Ghosh, Sagnik Majumder,
Jeet Mohapatra, Anant Mudgal, Shourya Pandey,
Pranjal Warade

Observer A : Prithwijit De

Observer B : Ranganathan Kalpathy Natarajan

Indonesia

Leader : Aleams Barra

Deputy : Budi Surodjo

Contestant : Jonathan Mulyawan Woenardi,
Erlang Wiratama Surya, Henry Jayakusuma,
Adi Suryanata Herwana, Herbert Ilhan Tanujaya,
Rezky Arizaputra

Observer A : Rudi Adha Prihandoko

Observer B : Hery Susanto

Ireland

Leader : Mark Flanagan

Deputy : Gordon Lessells

Contestant : Luke Gardiner, Paul Clarke,
Oisín Flynn-Connolly, Anna Mustata,
Ioana Grigoras, Robert Sparkes**Islamic Republic of Iran**

Leader : Erfan Salavati

Deputy : Kasra Alishahi

Contestant : Amin Behjati, Ali Daeinaby, Farbod
Ekbatani, Aria Halavati, Ali Sayadi,
Mojtaba Zareh Bidaki

Observer A : Roohallah Mahkam

Observer B : Morteza Saghafian

Observer C : Jahangir Nasirizarandi

Israel

Leader : Dan Carmon

Deputy : Amos Onn

Contestant : Aviel Boag, Yaron Brodsky, Boaz
Guberman, Liam Hanany, Dor Mezer, Dor
Shmoish

Observer A : Amotz Oppenheim

Observer B : Guy Raveh

Italy

Leader : Roberto Dvornicich

Deputy : Ludovico Pernazza

Contestant : Alberto Alfarano, Francesco Ballini,
Nikita Deniskin, Luca Macchiaroli, Francesco Sala,
Riccardo Zanutto

Observer A : Massimo Gobbino

Japan

Leader : Takahiko Fujita

Deputy : Yasuharu Asai

Contestant : Ko Aoki, Takuya Inoue, Kazuki
Matoya, Yuki Saeki, Hirotomo Shinoki,
Yuta TakayaObserver A : Takuma Kitamura, Hiroki Komatsu,
Ryu Minegishi

Observer B : Keiko Tasaki

Kazakhstan

Leader : Damir Yeliussizov

Deputy : Anton Vassilyev

Contestant : Akhan Ismailov, Olzhas
Kadyrakunov, Alexandr Shakiyev,
Alen Abdrakhmanov, Temirlan Amangeldin,
Daniyar Abesbek**Kosovo**

Leader : Ramadan Limani

Deputy : Güven Gokceoglu

Contestant : Besart Kodraliu, Arbër Avdullahu,
Albert Hoxha, Doruntina Sylejmani, Arbër Igrishta,
Liron Morina**Kyrgyzstan**

Leader : Saltanat Saparalieva

Deputy : Asel Abdylidaeva

Contestant : Murat Kubanychbekov, Kanybek
Asanbekov, Arstan Ashyrbekov, Zhakshylyk
Nurlanov, Danil Koshuev, Zhanatbek Zheenbaev

Latvia

Leader : Jevgēnijs Vihrovs
Deputy : Juris Škuškovniks
Contestant : Deniss Dunaveckis, Aleksejs Zajakins, Annija Varkale, Aleksejs Popovs, Artūrs Banga, Jēkabs Mežinskis

Liechtenstein

Leader : Alain Rossier
Deputy : Jana Cslovjecsek
Contestant : Robert Meier

Lithuania

Leader : Artūras Dubickas
Deputy : Romualdas Kašuba
Contestant : Paulius Ašvydis, Pol Maksim Bovarov, Domantas Jadenkus, Deividas Morkūnas, Andrius Ovsianas, Jonas Pukšta

Luxembourg

Leader : Charles Leytem
Deputy : Mike Dostert
Contestant : Tara Trauthwein, Oliver Nick

Macau

Leader : Ieng Tak Leong
Deputy : Lung Yam Wan
Contestant : Hou Tin Chau, Pui Chun Ng, Cho Hou Tang, Hou Leong Sio, Leong Kit Wong, Jia De Liu

Malaysia

Leader : M. Suhaimi Ramly
Deputy : Nor Sakinah Mohamad
Contestant : Hanissa Shamsuddin, Ivan Chan Kai Chin, Sean Gee Zhing, Tan Kin Aun, Theam Wing Chun, Yeoh Zi Song
Observer A : Irwan Iqbal Ihsanuddin

Mexico

Leader : Leonardo Ignacio Martínez Sandoval
Deputy : Rogelio Valdez Delgado
Contestant : Juan Carlos Ortiz Rhoton, Kevin William Beuchot Castellanos, Luis Xavier Ramos Tormo, Leonardo Ariel García Morán, Pablo Meré Hidalgo, Antonio López Guzmán
Observer B : Luis Eduardo García Hernández

Mongolia

Leader : Bayarmagnai Gombodorj
Deputy : Otgonbayar Uuye
Contestant : Bodrol Olonbaatar, Erdenebayar Bayarmagnai, Bayarjavkhlan Ganbold, Purev Batdelger, Amarsanaa Ganbaatar, Zolbayar Shagdar

Montenegro

Leader : Žana Kovijanić-Vukićević
Deputy : Gojko Jelovac
Contestant : Ognjen Djukovic, Andjela Markovic, Nikola Raicevic

Morocco

Leader : Mohamed Berraho
Deputy : Abdellatif Zerouale
Contestant : Ali Baouan, Yassine El Kaoui, Mouad Moutaoukil, Zouhair Ziani, Anass El Idrissi, Abdellah Aznag
Observer A : Mohamed Akki
Observer B : Hassan Asensouyis

Netherlands

Leader : Quintijn Puite
Deputy : Birgit van Dalen
Contestant : Eva van Ammers, Dirk van Bree, Tim Brouwer, Yuhui Cheng, Mike Daas, Bob Zwetsloot
Observer B : Merlijn Staps
Observer C : Levi van de Pol

New Zealand

Leader : Chris Tuffley
Deputy : Malcolm Granville
Contestant : Prince Michael Balanay, George Han, Miles Yee-Cheng Lee, Martin Anjie Luk, Kevin Shen, Xuzhi Zhang
Observer C : May (Jinghua) Meng

Nicaragua

Leader : Nelson Miranda
Contestant : Mauricio Rodríguez, Josué Hernández, Jafet Alejandro Baca

Nigeria

Leader : Adewale Roland Tunde Solarin

Deputy : Pius Aje Onah

Contestant : Princewill Chukwuemeka Okoroafor,

Akanimoh Boniface Udombeh, Mmesomachi

Nwchukwu, Fabian Chibuike Okafor, Sekinat

Ajoge Yahaya, Yusuf Olayinka Atolagbe

Observer A : Yunus Esencayi, Olusola Adeniran,

Daniel Chukwudi Isaac

Observer B : Aina Benjamin Olorunmaye

Observer C : Esosa Victoria Egharevah

Norway

Leader : Dávid Kunszenti-Kovács

Deputy : Johannes Kleppe

Contestant : Johan Sokrates Wind, Kari Lovise

Lodsby, Birk Ramberg, Håkon Flatval, Bruno

Kacper Mlodozieniec, Aleksander Dash

Observer C : Knut Iver Molden Lodsby

Pakistan

Leader : Sarfraz Ahmad

Deputy : Sana Javed

Contestant : Awais Muhammad Chishti,

Muhammad Daniyal Ali, Haris Bin Zahid, Merwa

Tariq, Muhammad Muneeb Afzal, Maaz

Mohammad Siddiqui

Observer A : Mohammad Jamil

Panama

Leader : Jaime Gutierrez

Contestant : Manuel Liu Ng, Andres Fabrega,

Daniel Enrique Watson Amado

Paraguay

Leader : Marcos Martínez Sugastti

Deputy : Ariel Schwartzman Cohenca

Contestant : Roberto Daniel Filizzola Ortiz, Elvis

Alexander Agüero Vera, Marcos Rubén Zárate

Gamarra, Antonio Nicolás Riera Zacarías,

Gerardo Sigfredo Fisch Paredes, Gerardo Iván

Piris Tillner

People's Republic of China

Leader : Bin Xiong

Deputy : Qiusheng Li

Contestant : Jiyang Gao, Jiafan He, Chenjie Yu,

Changzhi Xie, Nuozhou Wang, Zheng Wang

Observer A : Zhenhua Qu

Observer B : Yijie He

Peru

Leader : Jesús Zapata Samanez

Deputy : Jorge Tipe Villanueva

Contestant : Christian Omar Altamirano Modesto,

Jimmy Espinoza Palacios, Henry Felén Chávez,

Raul Alfredo Alcántara Castillo, Jemisson Coronel

Baldeón, Diego Martín Vigo Cadenillas

Philippines

Leader : Jose Ernie Lope

Deputy : Louie John Vallejo

Contestant : Clyde Wesley Ang, Kyle Patrick

Dulay, Raymond Joseph Fadri, Albert John

Patupat, Adrian Reginald Sy, Farrell Eldrian Wu

Observer A : Richard Eden

Poland

Leader : Michał Pilipczuk

Deputy : Andrzej Grzesik

Contestant : Adam Klukowski, Mikołaj Leonarski,

Konrad Jan Paluszczek, Piotr Pawlak, Paweł Piwek,

Mariusz Trela

Observer C : Beata Kwizdińska-Pawlak

Portugal

Leader : António Salgueiro

Deputy : Joana Teles

Contestant : Bruno Dias da Costa Carvalho,

Francisco Tuna de Andrade, Henrique Rui Neves

Aguiar, Henrique Miguel de Andrade Campos

Navas, Henrique Cravo Esteves Dos Santos,

Nuno Miguel Arala Santos

Puerto Rico

Leader : Luis Fernando Cáceres Duque

Deputy : Omar Colón Reyes

Contestant : Francisco Proskauer Valerio,

Gabriela Mari Carrion Rivera, Alejandro Miguel

Proskauer Valerio

Republic of Korea

Leader : Yongjin Song

Deputy : Bo-Hae Im

Contestant : Sehun Kim, Jaehyung Kim,

Chaewon Kim, Youseong Lee, Junghun Ju,

Jaewon Choi

Observer A : Seunghun Yi

Observer B : Sang Ho Son, Suyoung Choi,

Jaeeun Shin, Yeon Goo Choi, Sung Jin Park

Republic of Moldova

Leader : Valeriu Guțu

Deputy : Valeriu Baltag

Contestant : Valeriu Cojocari, Vladimir Cucu,
Daniel Griza, Dionisie Nipomici, Cezar Port,
Mihail Țarigradschi

Romania

Leader : Radu Gologan

Deputy : Cătălin Liviu Gherghe

Contestant : Ștefan Spătaru, Marius-Ioan Bocanu,
Teodor Andrei Andronache, Simona Diaconu,
Andrei-Bogdan Puiu, Ciprian-Mircea Bonciocat
Observer A : Mihail Bălună

Russian Federation

Leader : Nazar Agakhanov

Deputy : Dmitry Tereshin

Contestant : Ivan Bochkov, Ivan Frolov, Nikita
Gladkov, Alexander Kuznetsov, Ruslan Salimov,
Aleksandr Zimin

Observer A : Pavel Kozhevnikov

Observer B : Maxim Pratushevich

Saudi Arabia

Leader : Fawzi Al-Thukair

Deputy : Abdulrahman Alguwaizani

Contestant : Alhamzah Alnufaili, Alzubair
Habibullah, Ammar Alqatari, Omar Alrabiah,
Salman Saleh, Shaden Alshammari

Observer A : Malik Talbi, Sultan Albarakati

Observer B : Abdulrahman Albarak

Observer C : Modi Alshammari

Serbia

Leader : Dušan Đukić

Deputy : Marko Radovanović

Contestant : Marijana Vujadinović, Ognjen Tošić,
Ivan Damjanović, Aleksa Milojević, Aleksa
Konstantinov, Andela Šarković

Observer B : Miloš Milosavljević

Observer C : Vlasta Damjanović

Singapore

Leader : Yan Loi Wong

Deputy : Teck Kian Teo

Contestant : Kewei David Lin, Dylan Shan Hong
Toh, Yijia Liu, Zhao Yu Ma, Sheldon Kieren Tan,
Siah Yong Tan

Observer A : Tiong Seng Tay

Observer B : Yan Sheng Ang, Jun Jie Joseph
Kuan, Chan Lye Lee

Slovakia

Leader : Peter Novotný

Deputy : Tomáš Jurík

Contestant : Patrik Bak, Eduard Batmendiin,
Truc Lam Bui, Tomáš Kekeňák, Zhen Ning David
Liu, Samuel Sládek

Slovenia

Leader : Gregor Dolinar

Deputy : Matej Aleksandrov

Contestant : Amadej Kristjan Kocbek, Luka
Lodrant, David Popović, Jakob Jurij Snoj,
Lenart Treven, Domen Vreš

South Africa

Leader : Dirk Basson

Deputy : Melissa Kistner

Contestant : David Neal Broodryk, Nicholas
Kroon, Andrew McGregor, Yaseen Mowzer,
Sanjiv Ranchod, Bronson Rudner

Observer A : John Webb

Spain

Leader : María Gaspar

Deputy : Marco Castrillón

Contestant : Gonzalo Cao, Luis Crespo,
Jesús Dueñas, Cesc Folch, Berta García, Ismael
Sierra

Sri Lanka

Leader : Dayal Buddhika Dharmasena

Deputy : Thameera Priyadarshi Senanayaka

Contestant : Ruwimal Yasantha Pathiraja, Shenal
Santhush Kotuwewatta, Charuka Nishala
Kulathunga Bandara Herath Mudiyansele,
Mohamed Afham Mohamed Aflal, Wijelath
Mohotalage Don Sandil Sandipa Ranasinghe,
Samitha Yohan Abeysinghe Wijepala Abeysinghe
Mudiyansele

Sweden

Leader : Paul Vaderlind

Deputy : Victor Ufnarovski

Contestant : Martin Hesselborn, Malte Larsson,
Lisa Lokteva, David Wärm, Tianfang Zhang,
Lars Åström**Switzerland**

Leader : Clemens Pohle

Deputy : Dimitri Wyss

Contestant : Horace Chaix, Fabian Jin, David
Rusch, Daniel Peter Rutschmann, Stefanie
Zbinden, Henning Zhang**Syria**

Leader : Abdullatif Hanano

Deputy : Imad Fattash

Contestant : Mustafa Khalil, Muhammad Hanino,
Ghaith Alzouhaili, Sami Rahmeh, Mohamad
Mohamad, Yazan Alnasr**Taiwan**

Leader : Shou-Jen Hsiao

Deputy : John Meng Kai Hong

Contestant : Tien-Chun Cheng, Yu-Pin Chiu,
Calvin Shao-Huai Hsu, Wei-Jiun Kao, Tai-Ning Liao,
Pang-Cheng Wu

Observer A : Yen-Chi Roger Lin

Observer B : Kai Wang, Cheng-Der Fuh

Tajikistan

Leader : Umed Karimov

Deputy : Mirzobedil Jamolzoda

Contestant : Sobirdzhon Bobiev, Farrukh
Karimov, Kalomidin Klychev, Iyomiddin Boltaev,
Mekhron Bobokhonov**Tanzania**

Leader : Ertugrul Tarhan

Contestant : Bilal Ayoub Mrisho, Awadhi Miraji
Simba, Abdulrazaq Yusuf Abdallah**Thailand**

Leader : Wicharn Lewkeeratiyutkul

Deputy : Utsanee Leerawat

Contestant : Thee Ngamsangrat, Sivakorn
Sanguanmoo, Suchan Vivatsethachai, Thatchanok
Khampitak, Pachara Savettamalya, Wichaphon
AkarasereenontObserver A : Chatchawan Panraksa, Aram
Tangboonduangjit, Sujin KhomrutaiObserver B : Nuanchan Ritkham, Thotsaporn
Thanatipanonda, Khamron Mekchay, Keng
Wiboonton**The former Yugoslav Republic of Macedonia**

Leader : Vesna Manova-Erakovikj

Deputy : Alekso Malcheski

Contestant : Andrej Ilievski, Stefan Nikoloski,
Sanja Simonovikj, Andrej Ivanov, Nikola
Grunchevski, Bozidar Stevanoski**Trinidad and Tobago**

Leader : Indra Haraksingh

Deputy : Jagdesh Ramnanan

Contestant : Prasanna Ramakrishnan, Alex
Navarro, Arjun Isa Mohammed, Adam Scott Darryl
Superville**Tunisia**

Deputy : Ali Rahmouni

Contestant : Houcine Ben Daly, Omar Mohamed
Fadhel, Zouhaier Ferchiou, Mahdi Labidi**Turkey**

Leader : Azer Kerimov

Deputy : Şahin Emrah

Contestant : Feyza Duman, Halil İbrahim Güllük,
Ahmet İleri, Ahmet Abdullah Keleş, Muhammet
Furkan Merdan, Ali Haydar Sever

Observer A : Melih Üçer

Observer B : Müjdat Engin

Turkmenistan

Leader : Annamurat Gundogdyev

Deputy : Orazmammet Annaorazov

Contestant : Alshir Soyunjov, Dovlet Oviyagulyyev,
Dovran Nurgeldiyev, Perman Iljanov, Bazarbay
Halmedov, Murat Chashemov

Uganda

Leader : Jasper Okello

Deputy : Assumpta Kasamba Namuddu

Contestant : Isaac Owomugisha, Andrew

Tugume, Tevin Rwamahe, Claire Martha

Kusemererwa, Samson Byakika Rweinaga

Observer B : Mustafa Ekizoglu

Ukraine

Leader : Bogdan Rublov

Deputy : Andrii Pankov

Contestant : Anastasiia Alokchina, Sofiia Dubova,

Nataliia Khotiaintseva, Dinh Thanh Phong Vo,

Denys Smirnov, Anton Trygub

Observer A : Oleksandr Rudenko, Vitalii Lishunov

Observer B : Andrii Anikushyn

United Kingdom

Leader : Geoff Smith

Deputy : Dominic Yeo

Contestant : Joe Benton, Lawrence Hollom,

Samuel Kittle, Warren Li, Neel Nanda, Harvey Yau

Observer C : Jill Parker

United States of America

Leader : Po-Shen Loh

Deputy : John Berman

Contestant : Ryan Alweiss, Michael Kural, Allen

Liu, Yang Liu, Shyam Narayanan, David Stoner

Observer A : Mark Saul, Carol Saul, Alex Zhai

Uruguay

Leader : Ismael Valentín Rodríguez Brena

Deputy : Nicolás Uviedo Saavedra

Contestant : Maicol Denin Núñez Colman, Dino

Vincenzo Puppo Tito, Lucero Rodríguez Rubianes,

Rodrigo Schertz Cohen, Matías Gabriel Szykowski

Resnikow, Juan Ignacio Valero Villanueva

Uzbekistan

Leader : Shukhrat Ismailov

Deputy : Umid Rakhmonov

Contestant : Khurshid Juraev, Gayrat

Toshpulatov, Abbos Muhamedov, Jamshid

Yakshiev, Ruslanbek Ozodboev, Sardor Bazarbaev

Venezuela

Leader : Rafael Sánchez

Deputy : Sofía Taylor

Contestant : Rafael Aznar, Jose Tomas Guevara

Vietnam

Leader : Bá Khánh Trinh Lê

Deputy : Anh Vinh Lê

Contestant : Hải Đăng Nguyễn Tuấn, Việt Hà

Nguyễn Thị, Thế Hoàn Nguyễn, Huy Hoàng

Nguyễn, Anh Tài Hoàng, Xuân Trung Vũ

Observer A : Khắc Minh Nguyễn

Observer C : Phi Hùng Lê, Hoàng Hưng Đậu

Observing Countries

Afghanistan

Observer A : Onder Akkusi

Egypt

Observer B : Yasser Tawfik

Iraq

Observer A : Yusuf Zeybek, Yunus Kocatas

Kenya

Observer A : James Katende

RESULTS

TEAMS

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Albania									
Alboreno Voci	1	0	1	7	1	0	10	337	HM
Gledis Kallço	4	1	0	7	1	0	13	283	HM
Endi Reka	1	0	0	0	1	0	2	508	
Euxhen Hasanaj	1	0	0	7	1	0	9	365	HM
Fjona Parlaku	0	1	0	2	0	0	3	480	
Ana Peçini	0	0	0	0	0	0	0	553	
Algeria									
Abdelmoukasit Sagueni	4	0	0	1	1	0	6	431	
Souheib Abdeldjalil Allout	0	0	0	7	1	0	8	394	HM
Fayssal Saadi	5	1	0	7	1	0	14	257	B
Houssam Eddine Boukhecham	1	1	0	1	0	0	3	480	
Ilyes Hamdi	0	1	1	7	1	0	10	337	HM
Yassine Hamdi	7	3	1	7	1	0	19	118	S
Argentina									
Agustín Marchionna	4	1	0	7	1	0	13	283	HM
Lucas de Amorin	6	2	0	7	1	0	16	183	B
Brian Pablo Morris Esquivel	7	0	0	3	1	0	11	322	HM
Juan José Pérez Guerra	6	0	0	7	0	0	13	283	HM
Lisandro Filloy	7	1	0	3	1	0	12	307	HM
Carla Crucianelli	3	0	0	2	0	0	5	449	
Armenia									
Grigor Keropyan	7	0	1	7	3	0	18	140	B
Hakob Tamazyan	7	0	7	7	0	0	21	88	S
Albert Gevorgyan	7	1	0	7	1	0	16	183	B
Arsen Hambardzumyan	7	1	0	7	1	0	16	183	B
Narek Khandanyan	4	4	1	7	1	0	17	160	B
Sergey Nersisyan	7	1	0	7	1	0	16	183	B
Australia									
Alexander Gunning	7	6	7	7	2	7	36	4	G
Ilia Kuchеров	7	2	0	7	3	0	19	118	S
Seyoon Ragavan	7	7	1	7	7	0	29	19	G
Yang Song	7	2	1	7	3	0	20	101	S
Kevin Xian	7	3	1	7	3	0	21	88	S
Jeremy Yip	7	6	1	7	2	0	23	58	S
Austria									
Florian Fürsinn	1	0	0	2	0	0	3	480	
Josef Greilhuber	7	1	0	7	0	0	15	217	B
Levi Hauns Schmid	4	1	0	7	3	0	15	217	B
Miklós Zsigmond Horváth	7	0	0	2	0	0	9	365	HM
Bruno Perreux	7	0	0	7	0	0	14	257	B
Matthias Reich-Rohrwig	4	2	0	0	1	0	7	420	

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Azerbaijan									
Hasanli Farid	0	6	1	7	3	0	17	160	B
Mahammad Shirlinov	4	2	0	7	1	0	14	257	B
Mirali Ahmadli	1	0	0	7	1	0	9	365	HM
Anar Huseynov	3	1	0	7	1	0	12	307	HM
Tahir Nadirov	4	1	0	7	1	0	13	283	HM
Farman Dumanov	0	0	0	7	1	0	8	394	HM
Bangladesh									
Asif E Elahi	7	1	1	7	1	0	17	160	B
Adib Hasan	4	4	1	7	1	0	17	160	B
Md Sanzeed Anwar	7	0	0	7	7	0	21	88	S
Sazid Akhter Turzo	4	0	1	7	2	0	14	257	B
Md Sabbir Rahman	6	0	1	7	1	0	15	217	B
S M Nayeemul Islam	4	1	0	7	1	0	13	283	HM
Belarus									
Andrei Asanau	7	2	0	3	1	0	13	283	HM
Yahor Dubovik	7	3	0	7	1	0	18	140	B
Aleksey Gaponenko	7	0	0	7	1	0	15	217	B
Yahor Laurenau	0	0	0	7	1	0	8	394	HM
Valentin Vityaz	3	2	0	7	1	0	13	283	HM
Dmitry Voynov	7	0	2	7	1	0	17	160	B
Belgium									
Wouter Andriessen	7	0	0	2	1	0	10	337	HM
Simon Roelandt	3	1	0	2	0	0	6	431	
Art Waeterschoot	1	1	1	7	0	0	10	337	HM
Corentin Bodart	6	1	0	0	1	1	9	365	
Pablo Bustillo Vazquez	7	1	0	7	3	2	20	101	S
Savinien Kreczman	7	2	0	0	3	0	12	307	HM
Bolivia									
Amanda Nicole Iglesias Pacheco	0	1	0	0	0	0	1	532	
Victor Alvaro Gutierrez Kaisler	0	0	0	1	0	0	1	532	
Kevin Alcides Terán Mejía	0	0	0	2	0	0	2	508	
Sebastian Pereira Flores	1	0	0	0	0	0	1	532	
Enzo Ellery Salinas Jerez	0	0	0	0	0	0	0	553	
Bosnia and Herzegovina									
Milica Đukić	6	1	1	7	1	0	16	183	B
Demir Papić	0	0	1	7	1	0	9	365	HM
Zlatko Salko Lagumdžija	7	1	1	7	1	0	17	160	B
Neira Kurtović	4	1	0	7	1	0	13	283	HM
Adisa Bolić	3	0	0	7	1	0	11	322	HM
Mirza Arnaut	1	1	0	7	1	0	10	337	HM

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Botswana									
Ga Ram Park	0	0	0	0	0	0	553		
Kebafilwe Joseph Loiti	0	0	0	0	0	0	553		
Tinashe Olekantse	0	0	0	0	0	0	553		
Bamebothe John	0	0	0	0	0	0	553		
Sparsh Gautam	0	0	0	0	0	0	553		
Temana Boyce Bakaabatsile	0	0	0	1	0	1	532		
Brazil									
Murilo Corato Zanarella	7	1	0	7	3	1	19	118	S
Pedro Henrique Sacramento de Oliveira	7	1	1	7	4	2	22	76	S
Daniel Lima Braga	7	1	1	7	3	0	19	118	S
Gabriel Toneatti Vercelli	7	1	1	7	0	0	16	183	B
João César Campos Vargas	7	2	1	7	1	0	18	140	B
Rafael Filipe Dos Santos	3	1	1	7	3	0	15	217	B
Bulgaria									
Lyuben Lichev	7	3	7	7	1	0	25	40	S
Denitsa Markova	4	1	0	7	1	0	13	283	HM
Aleksandar Cherganski	7	1	1	7	0	2	18	140	B
Violeta Naydenova	7	6	1	7	1	0	22	76	S
Emiliyan Rogachev	4	2	0	2	1	0	9	365	
Alexander Tenev	7	0	0	2	1	3	13	283	HM
Cambodia									
Mengsay Loem	1	0	1	2	0	0	4	465	
David Taingngin	0	0	0	7	0	0	7	420	HM
Malineth Chea	0	0	0	2	0	0	2	508	
Sophearak Choeng	0	0	0	7	0	0	7	420	HM
Someta Sor	0	0	0	2	1	0	3	480	
Sereysopea Ung	0	0	0	0	1	0	1	532	
Canada									
Yan (Bill) Huang	4	1	0	7	5	1	18	140	B
Michael Pang	7	3	0	7	1	0	18	140	B
Zhuo Qun (Alex) Song	7	7	7	7	7	7	42	1	G
Kevin Sun	7	4	0	7	3	6	27	32	G
Alexander Whatley	7	2	0	7	2	0	18	140	B
Jinhao (Hunter) Xu	7	0	0	7	3	0	17	160	B
Chile									
Nicolas Vilches	1	1	0	7	0	0	9	365	HM
Marcelo Bernal	1	0	0	2	0	0	3	480	
Colombia									
Daniel Cáceres	7	0	1	7	0	1	16	183	B
Juan Sebastian Díaz	7	2	0	7	1	0	17	160	B
Nicolás De La Hoz	7	0	1	7	1	0	16	183	B
Pablo González	7	1	0	6	1	0	15	217	B
Oscar Gómez	1	0	0	4	0	0	5	449	
Jesús Caballero	3	0	0	0	0	0	3	480	

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Costa Rica									
Daniel León Jiménez	4	0	0	7	1	0	12	307	HM
Marco Antonio Cabrera Aguilar	0	0	0	7	1	0	8	394	HM
Kevin Gabriel Coto Mora	7	0	0	7	1	0	15	217	B
Erick Arturo Cortés Gutiérrez	1	0	0	2	0	0	3	480	
Marianne De Bedout Mora	0	0	0	0	0	0	0	553	
José Armando Chacón Rodríguez	6	1	0	7	1	0	15	217	B
Croatia									
Adrian Beker	7	7	1	7	7	0	29	19	G
Ivan Lazarić	7	1	0	7	1	0	16	183	B
Lukas Novak	1	2	0	4	1	0	8	394	
Petar Orlić	7	2	1	7	7	0	24	55	S
Daniel Paleka	7	2	1	7	3	0	20	101	S
Kristijan Štefanec	7	4	1	7	3	0	22	76	S
Cuba									
Humberto Riverón Valdés	7	0	0	7	1	0	15	217	B
Cyprus									
Andreas Stavrou	7	1	4	7	3	0	22	76	S
Marios Voskou	4	0	0	2	3	0	9	365	
Stelios Stylianou	4	0	0	7	0	0	11	322	HM
Angelos Pelecanos	7	0	0	0	1	0	8	394	HM
Andreas Economou	1	0	0	2	0	0	3	480	
Christodoulos Chatzimiltis	4	0	0	0	1	0	5	449	
Czech Republic									
Vojtěch Dvořák	7	1	0	0	0	0	8	394	HM
Matěj Konečný	7	1	0	2	1	0	11	322	HM
Marian Poljak	6	0	0	7	1	0	14	257	B
Jan Soukup	7	0	0	1	1	0	9	365	HM
Radovan Švarc	4	1	0	7	3	0	15	217	B
Pavel Turek	7	2	0	7	1	0	17	160	B
Democratic People's Republic of Korea									
Songyong Choe	7	2	1	7	1	5	23	58	S
Il Myong Ri	7	7	0	7	7	0	28	26	G
Jong Yol Ri	7	5	1	7	2	1	23	58	S
Song Hyok Kang	7	7	1	7	1	0	23	58	S
Myonghyok Ri	7	3	7	7	7	0	31	10	G
Kum Song Jon	7	1	7	7	4	2	28	26	G
Denmark									
Alexander Mangulad Christgau	1	0	0	2	0	0	3	480	
Matias Frank Jensen	0	1	0	0	1	0	2	508	
Emil Skovgaard Lund	4	0	0	0	0	0	4	465	
Egil Fieldgren Rischel	7	1	0	7	1	0	16	183	B
Stine Valgreen	4	0	0	7	1	0	12	307	HM
Mads Bach Villadsen	7	1	0	7	0	0	15	217	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Ecuador									
Anthony Flores	1	0	0	7	1	0	9	365	HM
Paolo Cuéllar	4	0	0	7	1	0	12	307	HM
Lisette Maingon	1	1	0	1	0	0	3	480	
Sebastián Regalado	1	1	0	0	0	0	2	508	
Valerie Bustos	0	0	0	0	0	0	0	553	
Joseph Tapia	0	0	0	1	0	0	1	532	
El Salvador									
Rodrigo Alberto Vasquez Posada	0	1	0	0	1	0	2	508	
Gabriel Emiliano Carranza Menjivar	1	0	1	1	2	0	5	449	
Dennis Joaquin Diaz Diaz	1	1	0	0	4	0	6	431	
Salvador Alonso Figueroa Vasquez	0	0	0	1	0	0	1	532	
Estonia									
Joonas Kalda	7	0	0	7	0	1	15	217	B
Richard Luhtaru	7	0	0	0	0	0	7	420	HM
Oliver Nisurmaa	7	1	0	0	1	0	9	365	HM
Simmo Saan	2	0	0	0	3	0	5	449	
Andres Unt	1	0	0	0	1	0	2	508	
Triinu Veeorg	4	0	0	7	2	0	13	283	HM
Finland									
Ella Anttila	3	0	0	0	0	0	3	480	
Juuso Heinonen	4	0	0	1	1	0	6	431	
Tuukka Korhonen	1	0	0	0	0	0	1	532	
Iiro Kumpulainen	1	0	0	0	0	0	1	532	
Kalle Luopajarvi	6	0	0	7	0	0	13	283	HM
Ella Tamir	2	0	0	0	0	0	2	508	
France									
Vincent Bouis	7	2	7	7	2	0	25	40	S
Félix Breton	7	0	0	7	1	3	18	140	B
Colin Davalo	7	1	0	7	3	0	18	140	B
Adrien Lemerrier	7	4	0	7	3	0	21	88	S
Florent Noisette	4	6	1	7	4	0	22	76	S
Julien Portier	4	3	0	6	3	0	16	183	B
Georgia									
Zauri Meshveliani	7	1	1	7	3	0	19	118	S
Alexandre Saatashvili	7	3	0	7	0	0	17	160	B
Giorgi Khosroshvili	7	0	0	7	0	0	14	257	B
Davit Bezhanishvili	4	0	0	0	1	0	5	449	
Giorgi Kldiashvili	5	0	0	7	2	0	14	257	B
Saba Dzmanashvili	1	2	0	7	1	0	11	322	HM
Germany									
Christian Bernert	7	3	1	7	3	0	21	88	S
Nicolas Köcher	1	0	0	1	1	3	6	431	
Sebastian Meyer	7	0	0	4	1	5	17	160	B
Adrian Riekert	7	7	1	7	3	0	25	40	S
Jörn Stöhler	7	3	0	7	0	0	17	160	B
Ferdinand Wagner	6	1	1	7	1	0	16	183	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Ghana									
Alexander Bechtold	1	0	0	2	0	0	3	480	
Nuneke Fafa Esi Kwetey	0	0	0	2	0	0	2	508	
Senyo Kofi Edzeani Ohene	0	0	0	0	0	0	0	553	
Nii Aryee Aryeetey	0	0	0	0	0	0	0	553	
Kapila Kommareddy	0	0	0	0	0	0	0	553	
Greece									
Christos Nestor Chachamis	4	0	0	7	3	0	14	257	B
Panagiota Karatza	1	0	0	2	0	0	3	480	
Dimitrios Chrysovalantis Melas	0	1	0	7	1	0	9	365	HM
Panagiotis Misiakos	6	1	0	7	1	0	15	217	B
Petros Ntounis	7	4	1	7	1	0	20	101	S
Apostolos Panagiotopoulos	1	1	0	7	1	0	10	337	HM
Hong Kong									
Wai Lam Cheung	6	5	0	0	3	0	14	257	B
Man Yi Kwok	7	0	1	7	3	0	18	140	B
Shun Ming Samuel Lee	7	1	0	7	1	0	16	183	B
Kam Chuen Tung	7	1	0	2	3	0	13	283	HM
John Michael Wu	7	2	0	7	4	0	20	101	S
Hoi Wai Yu	7	3	0	0	3	7	20	101	S
Hungary									
Zsuzsanna Baran	7	1	0	7	0	0	15	217	B
Márk Di Giovanni	7	1	1	3	1	1	14	257	B
Zsombor Fehér	7	1	1	7	1	4	21	88	S
Barnabás Janzer	7	1	0	7	1	0	16	183	B
Barnabás Szabó	7	6	1	7	1	0	22	76	S
Kada Williams	7	3	1	7	7	0	25	40	S
Iceland									
Garðar Andri Sigurðsson	7	1	0	2	0	0	10	337	HM
Dagur Tómas Ásgeirsson	6	0	0	7	0	0	13	283	HM
Hjalti Þór Ísleifsson	1	0	0	7	0	0	8	394	HM
Jóhann Ólafur Sveinbjarnarson	4	1	0	0	1	0	6	431	
Atli Fannar Franklín	1	0	0	2	0	0	3	480	
Elvar Wang Atlason	0	0	0	1	0	0	1	532	
India									
Soumik Ghosh	1	1	0	7	1	0	10	337	HM
Sagnik Majumder	7	1	1	2	1	0	12	307	HM
Jeet Mohapatra	7	7	1	7	1	0	23	58	S
Anant Mudgal	1	1	1	7	0	0	10	337	HM
Shourya Pandey	1	7	0	7	1	0	16	183	B
Pranjal Warade	0	6	1	7	1	0	15	217	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Indonesia									
Jonathan Mulyawan Woenardi	7	1	0	7	1	0	16	183	B
Erlang Wiratama Surya	7	1	0	7	1	0	16	183	B
Henry Jayakusuma	7	0	0	7	1	0	15	217	B
Adi Suryanata Herwana	7	2	1	7	3	0	20	101	S
Herbert Ilhan Tanujaya	4	0	0	7	3	0	14	257	B
Rezky Arizaputra	4	1	0	7	7	0	19	118	S
Ireland									
Luke Gardiner	1	1	0	1	0	0	3	480	
Paul Clarke	3	1	0	7	1	0	12	307	HM
Oisín Flynn-Connolly	7	0	0	0	2	0	9	365	HM
Anna Mustata	0	0	0	7	1	0	8	394	HM
Ioana Grigoras	1	0	0	3	0	0	4	465	
Robert Sparkes	0	0	0	1	0	0	1	532	
Islamic Republic of Iran									
Amin Behjati	7	1	7	7	3	0	25	40	S
Ali Daeinaby	5	2	2	7	1	0	17	160	B
Farbod Ekbatani	7	3	1	7	1	0	19	118	S
Aria Halavati	7	0	7	7	1	6	28	26	G
Ali Sayadi	7	5	7	7	3	0	29	19	G
Mojtaba Zareh Bidaki	7	3	7	7	3	0	27	32	G
Israel									
Aviel Boag	4	2	0	0	0	0	6	431	
Yaron Brodsky	7	1	0	0	2	0	10	337	HM
Boaz Guberman	7	0	2	0	1	0	10	337	HM
Liam Hanany	4	2	1	7	0	1	15	217	B
Dor Mezer	7	2	0	4	2	0	15	217	B
Dor Shmoish	7	7	2	7	4	0	27	32	G
Italy									
Alberto Alfarano	1	2	1	2	1	0	7	420	
Francesco Ballini	7	3	0	7	1	4	22	76	S
Nikita Deniskin	7	1	6	7	1	0	22	76	S
Luca Macchiaroli	2	3	1	3	3	0	12	307	
Francesco Sala	7	6	7	7	5	0	32	9	G
Riccardo Zanutto	3	1	0	0	1	0	5	449	
Japan									
Ko Aoki	7	2	4	7	1	0	21	88	S
Takuya Inoue	7	1	0	3	1	2	14	257	B
Kazuki Matoya	7	2	1	7	0	0	17	160	B
Yuki Saeki	7	2	1	7	3	0	20	101	S
Hiroto Shinoki	7	2	0	7	0	0	16	183	B
Yuta Takaya	7	2	2	7	3	0	21	88	S
Kazakhstan									
Akhan Ismailov	7	6	2	7	7	0	29	19	G
Olzhas Kadyrakunov	7	2	0	7	3	0	19	118	S
Alexandr Shakiyev	4	2	1	7	1	0	15	217	B
Alen Abdrakhmanov	7	0	0	7	3	0	17	160	B
Temirlan Amangeldin	4	1	0	7	1	0	13	283	HM
Daniyar Abesbek	1	3	0	7	1	0	12	307	HM

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Kosovo									
Besart Kodraliu	0	0	0	1	1	0	2	508	
Arbër Avdullahu	0	0	0	0	1	0	1	532	
Albert Hoxha	1	0	0	2	1	0	4	465	
Doruntina Sylejmani	4	1	0	7	1	0	13	283	HM
Arbër Igrishta	0	0	0	0	1	0	1	532	
Liron Morina	1	1	0	0	1	0	3	480	
Kyrgyzstan									
Murat Kubanychbekov	0	0	1	1	2	0	4	465	
Kanybek Asanbekov	1	0	0	2	0	0	3	480	
Arstan Ashyrbekov	0	1	0	0	0	0	1	532	
Zhakshylyk Nurlanov	0	1	0	2	0	0	3	480	
Danil Koshuev	0	0	0	0	0	0	0	533	
Zhanatbek Zheenbaev	0	0	0	6	0	0	6	431	
Latvia									
Deniss Dunaveckis	1	0	0	0	1	0	2	508	
Aleksejs Zajakins	7	0	0	0	1	0	8	394	HM
Annija Varkale	3	0	0	2	0	0	5	449	
Aleksejs Popovs	7	0	0	2	1	0	10	337	HM
Artūrs Banga	1	0	0	7	0	0	8	394	HM
Jēkabs Mežinskis	1	1	0	0	1	0	3	480	
Liechtenstein									
Robert Meier	7	2	0	7	2	0	18	140	B
Lithuania									
Paulius Ašvydis	4	1	0	1	0	0	6	431	
Pol Maksim Bovarov	4	0	0	0	1	0	5	449	
Domantas Jadenkus	5	1	0	0	0	0	6	431	
Deividas Morkūnas	6	0	0	2	1	0	9	365	
Andrius Ovsianas	7	0	0	7	1	0	15	217	B
Jonas Pukšta	4	1	0	7	1	0	13	283	HM
Luxembourg									
Tara Trauthwein	1	0	0	7	1	0	9	365	HM
Oliver Nick	1	0	0	2	0	0	3	480	
Macau									
Hou Tin Chau	7	1	0	7	7	0	22	76	S
Pui Chun Ng	1	1	1	7	3	0	13	283	HM
Cho Hou Tang	7	0	0	7	3	0	17	160	B
Hou Leong Sio	7	0	0	7	1	0	15	217	B
Leong Kit Wong	3	0	1	7	0	0	11	322	HM
Jia De Liu	1	0	1	7	1	0	10	337	HM
Malaysia									
Hanissa Shamsuddin	3	0	0	4	0	0	7	420	
Ivan Chan Kai Chin	6	1	1	7	1	0	16	183	B
Sean Gee Zhing	1	0	0	2	0	0	3	480	
Tan Kin Aun	4	0	0	7	3	0	14	257	B
Theam Wing Chun	7	0	0	3	0	0	10	337	HM
Yeoh Zi Song	7	1	0	7	1	0	16	183	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Mexico									
Juan Carlos Ortiz Rhoton	7	6	1	7	3	2	26	37	G
Kevin William Beuchot Castellanos	7	1	4	7	1	0	20	101	S
Luis Xavier Ramos Tormo	7	4	0	7	1	0	19	118	S
Leonardo Ariel García Morán	7	1	0	7	2	0	17	160	B
Pablo Meré Hidalgo	7	1	0	7	1	0	16	183	B
Antonio López Guzmán	7	1	0	7	1	0	16	183	B
Mongolia									
Bodrol Olonbaatar	7	1	0	7	1	0	16	183	B
Erdenebayar Bayarmagnai	4	0	1	7	3	0	15	217	B
Bayarjavkhan Ganbold	7	1	0	0	3	0	11	322	HM
Purev Batdelger	1	0	1	7	1	0	10	337	HM
Amarsanaa Ganbaatar	0	1	0	7	1	0	9	365	HM
Zolbayar Shagdar	4	1	0	7	1	0	13	283	HM
Montenegro									
Ognjen Djukovic	0	1	0	0	1	0	2	508	
Andjela Markovic	0	0	0	0	1	0	1	532	
Nikola Raicevic	7	1	0	7	1	0	16	183	B
Morocco									
Ali Baouan	2	0	0	7	2	0	11	322	HM
Yassine El Kaoui	3	0	0	2	0	0	5	449	
Mouad Moutaoukil	0	0	0	0	1	0	1	532	
Zouhair Ziani	0	0	0	0	3	0	3	480	
Anass El Idrissi	1	0	1	2	1	0	5	449	
Abdellah Aznag	0	1	0	0	1	0	2	508	
Netherlands									
Eva van Ammers	7	1	0	7	1	0	16	183	B
Dirk van Bree	6	0	0	2	2	0	10	337	
Tim Brouwer	7	1	0	2	1	0	11	322	HM
Yuhui Cheng	7	2	0	7	0	0	16	183	B
Mike Daas	1	1	0	4	0	0	6	431	
Bob Zwetsloot	7	2	0	7	1	0	17	160	B
New Zealand									
Prince Michael Balanay	1	0	0	7	1	0	9	365	HM
George Han	7	0	0	2	2	0	11	322	HM
Miles Yee-Cheng Lee	7	1	0	7	3	0	18	140	B
Martin Anjie Luk	1	0	0	7	1	0	9	365	HM
Kevin Shen	7	0	0	3	0	0	10	337	HM
Xuzhi Zhang	7	0	0	7	1	0	15	217	B
Nicaragua									
Mauricio Rodríguez	0	0	1	7	2	0	10	337	HM
Josué Hernández	0	1	0	7	0	0	8	394	HM
Jafet Alejandro Baca	1	0	0	7	0	0	8	394	HM

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Nigeria									
Princewill Chukwuemeka Okoroafor	3	1	0	0	2	0	6	431	
Akanimoh Boniface Udombek	0	0	0	7	0	0	7	420	HM
Mmesomachi Nwachukwu	0	0	1	7	0	0	8	394	HM
Fabian Chibuike Okafor	1	0	0	0	0	0	1	532	
Sekinat Ajoge Yahaya	0	0	0	0	0	0	0	553	
Yusuf Olayinka Atolagbe	0	0	0	0	0	0	0	553	
Norway									
Johan Sokrates Wind	6	3	0	7	4	0	20	101	S
Kari Lovise Lodsby	5	1	0	0	1	0	7	420	
Birk Ramberg	3	0	0	3	0	0	6	431	
Håkon Flatval	7	0	0	1	1	0	9	365	HM
Bruno Kacper Młodożeniec	7	0	0	3	0	0	10	337	HM
Aleksander Dash	1	0	0	0	1	0	2	508	
Pakistan									
Awais Muhammad Chisht	4	2	0	7	1	0	14	257	B
Muhammad Daniyal Ali	1	0	0	2	1	0	4	465	
Haris Bin Zahid	2	0	0	1	0	0	3	480	
Merwa Tariq	0	1	0	1	0	0	2	508	
Muhammad Muneeb Afzal	0	0	0	0	0	0	0	553	
Maaz Mohammad Siddiqui	0	0	0	2	0	0	2	508	
Panama									
Manuel Liu Ng	1	0	0	2	1	0	4	465	
Andres Fabrega	0	0	0	0	1	0	1	532	
Daniel Enrique Watson Amado	1	0	1	2	0	0	4	465	
Paraguay									
Roberto Daniel Filizzola Ortiz	4	2	0	7	1	0	14	257	B
Elvis Alexander Agüero Vera	7	0	0	7	1	0	15	217	B
Marcos Rubén Zárate Gamarra	1	1	0	2	0	0	4	465	
Antonio Nicolás Riera Zacarías	1	0	0	0	1	0	2	508	
Gerardo Sigfredo Fisch Paredes	7	1	0	7	1	0	16	183	B
Gerardo Iván Piris Tillner	0	0	0	2	0	0	2	508	B
People's Republic of China									
Jiayang Gao	7	7	1	7	1	7	30	17	G
Jiafan He	7	7	1	7	2	7	31	10	G
Chenjie Yu	7	7	7	7	7	6	41	2	G
Changzhi Xie	7	7	1	7	3	0	25	40	S
Nuozhou Wang	7	2	1	7	7	7	31	10	G
Zheng Wang	7	6	1	7	2	0	23	58	S

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Peru									
Christian Omar Altamirano Modesto	7	2	7	7	7	0	30	17	G
Jimmy Espinoza Palacios	7	3	0	7	3	0	20	101	S
Henry Felén Chávez	4	1	1	7	1	0	14	257	B
Raul Alfredo Alcántara Castillo	7	7	0	7	7	0	28	26	G
Jemisson Coronel Baldeón	7	2	1	7	4	0	21	88	S
Diego Martín Vigo Cadenillas	1	1	0	2	1	0	5	449	
Philippines									
Clyde Wesley Ang	7	1	1	7	3	0	19	118	S
Kyle Patrick Dulay	7	1	0	4	0	0	12	307	HM
Raymond Joseph Fadri	0	0	0	3	0	0	3	480	
Albert John Patupat	7	0	0	7	1	0	15	217	B
Adrian Reginald Sy	7	2	1	7	2	2	21	88	S
Farrell Eldrian Wu	7	2	0	7	1	0	17	160	B
Poland									
Adam Klukowski	7	7	7	7	3	0	31	10	G
Mikołaj Leonarski	4	1	7	7	1	0	20	101	S
Konrad Jan Paluszek	4	1	0	7	0	6	18	140	B
Piotr Pawlak	4	0	7	3	1	0	15	217	B
Paweł Piwek	7	0	0	7	1	0	15	217	B
Mariusz Trela	7	3	0	7	1	0	18	140	B
Portugal									
Bruno Carvalho	5	0	0	0	3	0	8	394	
Francisco Tuna de Andrade	7	0	0	7	0	0	14	257	B
Henrique Rui Neves Aguiar	5	1	1	7	1	0	15	217	B
Henrique Miguel de Andrade Campos Navas	1	1	0	0	3	0	5	449	
Henrique Santos	7	1	0	1	3	0	12	307	HM
Nuno Miguel Arala Santos	7	2	0	7	0	0	16	183	B
Puerto Rico									
Francisco Proskauer Valerio	7	0	0	7	0	0	14	257	B
Gabriela Mari Carrion Rivera	1	0	0	1	0	0	2	508	
Alejandro Miguel Proskauer Valerio	0	0	0	2	0	0	2	508	
Republic of Korea									
Sehun Kim	7	1	1	7	6	1	23	58	S
Jaehyung Kim	7	7	1	7	7	6	35	5	G
Chaewon Kim	7	2	1	7	1	0	18	140	B
Youseong Lee	7	0	1	7	1	2	18	140	B
Junghun Ju	7	5	7	7	7	7	40	3	G
Jaewon Choi	7	0	7	7	3	3	27	32	G

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Republic of Moldova									
Valeriu Cojocari	1	0	0	7	1	0	9	365	HM
Vladimir Cucu	6	1	0	7	1	0	15	217	B
Daniel Griza	7	0	0	1	1	0	9	365	HM
Dionisie Nipomici	7	0	1	7	3	0	18	140	B
Cezar Port	4	0	7	7	6	0	24	55	S
Mihail Țarigradschi	7	0	0	2	1	0	10	337	HM
Romania									
Ștefan Spătaru	7	2	2	7	3	0	21	88	S
Marius-Ioan Bocanu	7	5	1	7	3	0	23	58	S
Teodor Andrei Andronache	7	5	1	7	3	0	23	58	S
Simona Diaconu	5	7	1	7	7	0	27	32	G
Andrei-Bogdan Puiu	4	1	0	7	3	0	15	217	B
Ciprian-Mircea Bonciocat	7	1	7	7	1	0	23	58	S
Russian Federation									
Ivan Bochkov	7	2	1	7	1	7	25	40	S
Ivan Frolov	7	3	2	7	3	0	22	76	S
Nikita Gladkov	7	3	1	7	0	7	25	40	S
Alexander Kuznetsov	7	2	1	7	2	2	21	88	S
Ruslan Salimov	7	3	2	7	2	2	23	58	S
Aleksandr Zimin	7	6	1	7	1	3	25	40	S
Saudi Arabia									
Alhamzah Alnufaili	1	1	0	7	1	0	10	337	HM
Alzubair Habibullah	7	2	0	7	3	0	19	118	S
Ammar Alqatari	0	0	0	7	1	0	8	394	HM
Omar Alrabiah	4	2	1	7	1	0	15	217	B
Salman Saleh	6	1	0	7	1	0	15	217	B
Shaden Alshammari	7	0	0	4	3	0	14	257	B
Serbia									
Marijana Vujadinović	0	0	0	7	3	0	10	337	HM
Ognjen Tošić	7	2	1	6	1	0	17	160	B
Ivan Damjanović	7	1	0	7	3	0	18	140	B
Aleksa Milojević	7	1	0	1	1	0	10	337	HM
Aleksa Konstantinov	7	5	0	7	7	0	26	37	G
Andela Šarković	7	2	0	7	3	0	19	118	S
Singapore									
Kewei David Lin	4	2	7	7	3	2	25	40	S
Dylan Shan Hong Toh	7	2	1	7	3	0	20	101	S
Yijia Liu	7	3	0	7	1	0	18	140	B
Zhao Yu Ma	7	7	1	7	1	1	24	55	S
Sheldon Kieren Tan	7	7	1	7	7	0	29	19	G
Siah Yong Tan	7	5	0	7	2	2	23	58	S
Slovakia									
Patrik Bak	1	5	0	7	1	0	14	257	B
Eduard Batmendiijn	7	1	0	7	1	4	20	101	S
Truc Lam Bui	7	5	0	7	0	6	25	40	S
Tomáš Kekeňák	4	1	0	1	1	0	7	420	
Zhen Ning David Liu	7	1	0	7	1	0	16	183	B
Samuel Sládek	7	0	0	7	1	0	15	217	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Slovenia									
Amadej Kristjan Kocbek	4	1	0	0	0	0	5	449	
Luka Lodrant	4	0	0	2	1	0	7	420	
David Popović	7	0	0	7	0	0	14	257	B
Jakob Jurij Snoj	7	0	0	2	0	0	9	365	HM
Lenart Treven	4	0	0	1	0	0	5	449	
Domen Vreš	4	0	0	2	0	0	6	431	
South Africa									
David Neal Broodryk	5	1	0	2	2	2	12	307	
Nicholas Kroon	4	0	0	6	3	0	13	283	
Andrew Mc Gregor	0	0	0	7	1	0	8	394	HM
Yaseen Mowzer	7	1	0	7	1	0	16	183	B
Sanjiv Ranchod	4	0	0	4	0	0	8	394	
Bronson Rudner	7	2	0	1	1	0	11	322	HM
Spain									
Gonzalo Cao	7	1	0	3	0	0	11	322	HM
Luis Crespo	1	0	0	0	2	0	3	480	
Jesús Dueñas	1	0	0	3	0	0	4	465	
Cesc Folch	7	0	0	1	0	0	8	394	HM
Berta García	4	0	0	1	1	0	6	431	
Ismael Sierra	7	0	0	7	1	0	15	217	B
Sri Lanka									
Ruwimal Yasantha Pathiraja	3	0	0	7	1	0	11	322	HM
Shenal Santhush Kotuwewatta	6	0	0	2	1	0	9	365	
Charuka Nishala Kulathunga Bandara Herath Mudiyansele	1	0	0	7	0	0	8	394	HM
Mohamed Afham Mohamed Afal	3	0	0	7	1	0	11	322	HM
Wijelath Mohotalage Don Sandil Sandipa Ranasinghe	1	0	0	0	1	0	2	508	
Samitha Yohan Abeysinghe Wijepala Abeysinghe Mudiyansele	1	0	1	7	1	0	10	337	HM
Sweden									
Martin Hesselborn	7	0	0	1	1	0	9	365	HM
Malte Larsson	7	0	0	7	1	0	15	217	B
Lisa Lokteva	4	0	1	2	1	0	8	394	
David Wärm	7	0	0	1	1	0	9	365	HM
Tianfang Zhang	7	0	0	7	1	0	15	217	B
Lars Åström	4	2	0	0	1	0	7	420	
Switzerland									
Horace Chaix	7	0	0	7	1	0	15	217	B
Fabian Jin	3	0	0	0	3	0	6	431	
David Rusch	7	1	0	2	0	0	10	337	HM
Daniel Peter Rutschmann	7	1	0	7	1	0	16	183	B
Stefanie Zbinden	7	2	0	2	1	0	12	307	HM
Henning Zhang	7	0	0	7	1	0	15	217	B

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Syria									
Mustafa Khalil	1	0	0	7	2	0	10	337	HM
Muhammad Hanino	4	2	0	7	1	0	14	257	B
Ghaith Alzouhaili	5	0	0	7	1	0	13	283	HM
Sami Rahmeh	7	1	1	7	3	0	19	118	S
Mohamad Mohamad	0	1	0	4	0	0	5	449	
Yazan Alnasr	0	0	0	7	1	0	8	394	HM
Taiwan									
Tien-Chun Cheng	7	3	1	6	1	5	23	58	S
Yu-Pin Chiu	7	1	1	7	3	0	19	118	S
Calvin Shao-Huai Hsu	7	0	0	6	1	0	14	257	B
Wei-Jiun Kao	0	2	1	7	3	0	13	283	HM
Tai-Ning Liao	7	1	2	7	3	3	23	58	S
Pang-Cheng Wu	7	2	0	7	7	0	23	58	S
Tajikistan									
Sobirdzhon Bobiev	4	0	1	7	1	0	13	283	HM
Farrukh Karimov	7	3	1	7	1	0	19	118	S
Kalomidin Klychev	0	6	0	7	1	0	14	257	B
Iyomiddin Boltaev	0	1	0	7	1	0	9	365	HM
Mekhron Bobokhonov	0	0	0	2	0	0	2	508	
Tanzania									
Bilal Ayoub Mrisho	0	0	0	0	0	0	0	553	
Awadhi Miraji Simba	0	0	0	0	0	0	0	553	
Abdulrazaq Yusuf Abdallah	0	0	0	0	0	0	0	553	
Thailand									
Thee Ngamsangrat	7	1	0	7	7	0	22	76	S
Sivakorn Sanguanmoo	7	2	0	7	3	0	19	118	S
Suchan Vivatsethachai	7	7	1	7	7	0	29	19	G
Thatchanok Khampitak	7	2	0	7	1	0	17	160	B
Pachara Savettamalya	7	2	0	7	3	0	19	118	S
Wichaphon Akarasereenont	7	7	0	7	7	0	28	26	G
The former Yugoslav Republic of Macedonia									
Andrej Ilievski	0	0	1	2	1	0	4	465	
Stefan Nikoloski	4	0	0	3	1	0	8	394	
Sanja Simonovikj	0	0	0	3	1	0	4	465	
Andrej Ivanov	1	1	0	7	1	0	10	337	HM
Nikola Grunchevski	1	0	0	2	1	0	4	465	
Bozidar Stevanoski	6	0	1	7	1	0	15	217	B
Trinidad and Tobago									
Prasanna Ramakrishnan	7	4	0	7	1	0	19	118	S
Alex Navarro	1	0	0	1	1	0	3	480	
Arjun Isa Mohammed	3	0	0	0	0	0	3	480	
Adam Scott Darryl Superville	0	0	0	1	0	0	1	532	
Tunisia									
Houcine Ben Daly	7	1	0	4	1	0	13	283	HM
Omar Mohamed Fadhel	0	0	0	0	0	0	0	553	
Zouhaier Ferchiou	5	0	1	7	3	0	16	183	B
Mahdi Labidi	4	0	0	7	1	0	12	307	HM

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
Turkey									
Feyza Duman	7	2	1	7	3	0	20	101	S
Halil İbrahim Güllük	7	6	1	5	1	0	20	101	S
Ahmet İleri	7	7	3	7	1	0	25	40	S
Ahmet Abdullah Keleş	7	2	1	7	3	0	20	101	S
Muhammet Furkan Merdan	7	7	0	7	1	0	22	76	S
Ali Haydar Sever	1	2	0	2	1	0	6	431	
Turkmenistan									
Alshir Soyunjov	5	1	0	7	3	0	16	183	B
Dovlet Oviyagulyyev	7	0	1	7	3	0	18	140	B
Dovran Nurgeldiyev	4	0	0	1	3	0	8	394	
Perman Iljanov	0	1	0	7	3	0	11	322	HM
Bazarbay Halmedov	1	1	0	0	1	0	3	480	
Murat Chashemov	1	0	0	7	0	0	8	394	HM
Uganda									
Isaac Owomugisha	0	0	0	6	0	0	6	431	
Andrew Tugume	0	0	0	0	0	0	0	553	
Tevin Rwamahe	0	0	0	0	0	0	0	553	
Claire Martha Kusemerwa	0	0	0	0	0	0	0	553	
Samson Byakika Rweinaga	0	0	0	0	0	0	0	553	
Ukraine									
Anastasiia Alokhuina	7	2	0	7	7	0	23	58	S
Sofia Dubova	7	1	1	7	3	0	19	118	S
Natalia Khotiaintseva	7	7	2	7	3	0	26	37	G
Dinh Thanh Phong Vo	4	5	0	7	1	0	17	160	B
Denys Smirnov	1	5	7	7	2	7	29	19	G
Anton Trygub	7	2	0	7	3	2	21	88	S
United Kingdom									
Joe Benton	7	2	1	7	1	1	19	118	S
Lawrence Hollom	7	1	0	1	1	0	10	337	HM
Samuel Kittle	7	2	0	7	3	0	19	118	S
Warren Li	7	7	1	7	3	0	25	40	S
Neel Nanda	7	1	0	7	2	0	17	160	B
Harvey Yau	7	2	1	7	2	0	19	118	S

Remarks

G : Gold Medal
S : Silver Medal
B : Bronze Medal
HM : Honourable Mention

CONTESTANT	P1	P2	P3	P4	P5	P6	TOTAL	RANK	AWARD
United States of America									
Ryan Alweiss	7	2	1	7	7	7	31	10	G
Michael Kural	7	2	7	7	2	0	25	40	S
Allen Liu	7	7	7	7	1	6	35	5	G
Yang Liu	7	7	7	7	3	0	31	10	G
Shyam Narayanan	7	7	2	7	5	0	28	26	G
David Stoner	7	7	7	7	7	0	35	5	G
Uruguay									
Maicol Denin Núñez Colman	1	0	0	1	0	0	2	508	
Dino Vincenzo Puppo Tito	0	0	0	7	1	0	8	394	HM
Lucero Rodríguez Rubianes	0	0	0	0	0	0	0	553	
Rodrigo Schertz Cohen	1	0	0	0	0	0	1	532	
Matías Gabriel Szykowski Resnikow	1	0	0	0	0	0	1	532	
Juan Ignacio Valero Villanueva	4	0	0	0	0	0	4	465	
Uzbekistan									
Khurshid Juraev	1	0	0	7	1	0	9	365	HM
Gayrat Toshpulatov	0	0	0	2	0	0	2	508	
Abbos Muhamedov	4	2	0	7	1	0	14	257	B
Jamshid Yakshiev	0	0	0	7	7	0	14	257	B
Ruslanbek Ozodboev	1	0	0	7	1	0	9	365	HM
Sardor Bazarbaev	0	7	1	7	1	0	16	183	B
Venezuela									
Rafael Aznar	1	0	0	7	1	0	9	365	HM
Jose Tomas Guevara	1	0	0	3	0	0	4	465	
Vietnam									
Hải Đăng Nguyễn Tuấn	7	2	0	7	7	0	23	58	S
Việt Hà Nguyễn Thị	3	2	1	7	2	0	15	217	B
Thế Hoàn Nguyễn	7	5	7	7	5	0	31	10	G
Huy Hoàng Nguyễn	4	2	7	7	1	2	23	58	S
Anh Tài Hoàng	7	3	1	7	7	0	25	40	S
Xuân Trung Vũ	7	7	7	7	6	0	34	8	G

AWARDS



GOLD MEDAL AND PERFECT SCORE

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
1	Zhuo Qun (Alex) Song	Canada	7	7	7	7	7	7	42

GOLD MEDALS

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
2	Chenjje Yu	People's Republic of China	7	7	7	7	7	6	41
3	Junghun Ju	Republic of Korea	7	5	7	7	7	7	40
4	Alexander Gunning	Australia	7	6	7	7	2	7	36
5	Jaehyung Kim	Republic of Korea	7	7	1	7	7	6	35
5	Allen Liu	United States of America	7	7	7	7	1	6	35
5	David Stoner	United States of America	7	7	7	7	7	0	35
8	Xuân Trung Vũ	Vietnam	7	7	7	7	6	0	34
9	Francesco Sala	Italy	7	6	7	7	5	0	32
10	Myonghyok Ri	Democratic People's Republic of Korea	7	3	7	7	7	0	31
10	Jiafan He	People's Republic of China	7	7	1	7	2	7	31
10	Nuozhou Wang	People's Republic of China	7	2	1	7	7	7	31
10	Adam Klukowski	Poland	7	7	7	7	3	0	31
10	Ryan Alweiss	United States of America	7	2	1	7	7	7	31
10	Yang Liu	United States of America	7	7	7	7	3	0	31
10	Thế Hoàn Nguyễn	Vietnam	7	5	7	7	5	0	31
17	Jiyang Gao	People's Republic of China	7	7	1	7	1	7	30
17	Christian Omar Altamirano Modesto	Peru	7	2	7	7	7	0	30
19	Seyoon Ragavan	Australia	7	7	1	7	7	0	29

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
19	Adrian Beker	Croatia	7	7	1	7	7	0	29
19	Ali Sayadi	Islamic Republic of Iran	7	5	7	7	3	0	29
19	Akhan Ismailov	Kazakhstan	7	6	2	7	7	0	29
19	Sheldon Kieren Tan	Singapore	7	7	1	7	7	0	29
19	Suchan Vivatsethachai	Thailand	7	7	1	7	7	0	29
19	Denys Smirnov	Ukraine	1	5	7	7	2	7	29
26	Kum Song Jon	Democratic People's Republic of Korea	7	1	7	7	4	2	28
26	Il Myong Ri	Democratic People's Republic of Korea	7	7	0	7	7	0	28
26	Aria Halavati	Islamic Republic of Iran	7	0	7	7	1	6	28
26	Raul Alfredo Alcántara Castillo	Peru	7	7	0	7	7	0	28
26	Wichaphon Akarasereenont	Thailand	7	7	0	7	7	0	28
26	Shyam Narayanan	United States of America	7	7	2	7	5	0	28
32	Kevin Sun	Canada	7	4	0	7	3	6	27
32	Mojtaba Zareh Bidaki	Islamic Republic of Iran	7	3	7	7	3	0	27
32	Dor Shmoish	Israel	7	7	2	7	4	0	27
32	Jaewon Choi	Republic of Korea	7	0	7	7	3	3	27
32	Simona Diaconu	Romania	5	7	1	7	7	0	27
37	Juan Carlos Ortiz Rhoton	Mexico	7	6	1	7	3	2	26
37	Aleksa Konstantinov	Serbia	7	5	0	7	7	0	26
37	Natalia Khotiaintseva	Ukraine	7	7	2	7	3	0	26

SILVER MEDALS

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
40	Lyuben Lichev	Bulgaria	7	3	7	7	1	0	25
40	Vincent Bouis	France	7	2	7	7	2	0	25
40	Adrian Riekert	Germany	7	7	1	7	3	0	25
40	Kada Williams	Hungary	7	3	1	7	7	0	25
40	Amin Behjati	Islamic Republic of Iran	7	1	7	7	3	0	25
40	Changzhi Xie	People's Republic of China	7	7	1	7	3	0	25
40	Ivan Bochkov	Russian Federation	7	2	1	7	1	7	25
40	Nikita Gladkov	Russian Federation	7	3	1	7	0	7	25
40	Aleksandr Zimin	Russian Federation	7	6	1	7	1	3	25
40	Kewei David Lin	Singapore	4	2	7	7	3	2	25
40	Truc Lam Bui	Slovakia	7	5	0	7	0	6	25
40	Ahmet Ileri	Turkey	7	7	3	7	1	0	25
40	Warren Li	United Kingdom	7	7	1	7	3	0	25

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
40	Michael Kural	United States of America	7	2	7	7	2	0	25
40	Anh Tài Hoàng	Vietnam	7	3	1	7	7	0	25
55	Petar Orlić	Croatia	7	2	1	7	7	0	24
55	Cezar Port	Republic of Moldova	4	0	7	7	6	0	24
55	Zhao Yu Ma	Singapore	7	7	1	7	1	1	24
58	Jeremy Yip	Australia	7	6	1	7	2	0	23
58	Songyong Choe	Democratic People's Republic of Korea	7	2	1	7	1	5	23
58	Song Hyok Kang	Democratic People's Republic of Korea	7	7	1	7	1	0	23
58	Jong Yol Ri	Democratic People's Republic of Korea	7	5	1	7	2	1	23
58	Jeet Mohapatra	India	7	7	1	7	1	0	23
58	Zheng Wang	People's Republic of China	7	6	1	7	2	0	23
58	Sehun Kim	Republic of Korea	7	1	1	7	6	1	23
58	Teodor Andrei Andronache	Romania	7	5	1	7	3	0	23
58	Marius-Ioan Bocanu	Romania	7	5	1	7	3	0	23
58	Ciprian-Mircea Bonciocat	Romania	7	1	7	7	1	0	23
58	Ruslan Salimov	Russian Federation	7	3	2	7	2	2	23
58	Siah Yong Tan	Singapore	7	5	0	7	2	2	23
58	Tien-Chun Cheng	Taiwan	7	3	1	6	1	5	23
58	Tai-Ning Liao	Taiwan	7	1	2	7	3	3	23
58	Pang-Cheng Wu	Taiwan	7	2	0	7	7	0	23
58	Anastasiiia Alokhhina	Ukraine	7	2	0	7	7	0	23
58	Huy Hoàng Nguyễn	Vietnam	4	2	7	7	1	2	23
58	Hải Đăng Nguyễn Tuấn	Vietnam	7	2	0	7	7	0	23
76	Pedro Henrique Sacramento de Oliveira	Brazil	7	1	1	7	4	2	22
76	Violeta Naydenova	Bulgaria	7	6	1	7	1	0	22
76	Kristijan Štefanec	Croatia	7	4	1	7	3	0	22
76	Andreas Stavrou	Cyprus	7	1	4	7	3	0	22
76	Florent Noisette	France	4	6	1	7	4	0	22
76	Barnabás Szabó	Hungary	7	6	1	7	1	0	22
76	Francesco Ballini	Italy	7	3	0	7	1	4	22
76	Nikita Deniskin	Italy	7	1	6	7	1	0	22
76	Hou Tin Chau	Macau	7	1	0	7	7	0	22
76	Ivan Frolov	Russian Federation	7	3	2	7	3	0	22
76	Thee Ngamsangrat	Thailand	7	1	0	7	7	0	22
76	Muhammet Furkan Merdan	Turkey	7	7	0	7	1	0	22
88	Hakob Tamazyan	Armenia	7	0	7	7	0	0	21
88	Kevin Xian	Australia	7	3	1	7	3	0	21
88	Md Sanzeed Anwar	Bangladesh	7	0	0	7	7	0	21
88	Adrien Lemerrier	France	7	4	0	7	3	0	21

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
88	Christian Bernert	Germany	7	3	1	7	3	0	21
88	Zsombor Fehér	Hungary	7	1	1	7	1	4	21
88	Ko Aoki	Japan	7	2	4	7	1	0	21
88	Yuta Takaya	Japan	7	2	2	7	3	0	21
88	Jemisson Coronel Baldeón	Peru	7	2	1	7	4	0	21
88	Adrian Reginald Sy	Philippines	7	2	1	7	2	2	21
88	Ștefan Spătaru	Romania	7	2	2	7	3	0	21
88	Alexander Kuznetsov	Russian Federation	7	2	1	7	2	2	21
88	Anton Trygub	Ukraine	7	2	0	7	3	2	21
101	Yang Song	Australia	7	2	1	7	3	0	20
101	Pablo Bustillo Vazquez	Belgium	7	1	0	7	3	2	20
101	Daniel Paleka	Croatia	7	2	1	7	3	0	20
101	Petros Ntounis	Greece	7	4	1	7	1	0	20
101	John Michael Wu	Hong Kong	7	2	0	7	4	0	20
101	Hoi Wai Yu	Hong Kong	7	3	0	0	3	7	20
101	Adi Suryanata Herwana	Indonesia	7	2	1	7	3	0	20
101	Yuki Saeki	Japan	7	2	1	7	3	0	20
101	Kevin William Beuchot Castellanos	Mexico	7	1	4	7	1	0	20
101	Johan Sokrates Wind	Norway	6	3	0	7	4	0	20
101	Jimmy Espinoza Palacios	Peru	7	3	0	7	3	0	20
101	Mikołaj Leonarski	Poland	4	1	7	7	1	0	20
101	Dylan Shan Hong Toh	Singapore	7	2	1	7	3	0	20
101	Eduard Batmendijn	Slovakia	7	1	0	7	1	4	20
101	Feyza Duman	Turkey	7	2	1	7	3	0	20
101	Halil İbrahim Güllük	Turkey	7	6	1	5	1	0	20
101	Ahmet Abdullah Keleş	Turkey	7	2	1	7	3	0	20
118	Yassine Hamdi	Algeria	7	3	1	7	1	0	19
118	Ilia Kuchеров	Australia	7	2	0	7	3	0	19
118	Murilo Corato Zanarella	Brazil	7	1	0	7	3	1	19
118	Daniel Lima Braga	Brazil	7	1	1	7	3	0	19
118	Zauri Meshveliani	Georgia	7	1	1	7	3	0	19
118	Rezky Arizaputra	Indonesia	4	1	0	7	7	0	19
118	Farbod Ekbatani	Islamic Republic of Iran	7	3	1	7	1	0	19
118	Olzhas Kadyrakunov	Kazakhstan	7	2	0	7	3	0	19
118	Luis Xavier Ramos Tormo	Mexico	7	4	0	7	1	0	19
118	Clyde Wesley Ang	Philippines	7	1	1	7	3	0	19
118	Alzubair Habibullah	Saudi Arabia	7	2	0	7	3	0	19
118	Andela Šarković	Serbia	7	2	0	7	3	0	19
118	Sami Rahmeh	Syria	7	1	1	7	3	0	19
118	Yu-Pin Chiu	Taiwan	7	1	1	7	3	0	19
118	Farrukh Karimov	Tajikistan	7	3	1	7	1	0	19
118	Sivakorn Sanguanmoo	Thailand	7	2	0	7	3	0	19

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
118	Pachara Sawettamalya	Thailand	7	2	0	7	3	0	19
118	Prasanna Ramakrishnan	Trinidad and Tobago	7	4	0	7	1	0	19
118	Sofiia Dubova	Ukraine	7	1	1	7	3	0	19
118	Joe Benton	United Kingdom	7	2	1	7	1	1	19
118	Samuel Kittle	United Kingdom	7	2	0	7	3	0	19
118	Harvey Yau	United Kingdom	7	2	1	7	2	0	19

BRONZE MEDALS

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
140	Grigor Keropyan	Armenia	7	0	1	7	3	0	18
140	Yahor Dubovik	Belarus	7	3	0	7	1	0	18
140	João César Campos Vargas	Brazil	7	2	1	7	1	0	18
140	Aleksandar Cherganski	Bulgaria	7	1	1	7	0	2	18
140	Yan (Bill) Huang	Canada	4	1	0	7	5	1	18
140	Michael Pang	Canada	7	3	0	7	1	0	18
140	Alexander Whatley	Canada	7	2	0	7	2	0	18
140	Félix Breton	France	7	0	0	7	1	3	18
140	Colin Davalo	France	7	1	0	7	3	0	18
140	Man Yi Kwok	Hong Kong	7	0	1	7	3	0	18
140	Robert Meier	Liechtenstein	7	2	0	7	2	0	18
140	Miles Yee-Cheng Lee	New Zealand	7	1	0	7	3	0	18
140	Konrad Jan Paluszek	Poland	4	1	0	7	0	6	18
140	Mariusz Trela	Poland	7	3	0	7	1	0	18
140	Chaewon Kim	Republic of Korea	7	2	1	7	1	0	18
140	Youseong Lee	Republic of Korea	7	0	1	7	1	2	18
140	Dionisie Nipomici	Republic of Moldova	7	0	1	7	3	0	18
140	Ivan Damjanović	Serbia	7	1	0	7	3	0	18
140	Yijia Liu	Singapore	7	3	0	7	1	0	18
140	Dovlet Ovyagulyyev	Turkmenistan	7	0	1	7	3	0	18
160	Narek Khandanyan	Armenia	4	4	1	7	1	0	17
160	Hasanli Farid	Azerbaijan	0	6	1	7	3	0	17
160	Asif E Elahi	Bangladesh	7	1	1	7	1	0	17
160	Adib Hasan	Bangladesh	4	4	1	7	1	0	17
160	Dmitry Voynov	Belarus	7	0	2	7	1	0	17
160	Zlatko Salko Lagumdžija	Bosnia and Herzegovina	7	1	1	7	1	0	17
160	Jinhao (Hunter) Xu	Canada	7	0	0	7	3	0	17
160	Juan Sebastian Díaz	Colombia	7	2	0	7	1	0	17
160	Pavel Turek	Czech Republic	7	2	0	7	1	0	17
160	Aleksandre Saatashvili	Georgia	7	3	0	7	0	0	17
160	Sebastian Meyer	Germany	7	0	0	4	1	5	17
160	Jörn Stöhler	Germany	7	3	0	7	0	0	17
160	Ali Daeinaby	Islamic Republic of Iran	5	2	2	7	1	0	17

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
160	Kazuki Matoya	Japan	7	2	1	7	0	0	17
160	Alen Abdrakhmanov	Kazakhstan	7	0	0	7	3	0	17
160	Cho Hou Tang	Macau	7	0	0	7	3	0	17
160	Leonardo Ariel García Morán	Mexico	7	1	0	7	2	0	17
160	Bob Zwetsloot	Netherlands	7	2	0	7	1	0	17
160	Farrell Eldrian Wu	Philippines	7	2	0	7	1	0	17
160	Ognjen Tošić	Serbia	7	2	1	6	1	0	17
160	Thatchanok Khampitak	Thailand	7	2	0	7	1	0	17
160	Dinh Thanh Phong Vo	Ukraine	4	5	0	7	1	0	17
160	Neel Nanda	United Kingdom	7	1	0	7	2	0	17
183	Lucas de Amorin	Argentina	6	2	0	7	1	0	16
183	Albert Gevorgyan	Armenia	7	1	0	7	1	0	16
183	Arsen Hambardzumyan	Armenia	7	1	0	7	1	0	16
183	Sergey Nersisyan	Armenia	7	1	0	7	1	0	16
183	Milica Đukić	Bosnia and Herzegovina	6	1	1	7	1	0	16
183	Gabriel Toneatti Vercelli	Brazil	7	1	1	7	0	0	16
183	Daniel Cáceres	Colombia	7	0	1	7	0	1	16
183	Nicolás De La Hoz	Colombia	7	0	1	7	1	0	16
183	Ivan Lazarić	Croatia	7	1	0	7	1	0	16
183	Eigil Fjeldgren Rischel	Denmark	7	1	0	7	1	0	16
183	Julien Portier	France	4	3	0	6	3	0	16
183	Ferdinand Wagner	Germany	6	1	1	7	1	0	16
183	Shun Ming Samuel Lee	Hong Kong	7	1	0	7	1	0	16
183	Barnabás Janzer	Hungary	7	1	0	7	1	0	16
183	Shourya Pandey	India	1	7	0	7	1	0	16
183	Jonathan Mulyawan Woenardi	Indonesia	7	1	0	7	1	0	16
183	Erlang Wiratama Surya	Indonesia	7	1	0	7	1	0	16
183	Hiroto Shinoki	Japan	7	2	0	7	0	0	16
183	Ivan Chan Kai Chin	Malaysia	6	1	1	7	1	0	16
183	Yeoh Zi Song	Malaysia	7	1	0	7	1	0	16
183	Antonio López Guzmán	Mexico	7	1	0	7	1	0	16
183	Pablo Meré Hidalgo	Mexico	7	1	0	7	1	0	16
183	Bodrol Olonbaatar	Mongolia	7	1	0	7	1	0	16
183	Nikola Raicevic	Montenegro	7	1	0	7	1	0	16
183	Yuhui Cheng	Netherlands	7	2	0	7	0	0	16
183	Eva van Ammers	Netherlands	7	1	0	7	1	0	16
183	Gerardo Sigfredo Fisch Paredes	Paraguay	7	1	0	7	1	0	16
183	Nuno Miguel Arala Santos	Portugal	7	2	0	7	0	0	16
183	Zhen Ning David Liu	Slovakia	7	1	0	7	1	0	16
183	Yaseen Mowzer	South Africa	7	1	0	7	1	0	16

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
183	Daniel Peter Rutschmann	Switzerland	7	1	0	7	1	0	16
183	Zouhaier Ferchou	Tunisia	5	0	1	7	3	0	16
183	Alshir Soyunjov	Turkmenistan	5	1	0	7	3	0	16
183	Sardor Bazarbaev	Uzbekistan	0	7	1	7	1	0	16
217	Josef Greilhuber	Austria	7	1	0	7	0	0	15
217	Levi Haunschmid	Austria	4	1	0	7	3	0	15
217	Md Sabbir Rahman	Bangladesh	6	0	1	7	1	0	15
217	Aleksey Gaponenko	Belarus	7	0	0	7	1	0	15
217	Rafael Filipe Dos Santos	Brazil	3	1	1	7	3	0	15
217	Pablo González	Colombia	7	1	0	6	1	0	15
217	José Armando Chacón Rodríguez	Costa Rica	6	1	0	7	1	0	15
217	Kevin Gabriel Coto Mora	Costa Rica	7	0	0	7	1	0	15
217	Humberto Riverón Valdés	Cuba	7	0	0	7	1	0	15
217	Radovan Švarc	Czech Republic	4	1	0	7	3	0	15
217	Mads Bach Villadsen	Denmark	7	1	0	7	0	0	15
217	Joonas Kalda	Estonia	7	0	0	7	0	1	15
217	Panagiotis Misiakos	Greece	6	1	0	7	1	0	15
217	Zsuzsanna Baran	Hungary	7	1	0	7	0	0	15
217	Pranjal Warade	India	0	6	1	7	1	0	15
217	Henry Jayakusuma	Indonesia	7	0	0	7	1	0	15
217	Liam Hanany	Israel	4	2	1	7	0	1	15
217	Dor Mezer	Israel	7	2	0	4	2	0	15
217	Alexandr Shakiyev	Kazakhstan	4	2	1	7	1	0	15
217	Andrius Ovsianas	Lithuania	7	0	0	7	1	0	15
217	Hou Leong Sio	Macau	7	0	0	7	1	0	15
217	Erdenebayar Bayarmagnai	Mongolia	4	0	1	7	3	0	15
217	Xuzhi Zhang	New Zealand	7	0	0	7	1	0	15
217	Elvis Alexander Agüero Vera	Paraguay	7	0	0	7	1	0	15
217	Albert John Patupat	Philippines	7	0	0	7	1	0	15
217	Piotr Pawlak	Poland	4	0	7	3	1	0	15
217	Paweł Piwek	Poland	7	0	0	7	1	0	15
217	Henrique Rui Neves Aguiar	Portugal	5	1	1	7	1	0	15
217	Vladimir Cucu	Republic of Moldova	6	1	0	7	1	0	15
217	Andrei-Bogdan Puiu	Romania	4	1	0	7	3	0	15
217	Omar Alrabiah	Saudi Arabia	4	2	1	7	1	0	15
217	Salman Saleh	Saudi Arabia	6	1	0	7	1	0	15
217	Samuel Sládek	Slovakia	7	0	0	7	1	0	15
217	Ismael Sierra	Spain	7	0	0	7	1	0	15
217	Malte Larsson	Sweden	7	0	0	7	1	0	15
217	Tianfang Zhang	Sweden	7	0	0	7	1	0	15
217	Horace Chaix	Switzerland	7	0	0	7	1	0	15
217	Henning Zhang	Switzerland	7	0	0	7	1	0	15

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
217	Bozhidar Stevanoski	The former Yugoslav Republic of Macedonia	6	0	1	7	1	0	15
217	Việt Hà Nguyễn Thị	Vietnam	3	2	1	7	2	0	15
257	Fayssal Saadi	Algeria	5	1	0	7	1	0	14
257	Bruno Perreaux	Austria	7	0	0	7	0	0	14
257	Mahammad Shirinov	Azerbaijan	4	2	0	7	1	0	14
257	Sazid Akhter Turzo	Bangladesh	4	0	1	7	2	0	14
257	Marian Poljak	Czech Republic	6	0	0	7	1	0	14
257	Giorgi Khosroshvili	Georgia	7	0	0	7	0	0	14
257	Giorgi Kldiashvili	Georgia	5	0	0	7	2	0	14
257	Christos Nestor Chachamis	Greece	4	0	0	7	3	0	14
257	Wai Lam Cheung	Hong Kong	6	5	0	0	3	0	14
257	Márk Di Giovanni	Hungary	7	1	1	3	1	1	14
257	Herbert Ilhan Tanujaya	Indonesia	4	0	0	7	3	0	14
257	Takuya Inoue	Japan	7	1	0	3	1	2	14
257	Tan Kin Aun	Malaysia	4	0	0	7	3	0	14
257	Awais Muhammad Chishti	Pakistan	4	2	0	7	1	0	14
257	Roberto Daniel Filizzola Ortiz	Paraguay	4	2	0	7	1	0	14
257	Henry Felén Chávez	Peru	4	1	1	7	1	0	14
257	Francisco Tuna de Andrade	Portugal	7	0	0	7	0	0	14
257	Francisco Proskauer Valerio	Puerto Rico	7	0	0	7	0	0	14
257	Shaden Alshammari	Saudi Arabia	7	0	0	4	3	0	14
257	Patrik Bak	Slovakia	1	5	0	7	1	0	14
257	David Popović	Slovenia	7	0	0	7	0	0	14
257	Muhammad Hanino	Syria	4	2	0	7	1	0	14
257	Calvin Shao-Huai Hsu	Taiwan	7	0	0	6	1	0	14
257	Kalomidin Klychev	Tajikistan	0	6	0	7	1	0	14
257	Abbos Muhammedov	Uzbekistan	4	2	0	7	1	0	14
257	Jamshid Yakshiev	Uzbekistan	0	0	0	7	7	0	14

HONOURABLE MENTION

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
283	Gledis Kallço	Albania	4	1	0	7	1	0	13
283	Agustín Marchionna	Argentina	4	1	0	7	1	0	13
283	Juan José Pérez Guerra	Argentina	6	0	0	7	0	0	13
283	Tahir Nadirov	Azerbaijan	4	1	0	7	1	0	13
283	S M Nayeemul Islam	Bangladesh	4	1	0	7	1	0	13
283	Andrei Asanau	Belarus	7	2	0	3	1	0	13
283	Valentin Vityaz	Belarus	3	2	0	7	1	0	13
283	Neira Kurtović	Bosnia and Herzegovina	4	1	0	7	1	0	13
283	Denitsa Markova	Bulgaria	4	1	0	7	1	0	13
283	Alexander Tenev	Bulgaria	7	0	0	2	1	3	13

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
283	Triinu Veeorg	Estonia	4	0	0	7	2	0	13
283	Kalle Luopajarvi	Finland	6	0	0	7	0	0	13
283	Kam Chuen Tung	Hong Kong	7	1	0	2	3	0	13
283	Dagur Tómas Ásgeirsson	Iceland	6	0	0	7	0	0	13
283	Temirlan Amangeldin	Kazakhstan	4	1	0	7	1	0	13
283	Doruntina Sylejmani	Kosovo	4	1	0	7	1	0	13
283	Jonas Pukšta	Lithuania	4	1	0	7	1	0	13
283	Pui Chun Ng	Macau	1	1	1	7	3	0	13
283	Zolbayar Shagdar	Mongolia	4	1	0	7	1	0	13
283	Ghaith Alzouhaili	Syria	5	0	0	7	1	0	13
283	Wei-Jiun Kao	Taiwan	0	2	1	7	3	0	13
283	Sobirdzhon Bobiev	Tajikistan	4	0	1	7	1	0	13
283	Houcine Ben Daly	Tunisia	7	1	0	4	1	0	13
307	Lisandro Filloy	Argentina	7	1	0	3	1	0	12
307	Anar Huseynov	Azerbaijan	3	1	0	7	1	0	12
307	Savinien Kreczman	Belgium	7	2	0	0	3	0	12
307	Daniel León Jiménez	Costa Rica	4	0	0	7	1	0	12
307	Stine Valgreen	Denmark	4	0	0	7	1	0	12
307	Paolo Cuellar	Ecuador	4	0	0	7	1	0	12
307	Sagnik Majumder	India	7	1	1	2	1	0	12
307	Paul Clarke	Ireland	3	1	0	7	1	0	12
307	Daniyar Abesbek	Kazakhstan	1	3	0	7	1	0	12
307	Kyle Patrick Dulay	Philippines	7	1	0	4	0	0	12
307	Henrique Cravo Esteves Dos Santos	Portugal	7	1	0	1	3	0	12
307	Stefanie Zbinden	Switzerland	7	2	0	2	1	0	12
307	Mahdi Labidi	Tunisia	4	0	0	7	1	0	12
322	Brian Pablo Morris Esquivel	Argentina	7	0	0	3	1	0	11
322	Adisa Bolić	Bosnia and Herzegovina	3	0	0	7	1	0	11
322	Stelios Stylianou	Cyprus	4	0	0	7	0	0	11
322	Matěj Konečný	Czech Republic	7	1	0	2	1	0	11
322	Saba Dzmanashvili	Georgia	1	2	0	7	1	0	11
322	Leong Kit Wong	Macau	3	0	1	7	0	0	11
322	Bayarjavkhan Ganbold	Mongolia	7	1	0	0	3	0	11
322	Ali Baouan	Morocco	2	0	0	7	2	0	11
322	Tim Brouwer	Netherlands	7	1	0	2	1	0	11
322	George Han	New Zealand	7	0	0	2	2	0	11
322	Bronson Rudner	South Africa	7	2	0	1	1	0	11
322	Gonzalo Cao	Spain	7	1	0	3	0	0	11
322	Mohamed Afham Mohamed Aflal	Sri Lanka	3	0	0	7	1	0	11
322	Ruwimal Yasantha Pathiraja	Sri Lanka	3	0	0	7	1	0	11
322	Perman Iljanov	Turkmenistan	0	1	0	7	3	0	11

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
337	Alboreno Voci	Albania	1	0	1	7	1	0	10
337	Ilyes Hamdi	Algeria	0	1	1	7	1	0	10
337	Wouter Andriessen	Belgium	7	0	0	2	1	0	10
337	Art Waeterschoot	Belgium	1	1	1	7	0	0	10
337	Mirza Arnaut	Bosnia and Herzegovina	1	1	0	7	1	0	10
337	Apostolos Panagiotopoulos	Greece	1	1	0	7	1	0	10
337	Garðar Andri Sigurðsson	Iceland	7	1	0	2	0	0	10
337	Soumik Ghosh	India	1	1	0	7	1	0	10
337	Anant Mudgal	India	1	1	1	7	0	0	10
337	Yaron Brodsky	Israel	7	1	0	0	2	0	10
337	Boaz Guberman	Israel	7	0	2	0	1	0	10
337	Aleksejs Popovs	Latvia	7	0	0	2	1	0	10
337	Jia De Liu	Macau	1	0	1	7	1	0	10
337	Theam Wing Chun	Malaysia	7	0	0	3	0	0	10
337	Purev Batdelger	Mongolia	1	0	1	7	1	0	10
337	Kevin Shen	New Zealand	7	0	0	3	0	0	10
337	Mauricio Rodríguez	Nicaragua	0	0	1	7	2	0	10
337	Bruno Kacper Młodożeniec	Norway	7	0	0	3	0	0	10
337	Mihail Țarigradski	Republic of Moldova	7	0	0	2	1	0	10
337	Alhamzah Alnufaili	Saudi Arabia	1	1	0	7	1	0	10
337	Aleksa Milojević	Serbia	7	1	0	1	1	0	10
337	Marijana Vujaninović	Serbia	0	0	0	7	3	0	10
337	Samitha Yohan Abeysinghe Wijepala Abeysinghe Mudiyanseelage	Sri Lanka	1	0	1	7	1	0	10
337	David Rusch	Switzerland	7	1	0	2	0	0	10
337	Mustafa Khalil	Syria	1	0	0	7	2	0	10
337	Andrej Ivanov	The former Yugoslav Republic of Macedonia	1	1	0	7	1	0	10
337	Lawrence Hollom	United Kingdom	7	1	0	1	1	0	10
365	Euxhen Hasanaj	Albania	1	0	0	7	1	0	9
365	Miklós Zsigmond Horváth	Austria	7	0	0	2	0	0	9
365	Mirali Ahmadli	Azerbaijan	1	0	0	7	1	0	9
365	Demir Papić	Bosnia and Herzegovina	0	0	1	7	1	0	9
365	Nicolas Vilches	Chile	1	1	0	7	0	0	9
365	Jan Soukup	Czech Republic	7	0	0	1	1	0	9
365	Anthony Flores	Ecuador	1	0	0	7	1	0	9
365	Oliver Nisumaa	Estonia	7	1	0	0	1	0	9
365	Dimitrios Chrysovalantis Melas	Greece	0	1	0	7	1	0	9
365	Oisín Flynn-Connolly	Ireland	7	0	0	0	2	0	9
365	Tara Trauthwein	Luxembourg	1	0	0	7	1	0	9

RANK	CONTESTANT	COUNTRY	P1	P2	P3	P4	P5	P6	TOTAL
365	Amarsanaa Ganbaatar	Mongolia	0	1	0	7	1	0	9
365	Prince Michael Balanay	New Zealand	1	0	0	7	1	0	9
365	Martin Anjie Luk	New Zealand	1	0	0	7	1	0	9
365	Håkon Flatval	Norway	7	0	0	1	1	0	9
365	Valeriu Cojocari	Republic of Moldova	1	0	0	7	1	0	9
365	Daniel Griza	Republic of Moldova	7	0	0	1	1	0	9
365	Jakob Jurij Snoj	Slovenia	7	0	0	2	0	0	9
365	Martin Hesselborn	Sweden	7	0	0	1	1	0	9
365	David Wärn	Sweden	7	0	0	1	1	0	9
365	Iyomiddin Boltaev	Tajikistan	0	1	0	7	1	0	9
365	Khurshid Juraev	Uzbekistan	1	0	0	7	1	0	9
365	Ruslanbek Ozodboev	Uzbekistan	1	0	0	7	1	0	9
365	Rafael Aznar	Venezuela	1	0	0	7	1	0	9
394	Souheib Abdeldjalil Allout	Algeria	0	0	0	7	1	0	8
394	Farman Dumanov	Azerbaijan	0	0	0	7	1	0	8
394	Yahor Laurenau	Belarus	0	0	0	7	1	0	8
394	Marco Antonio Cabrera Aguilar	Costa Rica	0	0	0	7	1	0	8
394	Angelos Pelecanos	Cyprus	7	0	0	0	1	0	8
394	Vojtěch Dvořák	Czech Republic	7	1	0	0	0	0	8
394	Hjalti Þór Ísleifsson	Iceland	1	0	0	7	0	0	8
394	Anna Mustata	Ireland	0	0	0	7	1	0	8
394	Artūrs Banga	Latvia	1	0	0	7	0	0	8
394	Aleksejs Zajakins	Latvia	7	0	0	0	1	0	8
394	Jafet Alejandro Baca	Nicaragua	1	0	0	7	0	0	8
394	Josué Hernández	Nicaragua	0	1	0	7	0	0	8
394	Mmesomachi Nwachukwu	Nigeria	0	0	1	7	0	0	8
394	Ammar Alqatari	Saudi Arabia	0	0	0	7	1	0	8
394	Andrew McGregor	South Africa	0	0	0	7	1	0	8
394	Cesc Folch	Spain	7	0	0	1	0	0	8
394	Charuka Nishala Kulathunga Bandara Herath Mudiyansele	Sri Lanka	1	0	0	7	0	0	8
394	Yazan Alnasr	Syria	0	0	0	7	1	0	8
394	Murat Chashemov	Turkmenistan	1	0	0	7	0	0	8
394	Dino Vincenzo Puppo Tito	Uruguay	0	0	0	7	1	0	8
420	Sophearak Choeng	Cambodia	0	0	0	7	0	0	7
420	David Taingngind	Cambodia	0	0	0	7	0	0	7
420	Richard Luhtaru	Estonia	7	0	0	0	0	0	7
420	Akanimoh Boniface Udombeh	Nigeria	0	0	0	7	0	0	7

COUNTRY RANKING

RANK	COUNTRY
1	United States of America
2	People's Republic of China
3	Republic of Korea
4	Democratic People's Republic of Korea
5	Vietnam
6	Australia
7	Islamic Republic of Iran
8	Russian Federation
9	Canada
10	Singapore
11	Ukraine
12	Thailand
13	Romania
14	France
15	Croatia
16	Peru
17	Poland
18	Taiwan
19	Mexico
20	Hungary
20	Turkey
22	Brazil
22	Japan
22	United Kingdom
25	Kazakhstan
26	Armenia
27	Germany
28	Hong Kong
29	Bulgaria
29	Indonesia
29	Italy
29	Serbia
33	Bangladesh
33	Slovakia

RANK	COUNTRY
35	Macau
36	Philippines
37	India
38	Republic of Moldova
39	Belarus
40	Israel
41	Saudi Arabia
42	Georgia
43	Bosnia and Herzegovina
43	Netherlands
45	Czech Republic
45	Mongolia
45	Switzerland
48	Azerbaijan
49	Colombia
49	New Zealand
51	Greece
52	Argentina
52	Portugal
54	Syria
55	South Africa
56	Belgium
57	Malaysia
58	Turkmenistan
58	Uzbekistan
60	Austria
60	Sweden
62	Algeria
63	Cyprus
64	Tajikistan
65	Lithuania
65	Norway
67	Costa Rica
67	Paraguay
69	Denmark

RANK	COUNTRY
70	Estonia
70	Sri Lanka
72	Spain
73	Slovenia
74	The former Yugoslav Republic of Macedonia
75	Iceland
75	Tunisia
77	Albania
77	Ireland
79	Latvia
80	Ecuador
80	Morocco
82	Finland
82	Nicaragua
82	Trinidad and Tobago
85	Pakistan
86	Cambodia
86	Kosovo
88	Nigeria
89	Montenegro
90	Liechtenstein
90	Puerto Rico
92	Kyrgyzstan
93	Uruguay
94	Cuba
95	El Salvador
96	Venezuela
97	Chile
97	Luxembourg
99	Panama
100	Uganda
101	Bolivia
101	Ghana
103	Botswana
104	Tanzania

Remarks : 1. The country ranking is unofficial.
2. Not every country sent a full team.

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Chalermpong Worawannotai	Prapanpong Pongsriam	Thotsaphon Thongjunthug
Chariya Uiyasathian	Rasimate Maungchang	Tirasan Khandhawit
Gun Sunyeekhan	Ratinan Boonklurb	Tonkid Chantrasm
Kamthorn Chailuek	Ruth J. Skulkhu	Tuangrat Chaichana
Kijti Rodtes	Sajee Pianskool	Vorrapan Chandee
Kittikorn Nakprasit	Sawanya Sakuntasathien	Wacharin Wichiramala
Kritkorn Karntikoon	Sawian Jaidee	Warut Suksompong
Nat Sothanaphan	Sineenuch Suwannaphichat	Weerachai Neeranartvong
Natee Pitiwan	Sira Sriswasdi	Wich Huengwattanakul
Nattapong Bosuwan	Siripong Atipan	Wijit Yangjit
Nipun Pitimanaaree	Sittisade Polwiang	Wipawee Tangjai
Nithi Rungtanapirom	Somphong Jitman	Wittawat Kositwattanarerk
Ouamporn Phuksuwan	Sompong Chuysurichay	Wongsakom Charoenpanitseri
Panupong Pasupat	Sorathan Chaturapruek	Wuttisak Trongsirawat
Parinya Sa Ngiamsunthorn	Supap Kirtsaeng	Yothin Rakvongthai
Pasin Manurangsri	Tanat Komolsiripakdi	Yusuf Chebao

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Panat Guayjarernpanishk

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Matjaž Željko

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Kan-a-mart Amatayakul	Thiendanai Sermboonpaisarn
Suthinee Thaepunkulngam	Waratid Insorn

Senior Guides:

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Chalita Chomkatekaew	Oraphitchaya Rattanakoch	Sasipim Srivallapanondh
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