

# Reshaping Indonesian Students Training for IOI

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# Where is Indonesia ?



# Indonesian IOI participants



# Background of the research

Year	Gold	Silver	Bronze
2006	0	1	0
2007	0	0	4
2008	1	0	3
2009	0	2	1
2010	0	2	1
2011	0	0	2
2012	0	1	2
2013	0	2	2
2014	0	0	4
2015	0	2	1

Indonesia has been participating to IOI since 1955

In the last 10 years, our participants achievement is stabilized in Bronze.

How can we improve to Silver?

# Objectives

- To obtain findings related to the following factors by a qualitative research:
  - Factors that can help the Indonesian participants to get medals in IOI
  - Fitness of the training topics in Indonesian training program to IOI tasks
  - The influence of IOI to the career of IOI participants
- Using the findings of this research for a better IOI result

# Design Experiment

- To collect Data from 35 Indonesian alumni of the last ten years, from 2006 to 2015 [ 5 of them have been participating twice], by contacting them through alumni network.
- To analyze the 24 responses [70%]
- Other data are obtained from :
  - I-IOI training program database, journal and report
  - Interviews
  - Literature reviews
  - Other data from the Internet

# Finding and discussions

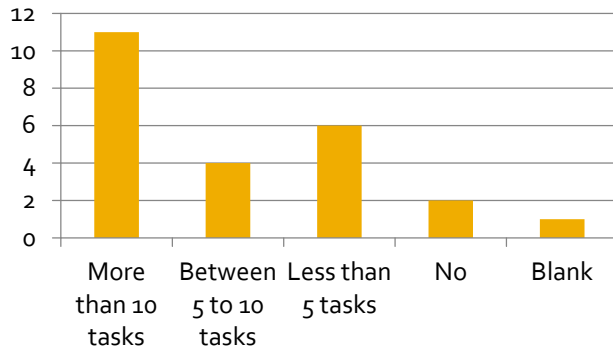
- Effectiveness Indonesian Training programs
- Other contributing factors
- Fitness of training topics to IOI Tasks
- Influence of IOI to Participants career

# Effectiveness of National Training Program

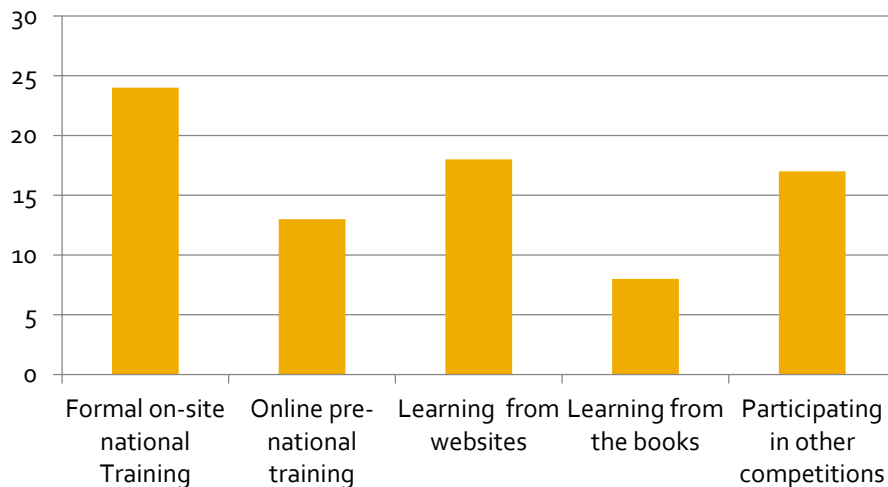
- On-line vs on-site?
- On-site training is more effective than on-line training *[with one exception]* :
  - Learn more from mentor
  - More focus
  - Real competitive environment
  - Being together build a team spirit and friendship
  - Better Internet connection
- Improvement of Training Program:
  - From unstructured to a better structured
  - Supported by online tools developed by alumni



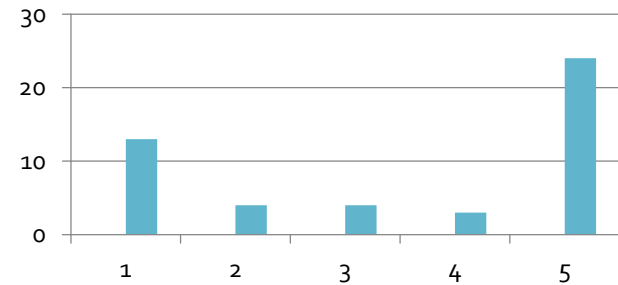
# Other Contributing Factors



Tasks/week exercised



Other resources



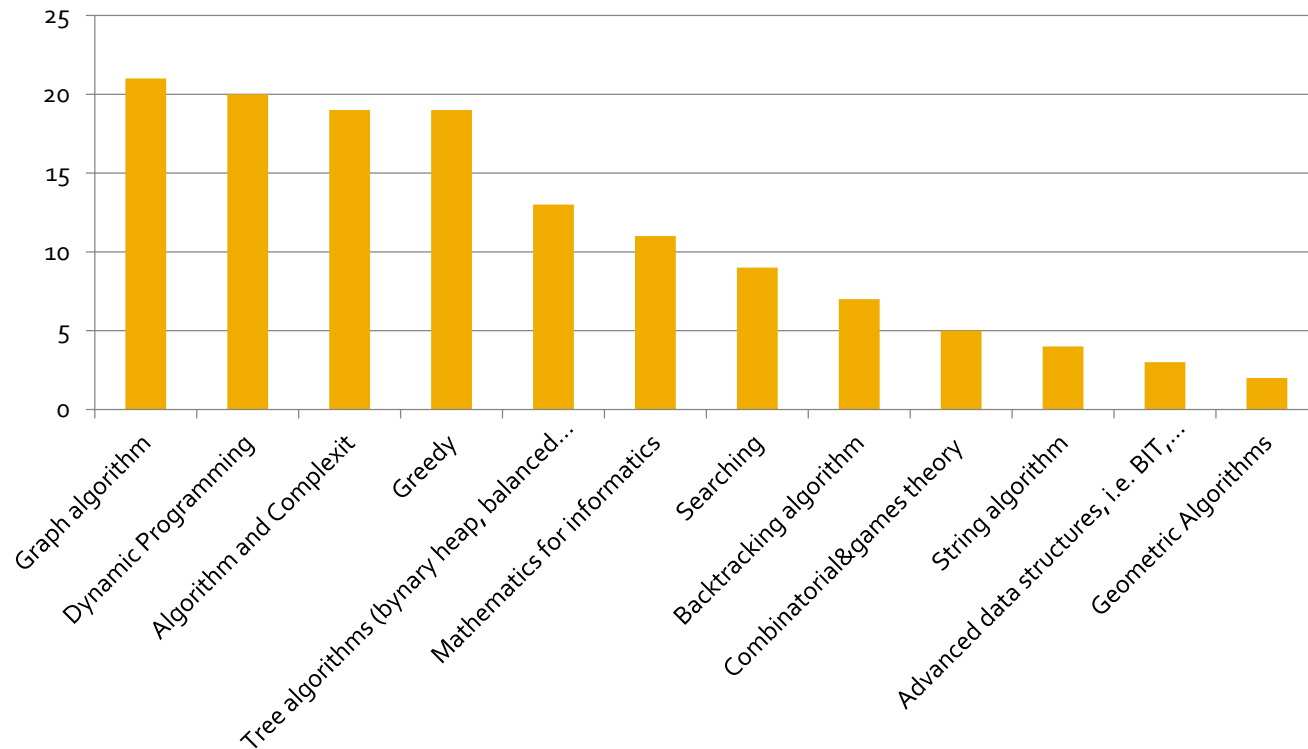
Hours/week for self exercise

**Other factors** mentioned by 1 alumni:  
grit/ perseverance, time management and prioritization attention to detail, creative thinking, the ability to recognize pattern on problems, experience with common tricks and avoiding common pitfalls, experience with a breadth of topics

# Overview of Training Curriculum

IOI year	Training Phase I	Training Phase II	Training Phase III	Training Phase IV
2006 – 2010	Basic programming Basic Exercises Simple simulation	CS topics, strategic problem solving Simulation	Advance Topics and Simulation	Final IOI preparation
2011 – 2013	Basic programming CS Topics, strategic problem solving, simulation	Advanced Topics and advanced problem, Simulation	Advanced Topics and simulation	Final IOI preparation
2014-2015	CS Topics and Advanced Topics & strategic problem solving, simulation	Special advanced topics More Simulation	More Simulation, more ad-hocs problem	Final IOI preparation

# Importants of Training Topics



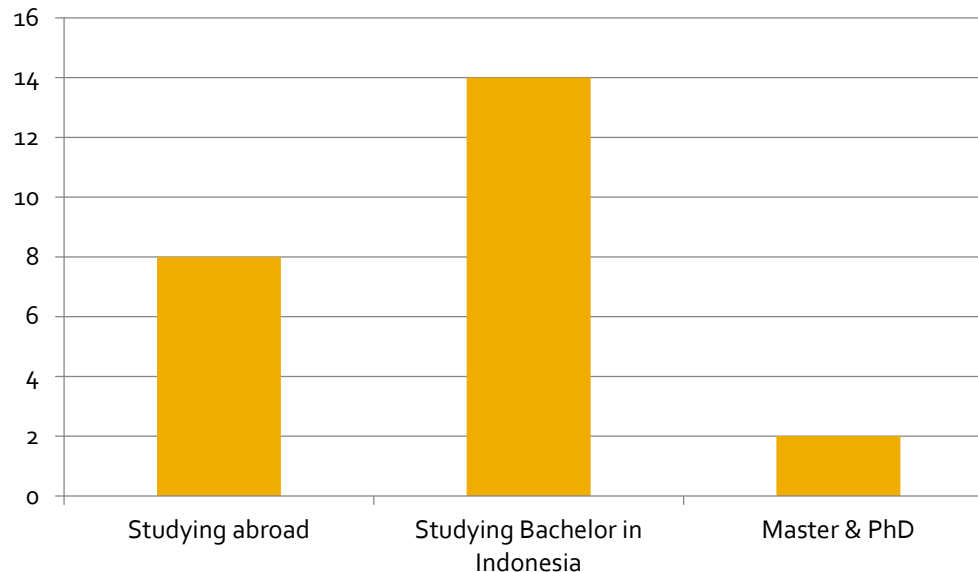
# Role of Alumni in Training

- Participation of alumni as Trainers:
  - In the first period (2006 - 2010), most of the trainers are the university faculty members.
  - In the second period (2011 - 2013) and in the third period (2014 - 2015), more alumni became trainers. It brings new colour to the program. The ambiance of programming competition becomes stronger.
- The creative problem solving exercises is introduced in addition to the classical training subject.
- The scientific committee is working together with IOI alumni closely for the training program subjects and tasks selection and preparation.

# Influence of IOI in career

- Winning IOI medals:
  - A gate to enter reputable universities and obtaining scholarship
  - Easiness to get an internship in a reputable IT companies abroad
  - Having Scholarship
- Most of all Indonesian participants are studying in Informatics *[2 exceptions]*

# IOI Alumni



2006 – 2008 alumni are graduated, most of them are Co-founders of start ups, or working in reputable IT company.  
Success of IOI alumni give motivation to candidate

# Discussion

- Leading countries in IOI have strong emphasis on mathematics in national education, and introduce algorithmic and problem solving since high school.
- Without having prior knowledge in Computer Science, solid mathematical foundation, and algorithmic problem solving in formal education, the Indonesian national training curriculum can only give the participants a foundation for general problem solving which is not enough for IOI due to increase of creativity, complexity and difficulty of IOI tasks.

# Conclusions

- Considering that IOI tasks are more and more difficult and creative, these findings will be used to reshape our strategy in the coming year.
- We have to Work together with Ministry of Education for better national mathematics , science and computer science education
- Introducing Computational thinking from the earlier age, for example by Bebras computational challenge
- More alumni involvement not only in training, but also in organizing local and regional programming competition and continuous improvement of training program curricula



# Related Works

- Factors contributed to the successful of selection, preparation and participation in IOI, by Nedkov et al (2012) :
  - Traditions
  - Strong emphasis on mathematics in national education
  - Targetted extra-curricular activities
  - Early start
  - Gaining experience by participating in competitions
  - Systematics management and dedicated people
  - Motivation and rewards.

# Thank you

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- Any questions?

# Other Contributing Factors

- Self exercise, reading books, on-line resources, and other competitions that made them regularly connect to the world of competition.
- Self exercise:
  - 54% of the respondents were exercising themselves more than 10 hours per week,
  - 17% only between 5 to 10 hours per week,
  - 17% at least 3 hours per week, and 13 % exercise irregularly.
- Solve past IOI tasks, but not so much:
  - 46% solve more than 10 tasks,
  - 17 % between 5 to 10 tasks,
  - 25% less than 5 tasks, and
  - 8% does not try to solve in past IOI tasks, and
  - 4% did not comment .