

International olympiads in Informatics in Kazakhstan

A. Iglikov
Z. Gamezardashvili
B. Matkarimov

Olympiads overview

Till 2003:

- National Olympiad in Informatics for secondary school students (organized by Daryn)

Now:

- National Olympiad in Informatics for secondary school students
- Republican Olympiad for university students
- ACM ICPC subregional contest
- Open championships of universities (KBTU, Nazarbayev U, Kazakh NU, International ITU, Suleyman Demirel U)
- International Zhautykov Olympiad
- Eurasian Olympiad in Informatics

Organizations

Republican Scientific Practical Center “Daryn” of the Ministry of Education and Science:

- responsible for National olympiads, IOI team selection, training, etc

O. Zhautykov Republican Specialized Physics-Mathematics Secondary Boarding School:

- organizes International Zhautykov Olympiad

Kazakh-British Technical University:

- organizes KBTU Open Championships
- organizes open training camps
- organizes summer / winter programming schools

Organizations (2)

Nazarbayev University:

- hosts ACM ICPC subregional contest in Astana
- organizes NU Open Championship
- organizes training camps

Kazakh National University:

- hosts ACM ICPC subregional contest in Almaty
- organizes Republican programming olympiad for university students

International IT University:

- organizes IITU Open Championship
- organizes training camps

K.Satpayev Kazakh National Technical University:

- hosts International Zhautykov Olympiad

International onsite olympiads

International Zhautykov olympiad

Eurasian olympiad in informatics

International Zhautykov olympiad

- first time conducted in 2005 (included only mathematics and physics)
- since 2009 includes informatics
- conducted by RSPhMSBSch (fizmat, the organizer) and International IT University (host since 2012)
- each team consists of 7 students
- each student competes individually in only one discipline
- classic IOI rules (except that Java is allowed)
- medals are allocated individually
- weighted sum is used to compute team score
- there are great prizes both for individual results and team results

Eurasian olympiad in informatics

- first time conducted in 2009
- organizers: SPb NRU ITMO, Daryn, Kazakh NTU
- actually EOI is All-Russian Team Olympiad hosted in Almaty (Kazakhstan)
- ACM ICPC style (almost all rules are the same)
- technical committee is from SPb NRU ITMO
- EOI is a “golden standard” for olympiads in Kazakhstan

Preparing a contest

- preparing contestants environment
- preparing contest management system
- creating a problem set

Preparing environment: ideal conditions

- **Precisely equivalent computers:** the environment should have enough computers for all contestants plus reserves for failures and the testing system;
- **Networking and printing:** all computers must be connected to network and there should be a printer available for each contestant;
- **Power, backup and restore:** system should be stable under power and other faults;

Preparing environment: ideal conditions (2)

- **Time to work:** whole system must be available and reserved for at least one week before contest;
- **Permissions:** the technical committee must have full access to the system, i.e., permission to modify hardware, to format hard drives, and reinstall the operating system and other software;
- **Software:** there should be a reliable ready-to-work contest management system;
- **Knowledge and experience:** the technical committee must have good knowledge of operating system and contest system administration;

Preparing environment: ideal conditions (3)

If all of these conditions are met, then there is a chance to run contest ideally.

Preparing environment: the reality

- + contests usually take place in universities, as a result, we have more or less similar computers situated in a collocated laboratories, with relatively good network and sometimes even with servers and printers
- nobody gives full control to these computers to the technicians of an olympiad (if there is no special order from the Ministry)
- nobody will even talk about reinstallation of operating system
- there is no possibility to reserve computers for several days before the contest
- all universities primarily use Windows-family operating systems
- there are only a few people in the technical committee and all of them are working or studying

Preparing environment: the reality (2)

So, to not loose good relations with the hosting university and provide good conditions for the participants we must somehow survive in the given conditions (i.e., **prepare everything in 12 hours**)

Preparing environment: survival guide

automate everything

Preparing environment: survival guide (2)

- use **portable (not requiring explicit installation) compilers** and IDEs (MinGW C/C++, Oracle Java, FPC, Code::Blocks, Eclipse, Far Manager, etc)
- use **self-extracting archives** for deploying the software, also note that SFX-archives can execute some commands after extraction
- use **command shell scripting** hardly, almost all installation and configuration tasks can be done through simple scripts
- find how to **run commands on remote computers**

Preparing environment: survival guide (3)

Using these principles we can prepare 100 workstations in half of a day, even without having direct administrative privileges

Testing system

There is a number of freely available systems: PCMS2, eJudge, PC², etc.

- some work only on Linux
- some require huge administration experience
- some do not support IOI rules
- it is impossible to quickly fix a problem or add a new feature

Testing system (2)

At some moment we have decided to write our own system.

It was developed in 3 stages:

- simple batch scripts for testing pre-collected submissions – used in National olympiads without network: no user interface, just command files that produce a text file with results
- a simple UI for submitting solutions and displaying standings, was born in two long nights before the IZhO 2011
- written from the scratch distributed testing system with convenient UI for contestants, jury and observers, successfully used in IZhO 2012, IZhO 2013 and National Olympiad in 2013

Testing system (3)

Features of our testing system:

- the author is a constant member of technical committee (bug fixes and features can be implemented quickly)
- almost all parts are cross-platform or potentially cross-platform
- uses shared folders for communication between machines (no network/firewall limitations, debugging is easy)
- modules are very independent (reboot/remove/add invoker on the fly)

Testing system (3)

- configuration is very simple (several small XML-files)
- UI and main logic are written in PHP, so fixes and upgrades can be made quickly, and the code is quite simple and understandable
- invoker manager is written in plain command shell language, so we don't need some special setup on invokers except compilers
- system performs full testing during the contest (not showing results to contestants for tasks with partial feedback), so jury always sees current standings
- uses invokers from PCMS2 (by ITMO) and testlib (by SSU), available on their websites

Preparing problem set

One of the main features of IZhO is wide distribution of contestant skill level and experience.

It is an international competition but not so big as IOI. So smaller number of countries participate and those who do participate sometimes do not send their strongest contestants.

So the contestants level is distributed from IOI gold medalists to beginners.

It's quite challenging to create a problem set in this situation, both interesting for experienced contestants and beginners. Our goal is to avoid situations when there are too much full scores and too much complete zeroes.

Preparing problem set (2)

In several first contests we always included a simple problem that can be fully solved by a beginner

Now almost each problem has an easy subtask for 30 or even 50 points, solvable by naive algorithm

Conclusion

Holding an International contest is a big responsibility and has large number of difficult and not-so-difficult challenges.

Having experienced team, all these challenges can be easily solved in ideal environment, but the reality introduces many limits, so we always need to find balancing point between ideal and possible solution, which experienced team always finds.

In 2015, the International Olympiad in Informatics will be hosted by the Republic of Kazakhstan and we will be happy to present our country at the best level of international contests organization!

Questions?

Photos!





Низко шумовый!
Audio-quiet technology
Attention!
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Thank you for attention!