

Programming Competitions for ITESM: Introduction

Maxim Buzdalov, Niyaz Nigmatullin

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Outline

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Programming environment

Common things for problems

Submission system: PCMS2 Client

What today?

Course website

`http://neerc.ifmo.ru/trains/itesm`

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What are they about?

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What are they about?

- ▶ Several problems are given

Programming competitions

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- ▶ Several problems are given
 - ▶ input data format

Programming competitions

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 - ▶ input data format
 - ▶ output data format
 - ▶ what to do with that

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- ▶ Solve as many problems as you can

Programming competitions

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- ▶ Solve as many problems as you can
 - ▶ Write a program

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 - ▶ **Efficiently**: fit time and memory limits

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 - ▶ Program is tested on several test cases

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 - ▶ **Compilation error**

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 - ▶ **Wrong answer, test XX**

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 - ▶ Security violation, test XX

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- ▶ Learn how to solve problems efficiently
 - ▶ invent an efficient algorithm

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 - ▶ write an efficient program

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- ▶ Learn how to solve problems efficiently
 - ▶ invent an efficient algorithm
 - ▶ write an efficient program
 - ▶ use human/computer resources efficiently

This course

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- ▶ Learn how to solve problems efficiently
 - ▶ invent an efficient algorithm
 - ▶ write an efficient program
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- ▶ Learn how to implement solutions correctly

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- ▶ Learn how to solve problems efficiently
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- ▶ Learn how to debug your implementations

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- ▶ Learn how to solve problems efficiently
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 - ▶ write an efficient program
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- ▶ Learn to read code from the paper

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- ▶ Contests
 - ▶ thematic problems (graphs, CG, DP)

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 - ▶ real problems (high school competitions)
- ▶ Problem analysis

This course

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- ▶ Contests
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- ▶ Problem analysis
- ▶ Lectures

This course

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- ▶ Contests
 - ▶ thematic problems (graphs, CG, DP)
 - ▶ real problems (high school competitions)
- ▶ Problem analysis
- ▶ Lectures
 - ▶ coding tips and tricks, team strategies, ...

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Available languages

- ▶ C, C++, Java (as at World Finals)

Common things for problems

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Common things for problems

- ▶ Testing machines: AMD Phenom II X4 955, 3.2GHz, 8G RAM

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 - ▶ “security violation” if waiting for `stdin`, if using files

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 - ▶ be careful when reading problem statement

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 - ▶ be careful when reading problem statement
- ▶ Time limit: see problem statement

Common things for problems

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 - ▶ be careful when reading problem statement
- ▶ Time limit: see problem statement
- ▶ Memory limit: typically 256 megabytes

Common things for problems

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 - ▶ be careful when reading problem statement
- ▶ Time limit: see problem statement
- ▶ Memory limit: typically 256 megabytes
- ▶ We report test numbers

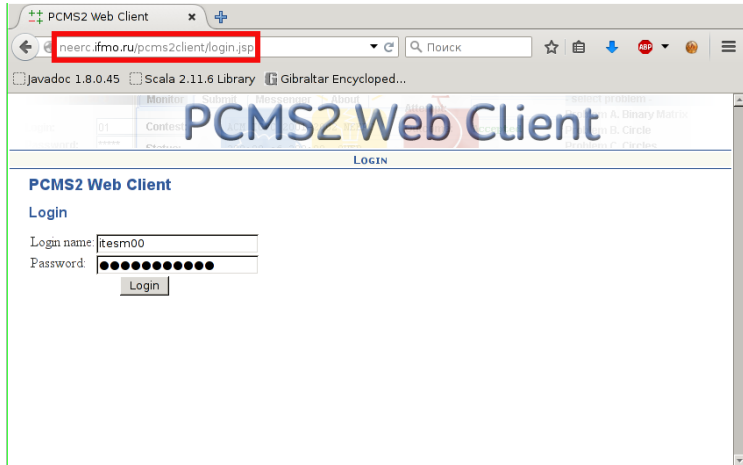
Common things for problems

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 - ▶ typically `something.in/something.out`, if using files
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 - ▶ be careful when reading problem statement
- ▶ Time limit: see problem statement
- ▶ Memory limit: typically 256 megabytes
- ▶ We report test numbers
 - ▶ “wrong answer, [test 22](#)”
- ▶ Usually first k tests are example tests from the problem statement

PCMS2 Client: Login window



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PCMS2 Client: Monitor

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PCMS2 Web Client

MONITOR SUBMIT RUNS MESSENGER LOGOUT

Programming Challenges for ITESM: Day 1

RUNNING, 159:01 of 300:00 ☒ Show time

Last success: * SPb IFMO 8, G (Given a string...), 158:06

You are: Jury

Rank	Party	A	B	C	D	E	F	G	H	I	J	K	=	Time
1	SPb SU 1	+	+	+	-1	.	.	+	+2	+	+	+	8	452
2	SPb IFMO 1	+2	+	+	.	+	.	+2	.	+	+	+	7	490
3	SPb IFMO 2	+	+	+	.	-2	.	+1	+2	+	+	+	7	551
4	SPb IFMO 3	+1	+	+3	.	.	.	+	-3	+	+4	+	6	401
5	Petrozavodsk SU 1	+1	+	+	.	+2	.	-6	.	+1	+	+	6	450
6	SPb SPU 1	+	+	+1	.	.	.	+1	.	+	+	+	6	489
7	SPb IFMO 4	+	+2	+	.	.	.	+4	+	+2	+	+	6	400

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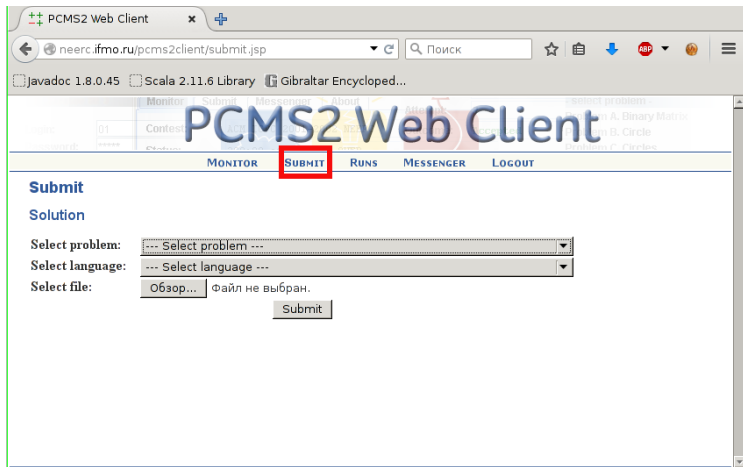
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What today?

PCMS2 Client: Submit a problem



The screenshot shows a web browser window titled "PCMS2 Web Client" with the URL "neerc.ifmo.ru/pcms2client/submit.jsp". The browser's address bar and search bar are visible. Below the browser window, the PCMS2 Web Client interface is displayed. It features a navigation bar with links: "Monitor", "Submit", "Messenger", "About", "Contest", "ACM", "ICPC", "IOI", "IOJ", "IOI", "IOJ", "IOI", "IOJ". The "Submit" link is highlighted with a red box. Below the navigation bar, the "Submit" section is active, showing a "Solution" form. The form includes three dropdown menus: "Select problem:" (with "-- Select problem --" selected), "Select language:" (with "-- Select language --" selected), and "Select file:" (with "Обзор..." selected). A "Submit" button is located at the bottom of the form. The text "Файл не выбран." is displayed next to the "Select file:" dropdown.

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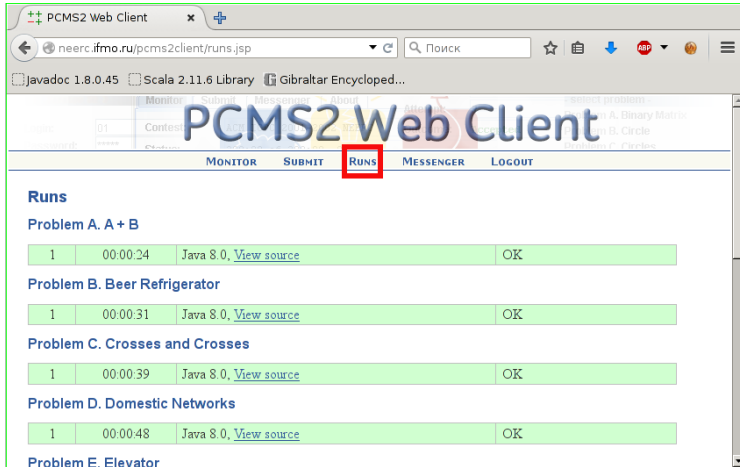
PCMS2 Client

What today?

PCMS2 Client: View your runs

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The screenshot shows a web browser window titled "PCMS2 Web Client" with the URL "neerc.ifmo.ru/pcms2client/runs.jsp". The browser's address bar and search bar are visible. Below the browser window, the PCMS2 Web Client interface is shown. The "RUNS" tab is highlighted with a red box. The interface displays a list of runs for various problems, including "Problem A. A + B", "Problem B. Beer Refrigerator", "Problem C. Crosses and Crosses", "Problem D. Domestic Networks", and "Problem E. Elevator". Each problem has a table of runs, with the first run in each table showing a status of "OK".

Problem	Run ID	Time	Language	Status
Problem A. A + B	1	00:00:24	Java 8.0, View source	OK
Problem B. Beer Refrigerator	1	00:00:31	Java 8.0, View source	OK
Problem C. Crosses and Crosses	1	00:00:39	Java 8.0, View source	OK
Problem D. Domestic Networks	1	00:00:48	Java 8.0, View source	OK
Problem E. Elevator				

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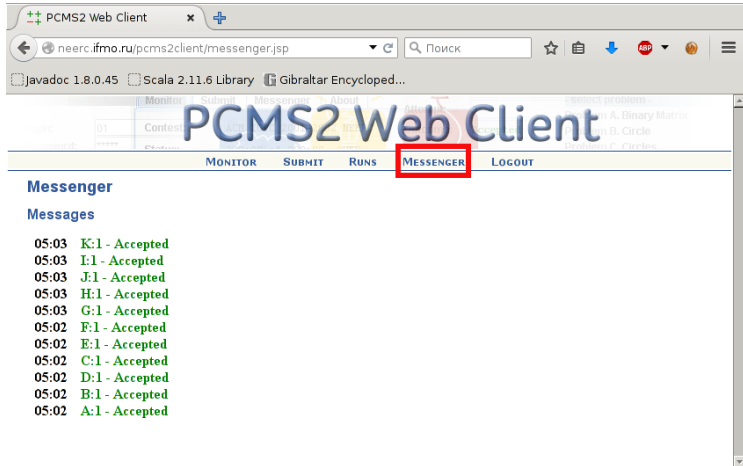
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What today?

PCMS2 Client: View messages

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The screenshot shows a web browser window titled "PCMS2 Web Client" with the address bar displaying "neerc.ifmo.ru/pcms2client/messenger.jsp". The browser's address bar also shows "Поиск" (Search) and "ABP". The page content includes a navigation bar with links: "MONITOR", "SUBMIT", "RUNS", "MESSENGER" (highlighted with a red box), and "LOGOUT". Below the navigation bar, the "Messenger" section is visible, showing a list of messages under the heading "Messages". The messages are as follows:

Time	User	Status
05:03	K:1	Accepted
05:03	I:1	Accepted
05:03	J:1	Accepted
05:03	H:1	Accepted
05:03	G:1	Accepted
05:02	F:1	Accepted
05:02	E:1	Accepted
05:02	C:1	Accepted
05:02	D:1	Accepted
05:02	B:1	Accepted
05:02	A:1	Accepted

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Practice session

- ▶ Get acquainted with the environment

Practice session

- ▶ Get acquainted with the environment
- ▶ We together solve two problems

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- ▶ Get acquainted with the environment
- ▶ We together solve two problems
- ▶ Then you solve two simple problems and one funny problem in an hour

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 - ▶ C/C++: check how `std::cin`, `std::cout`, `printf`, `scanf` work with various data types (`long long`, `long double`, etc)

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 - ▶ in every language and every dialect you plan to use
 - ▶ C/C++: check how `std::cin`, `std::cout`, `printf`, `scanf` work with various data types (`long long`, `long double`, etc)
- ▶ You may check system error messages, testing machine performance, etc