

# BOI 2007 Rules

April 29, 2007

## Competition Days

The competition days of BOI 2007 are Wednesday, April 25 and Thursday, April 26. On each competition day there will be one competition round in which the contestants will have five hours to complete three tasks.

There will be a practice round on Tuesday, April 24. In the practice round the contestants will have one hour and one practice task to get familiar with the contest environment, including their workstations and the evaluation system interface.

The solutions submitted during the practice round will be evaluated, but the results will not be considered in the final ranking.

## Competition Equipment

For each competition round each contestant will have a desk with an IBM PC-compatible computer. At least the following software will be available on each computer:

- the Linux operating system
- the Free Pascal compiler, version 2.0.0
- the GCC compiler for C and C++, version 4.1.2
- the GNU Emacs editor, version 21.4.1
- the vim editor, version 7.0
- the kate, version 2.5.5
- the rhide, version 1.5.0.1
- the gdb debugger, version 6.4.90
- the Firefox browser. (It may only be used to access the BOI 2007 evaluation system and the documentation of the software listed here)

The software will be installed in standard configuration including help files and examples (if any are supplied by the vendor).

The contestant can use all software and documentation found on the computers and the Grading server. No other software or documentation is allowed.

Blank paper, pens and all necessary forms will be available in the competition room. Contestants may bring keyboards with them; however, the organizers have the right to deny their use (if for instance their programmable keys have been utilized excessively). Using any printed materials (except official BOI 2007 materials) or other materials or equipment (except official BOI 2007 equipment) is prohibited. Bringing any other electronic devices (including mobile phones) to the competition room is prohibited.

## The Tasks

The tasks posed at BOI 2007 are intended to be of algorithmic nature. That is, the focus is on designing correct and efficient algorithms.

## The Solutions

Unless stated otherwise in the task description, the solution of a task is a program written in the following three supported programming languages:

<b>Language</b>	<b>Standard dialect</b>
C	ISO C99
C++	1998 ISO C++, extended with the same long long int idiom as in ISO C99
Pascal	Borland Turbo Pascal 7.0

It is strongly advised to avoid using platform-specific features in Pascal. For C and C++, it is recommended to use only the aforementioned standard dialects. The source code of each solution must be contained in one file and submitted through the BOI 2007 contest system interface.

The program must read input data from an ASCII text file with the name given in the task description. Contestants must not include full path in file open operations. They must assume that input file is in the current working directory. Programs must not attempt to read any additional data neither from the keyboard nor from files not specified in the task description.

Contestants may always assume that the input data agrees with the task description.

The input file consists of a number of lines, each of them (including the last one) terminated by an end-of-line marker. Input values are separated from each other by either a single space character or a single end-of-line marker. The structure of input is always such that a contestant does not need to worry about end-of-file conditions.

The program must write output data to an ASCII text file with the name specified in the task description. Contestants must not include full path in file open operations. They must create the output file in the current directory. Output on the screen or contents of any other files will

not be evaluated. It is not allowed to make working files during program execution. Output data must consist of a sequence of items separated by space characters or end-of-line symbols as specified in the task description. Contestants must not add output of their own.

In output, spaces and end-of-line symbols must appear exactly as stated in the task description. Each output line (even the last one) must end with the end-of-line symbol. No spaces may precede the end-of-line symbols.

Any of the above conditions may be overridden in the task description. Please note that the input and output file names are case-sensitive and the input file is read-only in the evaluation system.

## **Starting**

When contestants enter a competition room at the beginning of a competition round, they will find the competition tasks inside an envelope next to the computer. Contestants are not allowed to open the envelope or touch the computer until the start signal is given. For each contestant task descriptions are presented in English and in his/her native language (if such a translation has been prepared by the team leaders). In case of any discrepancies, the English text is binding and official.

## **Assistance**

A contestant may ask a room supervisor for assistance at any time. The supervisors will NOT answer questions about the competition tasks (see the section “Requests” below), but will deliver question forms, help to find toilets, and attend to computer problems. The contestant must not communicate with other contestants during the competition.

## **Requests**

Contestants may submit questions and technical support requests.

Questions must be submitted in writing on special question form. Question forms are available in competition rooms in English.

If the question is submitted in native language it will be translated into English by the team leader. Requests should be submitted to the room supervisor.

Contestants may ask questions concerning the competition tasks only during the first hour of the competition. Only one of the following three answers is possible: “Yes”, “No”, or “No Comment”. All questions not related to the text of the competition tasks will be answered “No Comment”.

The jury consisting of the team leaders of the participating countries will answer every question submitted by contestants. Answering may take some time, so the contestant should continue

working while waiting for the answer to a given question. The contestant shall not be involved in the discussion.

If contestants encounter problems with hardware, they can submit a technical problem request to the room supervisor. In case of hardware failure, extra time will be granted to a contestant, but this will cover only the amount of time needed to replace the hardware.

## **Delivering the solutions**

Contestants submit their solutions using the web-based evaluation system interface.

The Contest system accepts the submission if it compiles and solves the given simple test(s). Alternatively, the contestant can force the system to accept the submission even if it fails to solve the test(s) by checking the appropriate option in the user interface of the system. The system will report whether the submission was accepted or not.

The URL, username, and password needed to access the system will be given to each contestant together with the tasks.

## **Ending the Competition**

Contestants will be given a warning both 15 and 5 minutes before the end of the competition. The contestants have to submit their solutions before the end signal. At the end signal contestants must immediately stop working.

## **Evaluation Process**

After each round, an evaluation process starts.

Evaluation of a program involves several test runs with confidential input data and special evaluation software. A test run for a program consists of the following steps:

- The contestant's last submission that was accepted by the Grading system (see the section "Delivering the solutions" above) will be compiled using the command line compiler and the switches specified below.
- The resulting executable will be copied into a special evaluation directory.
- Input data will be copied into the appropriate file in the same directory.
- The executable will be executed without any command-line parameters.
- If the program terminates with return code 0 within the time limit specified in the task description, then the output will be checked, otherwise the output will NOT be checked and the program scores 0 points for the test.

The points awarded for each test run are aggregated to give the final score for the problem. The team leader will receive a printed form with evaluation results.

The evaluation will run on separate computers with the Linux operating system. The compilation characteristics are as follows:

<b>Language</b>	<b>Suffix</b>	<b>Compiler and version</b>	<b>Compilation command and options</b>
Pascal	.pas	Free Pascal 2.0	ppc386 -Mtp -Sg -O2 -XS
C	.c	GCC 4.1.2	gcc -std=c99 -O2 -static -lm
C++	.cpp	GCC 4.1.2	g++ -std=c++98 -O2 -static -lm

The filename must be suffixed exactly as shown in order for the Grading system to select the appropriate compiler. Programs must not attempt to modify hardware and operating system settings.

Programs must not attempt to use more than 16 MB of memory. The size of a source file must not exceed 1 MB. This may be overridden in the task description.

Testing is done on an Intel Celeron M 1.73GHz processor.

## **Penalties**

If a contestant violates these rules, then the organizers tell the contestant to stop further violations immediately and resume orderly work. After the contest session, the jury consisting of the team leaders of the participating countries will decide on possible further penalties, depending on the severity of the violation. Such penalties range from subtracting points from the contestant's score to even eliminating the contestant from the competition altogether.