ICPC Challenge

Competition Model

March 26, 2009

The 2009 ICPC World Finals will include an ICPC Challenge problem, a problem that offers teams a different type of programming task. Instead of developing programs that try to provide correct output for all the judge's test data, teams develop programs that compete against those of other teams. Each team's program, their *player*, competes in a game-like simulation, and an overall winner is determined via a tournament among submitted players. The coding phase of this competition will run for two weeks and will end two weeks prior to the world finals. The tournament among submitted players will be presented as part of the world finals events.

The ICPC Challenge is an effort to continue to offer the kinds of visual, interactive, competitive programming problems popularized by previous offerings of the Java Challenge. For many participants, the challenge problem has provided an exciting, open-ended opportunity to express creativity. Success is a result of developing and implementing a robust player with a sound strategy and correctly anticipating the strategies employed by ones opponents.

This document describes how the ICPC Challenge will be conducted. At the start of the coding phase, a document describing this year's challenge problem and software supporting that problem will be made available on the challenge website, `http://icpc.baylor.edu/challenge`.

Participation

Each world finals team can submit a player to compete in the ICPC Challenge tournament. For 2009, this is a contest among the world finals teams, and only team members and the coach are permitted to contribute to designing and implementing the team's player.

Coding Phase

At 00:00 GMT on March 16, 2009, a description of the problem will be made available on the ICPC Challenge website. Teams can download this description along with a copy of the game and some sample code for players.

The coding phase will run for two weeks. Teams can develop their players, submit preliminary versions of their code and even compete with preliminary versions of other teams' players.

By the end of the coding phase, 00:00 GMT on March 30, 2009, teams must submit the final version of their player. The last version submitted before this deadline is considered the team's final submission.

Player Operation and Organization

Players may be implemented in either C/C++ or Java. Each turn, the player interacts with the game by reading game states from standard input and writing a desired move to standard output.

Source code for a player may consist of multiple files, but all files must reside in a single directory. Java implementations should place all classes in the default package.

Submissions can include source files and data files supporting the player, but the submission for a single player cannot exceed 256 kilobytes in total size and 50 individual files. A player's source code and any other submitted files will be available in the current directory during execution.

For C/C++ submissions, all files ending in `.cpp` will be compiled and linked together into an executable. During compilation, the submission directory will be the current directory. Player code will be compiled with the -O option and will be linked with -lpthread.

For Java submissions, all files ending in `.java` will be compiled. Only one main function is expected in the resulting classes, and that class will be executed as the player.

Submission language is determined by the file name extensions used in the submission. Submissions that contain a mixture of Java and C++ files will be considered invalid, as will submissions do not compile or do not have a single entry point.

Compile/Execute Environment

The specifics of the execution environment may be subject to change before the coding phase begins. This section describes what is currently anticipated.

The compilation and execution environment for players will approximate the team machine configuration for the world finals. Player code will be compiled and will run on a virtual machine running on a 3.0 Ghz Xeon processor installed with version 5.2 CentOS. Java submissions will be compiled and run with version 1.6 of the Sun JDK, and C++ submissions will be compiled with version 4.1.2 of g++.

Player code will have uncontested use of a single core and 1 GB of physical memory, except for the overhead associated with the operating system and the virtual machine environment. During execution, player submissions will be permitted to read from standard input and write to standard output and standard error. They may also open files in the current directory for reading and even create new threads. Attempts to access other system resources (*e.g.*, read from files elsewhere, create network connections, start new processes) may result in disqualification.

Submission Interface

Once the coding phase begins, the challenge website, `http://icpc.baylor.edu/challenge`, will offer a link to a web interface for submitting player code. Finals team members will authenticate using the same credentials they use for the registration system, and then they will be permitted to submit player code on behalf of their team. Any member of the finals team can submit a player for the team, and each new submission from any team member takes precedence over previous submissions.

All source code and supporting files for a player must be submitted at once. If you forget to submit an important file, you will need to re-submit everything to have a working player.

Preliminary Matches

A day of the coding phase runs from 00:00 GMT to 00:00 GMT the next day. With the exception of the last day, preliminary matches are held after every coding day. At the end of each day, a snapshot of the latest version of every team's player will be taken. Each player will compete in 3 matches with randomly selected players from other teams. A will/loss record for these random matches will be recorded for each team and reported publicly at `http://icpc.baylor.edu/challenge`.

In addition to the three random matches, each day a team may request up to three additional matches with the latest preliminary version of the players from other teams. These matches are held at the same time as the random matches and depend on the state of players at the end of the coding day. Results of these requested matches are not included in the win/loss record for the team and are not publicly available, but a recording of the match is made available to both the team requesting the match and the team against which they choose to compete. This gives teams the ability to challenge others with a strong win/loss record and

see how they perform against them. However, electing to compete against another team in a preliminary match exposes something of your own play strategy to that team.

Recordings of requested preliminary matches are available the next day from the challenge submission interface. Recordings of the randomly selected matches are not made available.

Final Tournament

At 00:00 GMT on March 30, 2009, a final snapshot of every team's submission will be taken. These are considered the teams' official submissions.

A tournament among these players will be featured as part of the 2009 world finals. The tournament will be organized into two phases. The initial phase will group players into 16 randomly-chosen groups. A round-robin tournament within each group will determine which teams advance to the second phase, a double-elimination tournament to determine the winner and runners up.

Additional Information

The ICPC Challenge website, `http://icpc.baylor.edu/challenge`, will provide regularly updated information during the coding phase of the challenge. Questions can also be directed to the director of the challenge problem, `David_Sturgill@baylor.edu`.