What's New In PC^2 Version 9.1

1. Introduction

This document describes changes and enhancements in PC^2 between Versions 9.0 and 9.1. If you are not already familiar with Version 9.0 you should be sure to read the separate document "What's New In PC^2 Version 9.0" prior to this document, since many of the changes described here refer to modifications, enhancements, and bug fixes to the Version 9.0 system described in that document. If you are not familiar with PC^2 at all, then you should first read the "PC^2 Version 8 Contest Administrator's Guide", followed by the "What's New In Version 9.0" document.

2. New Features

2.1. Automated Judging

Starting with Version 9.1, PC^2 provides support for "automated judging" – sometimes referred to as "computer judging". Automated judging is the ability to have team submissions automatically evaluated and to have the evaluation returned to teams without human intervention. Automated judging can be configured on a per-problem basis; that is, some contest problems may be set to be "auto-judged" while others are handled by human judges as in previous versions of the system.

2.1.1. Problem Setup

The Add/Edit Problem screens now provide three tabs: one for configuring the problem itself (as in previous versions of PC^2); one for configuring the "Validator" associated with the problem (also as in previous versions); and one for configuring the "judging type" of the problem. To specify that a problem should be able to be "auto-judged", its "type" should be changed from "Manual Judging" (the default, which is identical to the way judging worked in previous versions) to "Computer Judging". The following shows the "Judging Type" screen used to configure a problem for auto-judging.
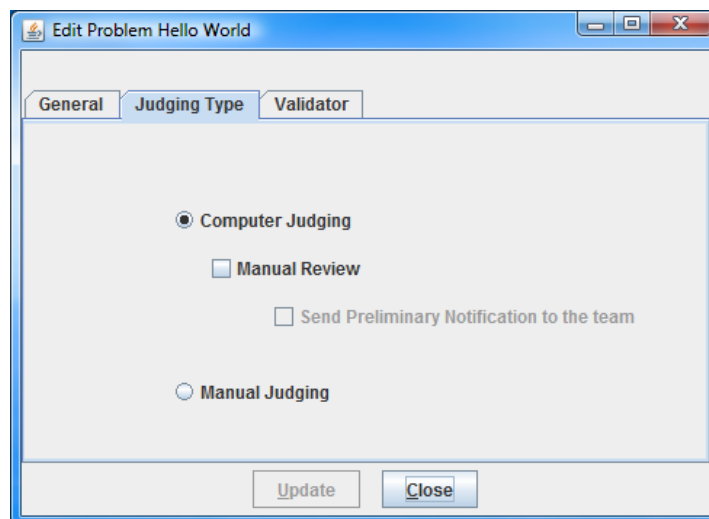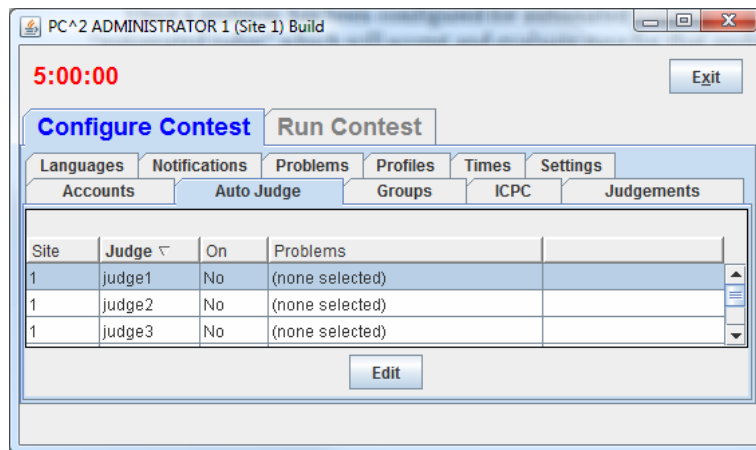

Problems which are configured for computer judging require having a "Validator" associated with them. A Validator is typically a separate user-written program that accepts as input (from PC^2) the execution output of a team's run, and returns to PC^2 an indication of what judgment should be applied to the run. [Note that validators have been supported in PC^2 since Version 8.5. However, in

versions prior to the V9.1 release, validators were only used to display a "recommended response" to assist the human judge; starting with V9.1 the system supports allowing the validator to be solely responsible for determining the run judgment without human intervention.]

The specification for creating validators is exactly the same as in all previous versions of PC^2; see the PC^2 Version 8 Admin Guide, or the Validator specification posted at the PC^2 website, for details. Also, as with previous versions of PC^2, the system provides a simple "internal" validator which may be used in lieu of a separate user-written program.

2.1.2. Judge Setup

Once a problem has been configured for automated judging, it is necessary to create and start an "automated judge" which will accept and evaluate runs for that problem. The contest administrator must create one or more Judge accounts (using the normal account creation procedure) which will be used solely for auto-judging. Once these judge accounts are created, the Admin "Auto Judge" tab is used to select and edit (configure) each account which will be used for auto-judging. The following shows account "judge1" selected (highlighted) in preparation for editing (configuring for auto-judging).


Clicking the "Edit" button shown above will display the Auto-Judge Settings for the selected account as shown below. In this example there have been two problems configured for computer judging – one with the name "Hello World" and the other with the name "Sum the Ints". The "Sum the Ints" problem has been selected (highlighted) and the "Enable Auto Judging" box has been checked; hitting the "Update" button will configure this account ("judge1") to automatically fetch and judge any runs submitted for the "Sum the Ints" problem.
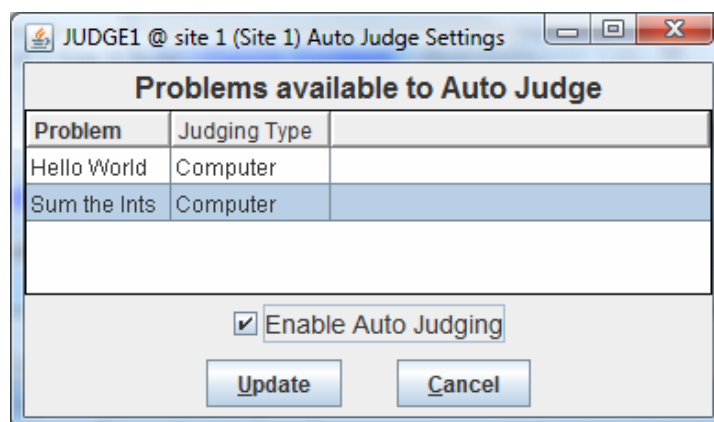
It is important to note that *assigning a problem to a judge account for auto-judging requires both selecting the problem* on the "Auto Judge Settings" screen *and enabling auto-judging for the selected problem(s)* by clicking the Enable Auto Judging checkbox. Problems which are not selected (highlighted) when the "Update" button is pushed will not be auto-judged by that judge; failing to check the "Enable Auto Judging" checkbox will disable the judge account from performing any automated judging.

The following picture shows the Admin "Auto Judge" tab after the preceding "Update" operation. Notice that judge1 has been "enabled" for auto-judging (On=Yes), and it is configured to judge "Sum the Ints" (only).   It is allowable to configure a single judge account to auto-judge any number of problems (however, the problems must have been configured for "computer judging" or they will not appear on the Auto Judge Settings screen for the judge).
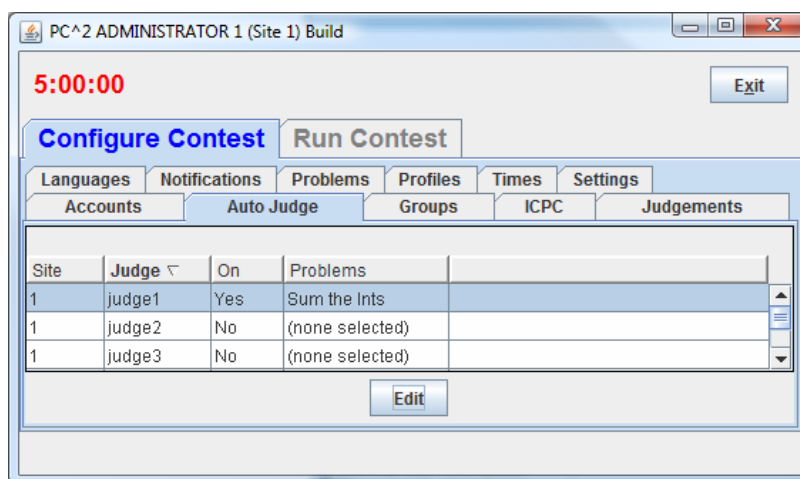

Once a judge account (or several judge accounts, each judging different problems for example) has been configured, the auto-judging process is initiated by *logging a PC^2 client into that account.* In the above example, for instance, logging "judge1" in to the contest will automatically cause any runs submitted for the "Sum the Ints" problem to be fetched and judged automatically, with the result automatically sent back to the team.

2.2. Preliminary Judging and Manual Review

Problems which have been configured for "Computer Judging" can be handled in multiple different ways by the system. One way is to have the system simply return the result to the team upon completion of automated judging. This is the simplest case and matches the screens shown above.   This would be used when it was desired to have the contest run in "fully automated" mode with no direct human involvement in the judging process.

Alternatively, the system can be configured so that it first evaluates a run and then, instead of sending the result back to the team, "forwards" the run and the recommended result to a human judge for "manual review". In this case an additional option exists: immediately notifying the team of the result of the "automated" portion of the judging process, before the completion of the "review" process by the human judge. Sending the auto-judging response to the team without waiting for completion of the human review is referred to as issuing a "Preliminary Notification". This function can be enabled on a per-problem basis on the "Judging Type" tab on the Problem

configuration screen. An example of a problem being configured for Computer Judging with Manual Review and Preliminary Notification of the team is shown below, followed by an image of the problem configuration status in the Admin "Problems" tab.
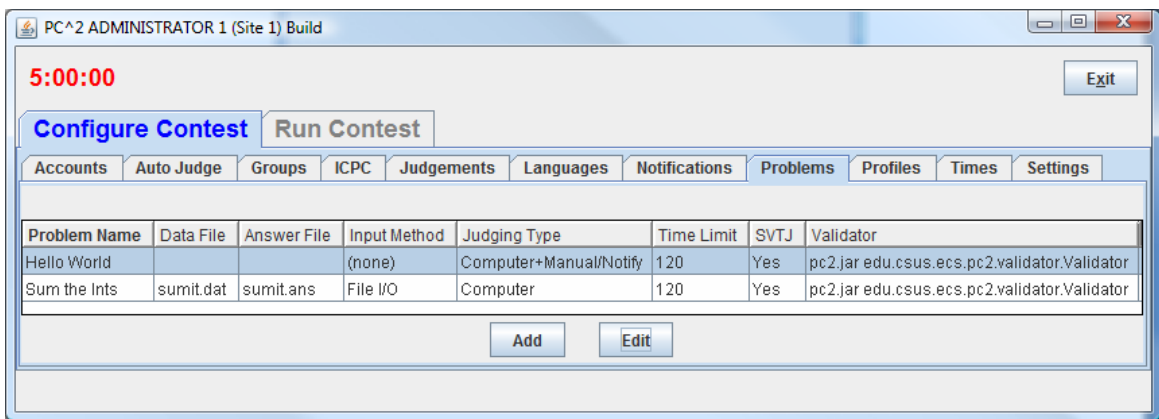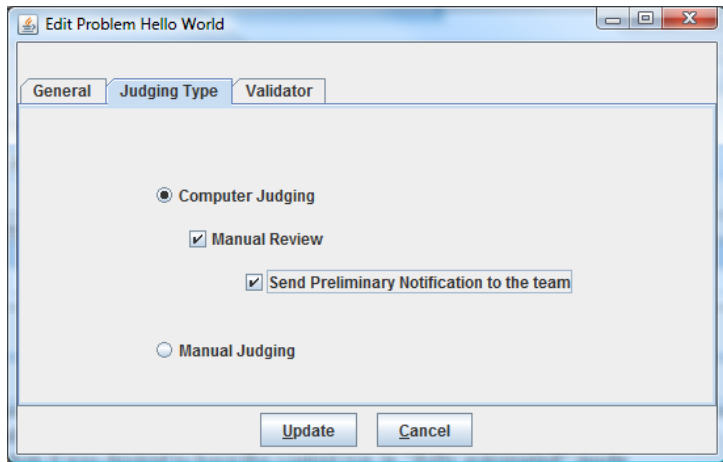
2.3. Run and Clarification Filtering

Beginning with Version 9.1, many screens which display "grids" (lists of runs and/or clarifications in the contest) also support the ability to "filter" the runs which are displayed in the grid. Clicking the "Filter" button will display a Filter configuration screen allowing the user to choose the criteria for runs which should be displayed on the corresponding grid. For example, the following shows the configuration for a filter to cause a grid to show only NEW runs written in Java for the "Hello World" problem. Note that a filter is not activated unless "Filter On" is checked.

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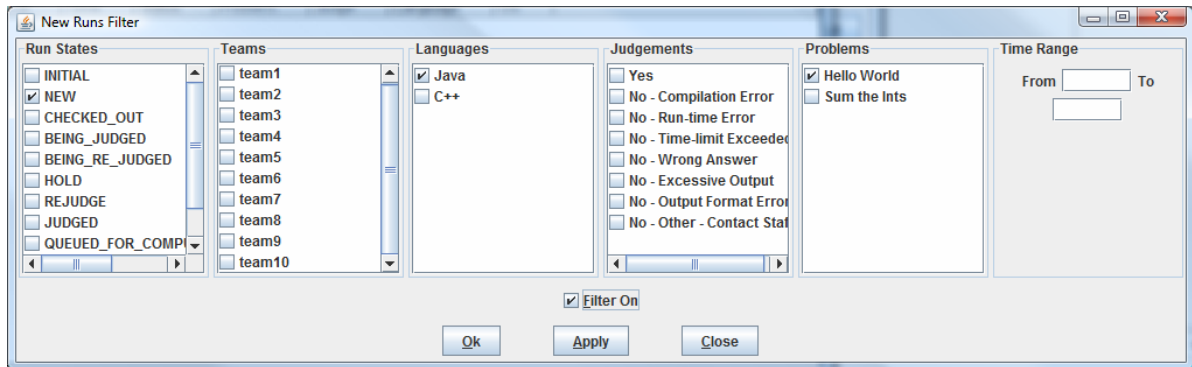
2.4. Importing ICPC Data

Support for accessing data maintained at the ICPC Headquarters (for example, Registration information for teams participating in ICPC Regional Contests) has been improved in V9.1. In particular, the Admin has a new "ICPC" tab which allows for easy import of files downloaded from the Headquarters database system, along with facilities for modifying the way the team information contained in the download file is displayed on the scoreboard.

2.5. API Implementation

Beginning with V9.1, PC^2 provides a new Application Programming Interface (API). This API supports creation of arbitrary external clients which can connect to a running contest (provided they have the proper authentication credentials – specifically, a valid account and password). Once connected to a contest, the external client can "register" to listen for the occurrence of a variety of contest events. For example, clients can arrange to be notified whenever a new run is submitted, when a judgment is returned, when certain contest configuration data changes, and a host of other events. Documentation on the use of the API, including code samples showing how to create and connect a new client through the API, can be found by following the "API Documentation" link posted on the PC^2 Test User's Group (TUG) page.

2.6. Native Look-And-Feel

Beginning with V9.1, PC^2 uses the local machine's "native look-and-feel" by default. This means that running PC^2 on a machine will produce GUI screens and related components that have the same general appearance as other similar components on that machine. Users who wish to override this default action can do so via settings in the **pc2v9.ini** file. Specifically, the entry **plaf=java** in the **[client]** section of **pc2v9.ini** will force PC^2 clients to use the standard Java "pluggable look-and-feel" regardless of the underlying OS platform, whereas **plaf=native** will cause it to use the native platform's look and feel (**native** is also the default if no relevant **pc2v9.ini** entry is present). Future releases may also allow other "pluggable look-and-feel" frameworks to be similarly invoked by name, but V9.1 supports only the **java** and **native** PLAF's.

3. Bug Fixes

A large number of bugs have been fixed between Version 9.0 and Version 9.1. For starters, the bugs listed in sections 7.1-7.3 of "What's New In PC^2 Version 9.0" – that is, handling multiple logins using the same account, the functionality of the "Automated Judging" mode, and ability to use the "Add Accounts" button – have all been fixed in Version 9.1.

In addition, nearly 100 other bugs – some trivial, some significant – have been found and fixed in Version 9.1. For complete list of bugs fixed in V9.1, please see the PC^2 Bugzilla bug list posted on the PC^2 Test User's Group (TUG) page.

Finally, a number of issues still remain in the 9.1 distribution. Many of these have already been fixed and will be contained in the next release, while some are still be worked on. A complete list of these issues along with their current status is also available on the TUG page. Some of the more significant issues include:

- The "countdown clock" on team machines showing the "Remaining Time" in the contest may be incorrect under certain circumstances.

- Duplicate logins to a Judge account can cause Runs to temporarily disappear from the Judge's grid.

- Balloon notification messages may be printed whether or not a Judge specifies that a Team should be notified of a Run Judgment.

- Under certain conditions the Admin can erroneously allow the Contest Administrator to configure a problem for "Computer Judging" without requiring specification of a validator.

- If the Contest Administrator loads a replacement data file for a contest problem and the replacement file has the same name as the original file, under certain conditions the Admin fails to load the new file.

- A Judge account configured for "Auto-Judging" does not check the "run submission queue" when it is started (logged-in); any runs already in the queue will not be processed until the occurrence of the first submission after the "auto-judge" was started.

Again, many of these bugs have already been found and fixed, but those fixes are not necessarily present in the V9.1 release. See the PC^2 TUG page, and the PC^2 Bugzilla system, for further information.