

Touché Programming Contest Software

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Introduction

The Touché project was started by Jason O'Kane. Others who worked on it before us were David Whittington (a.k.a. Sparky), David Crim, Steve Overton, Victor Replogle, Dr. Geisler, and Dr. Brandle.

The goal of the software is to effectively run a programming contest, in which contestants can submit their code online, and judges can review that code after it has been run against the appropriate test cases. The judges should be able to look at an automated grade, and either agree with it, or make a different judgment. The contests are to be easy to construct by the administrator, and flexible in their options even while running.

There were three major upgrades that were undertaken during this project. A change to the judging interface, Bug fixes and enhancements, and placing the software on two live CDs.

The Old Architecture



This is the old judging page. Under the old architecture, the judge would stay on this page and wait for new submissions to come in. When a contestant would submit a new piece of code this page would compile, and run it, and then give a suggested result. The judge could only view one code submission at a time, and had to sit and watch as every single submission was compiled and run. There was also a serious bug in that whenever they would leave this page, any submission that was currently displayed would be lost.

The New Architecture

In this new page, made in the new architecture, the judge can view all submissions at one time. They are given the team name, problem, and suggested response all at once. You might have noticed, however, that they do not have means by which they can make their judgment for each submission.



The New Judging Page

The link from the page above directs the judge to this new page. It looks very much like the page under the old architecture, but it has more information, such as the link to the source code.



Enhancements

In addition to making changes to the architecture, two additional functionalities were made to enhance the system.

The Review Judgments Page

This new page gives the judges the additional option of being able to change their judgments. Before, when a judgment was made, the judge would never be able to see that submission again. Now, the judges can look at all of the old submission which have already been judged, and change their judgment if they feel that a mistake was made the first time.

The Re-judge the Contest Option

This page was added to the administrator's interface rather than the judge's. What this does, is it re-runs the contest, making new auto-responses for each submission. On this page the administrator can see each submission that has a different auto-response compared to the response previously given to it by a judge. This is an essential feature, because there are occasions where a test might be flawed, so good code will be judged poorly, and poor code may be judged well. Once this problem is found, this option can help to make the corrections in the contest results.

Bug Fixes and Feature Additions

There were a couple different lists of bugs and feature requests that had been put together by people running and observing the contests that have been conducted with the software. These lists were compiled into one larger list as they were discovered. There were around 40 bugs in the original this and this has been cut to just a couple. The contest setup consisted of about 3 pages of instructions that involved the user setting up the server, the file system, and the database. There was also some handholding that needed to take place throughout the running of a contest. These things made it very difficult for any user that was unfamiliar with the system.

Contest Setup



These three pages replaced about two pages of complicated instructions. Rather than the administrator setting up the file system and database manually, he simply goes through these three pages and a script takes care of all the behind the scene setup.

The image below shows the interface for many of the additional features that make the software easier to use.

In the normal course of setting up and running a contest, there is usually a test contest, a warm-up contest, and the real contest. With the old system, this meant that the administrator would have to set up three different contests and enter the information for each contest individually. Some features that were implemented to make this easier were the clear contest and clone contest. With these



features, one contest can be created and set up, then it can be cleared after tests, or cloned to make a real contest from a warm-up contest.

There were many other features that were implemented to make the system nicer to work with. Things such as the possibility to extend the contest if the need should arise, an easy way to have each team's files put in a zip file and emailed to them. Another item that was added to make the software easy to use was the creation of a script to create contest. When this is used in conjunction with the last section of the project, the live CD's, it should be very easy to get a contest up and running. The administrators should be able to set everything up through forms in a web browser.

Live CD

The Touché contest software involves a complex system setup in order for it to function properly. The solution to this problem was to create the script mentioned earlier and to create a live CD. A live CD is a bootable operating system that runs completely from a CD. The distribution we are using is KNOPPIX. This is a live CD that is known for its ability to work with almost any hardware configuration. It also will increase security because the participants in a contest will be unable to affect any of the contests host's systems.

Several hurdles had to be overcome during the course of the project. The main hurdle was the fact that changes made in KNOPPIX are not persistent. This meant that any changes made to test the system were reset any time the computer was rebooted. This meant that any changes needed to be made in a non testing environment and then the iso had to be recreated which could take up to 30 minutes. This made it time consuming and difficult to do testing and rework. The next major hurdle was the fact that KNOPPIX is set up differently than other Linux distributions. This meant that learning how it was set up and finding documentation was difficult. Making sure that our system was set up the same way as Taylor's server was very important to ensure the contest software would run.

The final state of the project was a working live CD server. There are some minor tweaks that need to be completed, but a test contest was able to be completed and all parts of the system appeared to be working correctly.

The live CD will make it much easier to run a contest at a remote location. All the system setup will be done on the CD and thru the setup script. This will make it much easier to distribute our contest system to other sites.



Conclusion

In conclusion, the changes that were made to the coding contest software have brought the system as a whole much closer to the final goal that for the project. With the new enhancements, the contest can be set up much more quickly now than it could before. The judges will find responding to submission a much more intuitive task, which is performed faster, and with better information than before. The live CDs will make the setup and administration of the contest much easier. They will also allow for easy distribution of the Touché software.

We would like to acknowledge those people who have worked on this project before us. We used a great deal of their work in making the changes that we did. And we would like to give special acknowledgement meant to Dr. Geisler, who spent many hours over the past month giving us the help and support which made this project so successful.