

UIL Computer Science

District Hands On Contest - Pilot

Contest Director's Guide

Introduction: Thank you for agreeing to participate in the pilot of the UIL Computer Science hands on programming competition at the district level. The pilot is being conducted to determine if it feasible to include a hands on portion as an official part of the district level contest at some future date. The pilot also allows districts to gain experience in running a hands on programming contest. As a pilot the result of the hands on competition has no effect on which individuals and team advance to the regional competition. Nor does it affect the district sweepstakes competition. At the district level those results are based solely on the results of the written test.

If you have any questions about these instructions please contact Mike Scott at scottm@cs.utexas.edu or (512) 217-4325.

Overview of the Contest:

- In a hands on programming contest teams consist of three members. If a team has four members the coach decides which three members participate in the hands on competition. There must be at least 3 members on the team to compete in the hands on competition.
- Each team has one computer consisting of a single monitor, keyboard, and system. If laptops with external keyboards are used the regular laptop keyboard must be covered in some way. Teams may use one printer, but a printer is not required. The computer may be loaded with normal software (such as word processors, etc.), the Java SDK, a development environment (such as JCreator, Eclipse, NetBeans, or whatever IDE the team chooses), the documentation for the Java API's, and the API's themselves. It is important that the computer system be free of any code written by the contestants prior to the contest such as solutions to practice problems, solutions to prior contest problems, or programs written in class. Teams may also have two textbooks or references that are reasonably free of written notes. A book on a CD is not an acceptable reference and should be removed from the computer system.
- When systems are setup teams are given a dry run problem. This is a simple problem to insure understanding of the contest operations. It is acceptable to publish the dry run problem prior to the contest. Teams write a Java program to solve the program and submit the source code for their solution to the judges on a floppy disk with a run sheet. The judges compile and run the contestants' solutions using the judging data. Expected results are compared to actual results from the contestant's solution. The judges then record on the run sheet if solution is accepted or rejected and return the run sheet to the contestants. Teams may continue to submit solutions to the dry run problem until they get it correct or until the time for submitting the dry run is over.

- After the dry run last minute instructions may be issued and any final questions resolved. Contestants should delete the solution to the dry run problem from their computers.
- The official contest starts when teams are allowed to open the sealed envelope that contains the actual problems. The pilot of the hands on programming contest at district will consist of 6 programming problems.
- Teams have one hour to complete as many solutions as they can. When a team has a possible solution to a problem, they submit a disk with the source code and a completed run sheet to the judges. The judges record which problem is being attempted and what time the entry was received. The solution is then compiled and run using the judging data which will include test cases not shown on the problem statement sheet. If the solution produces the correct output for the judge's data, it is accepted and recorded as being correct on the run sheet. If it fails, a reason for rejection is marked on the run sheet. In either case the disk with the solution disk and the run sheet are returned to contestants.
- At the end of 60 minutes, time is called. At this time, any solution on disk that is being held up in the air to be judged will be collected. No further solutions will be allowed. Any remaining solutions are judged and results of the contest determined.

The rest of this guide consists of three parts. The first details the preparations that should be completed prior to the day of the contest. The second details the tasks to be completed on the day of the contest. The third explains how to run the actual contest.

Tasks to be completed before the day of the contest: The following items should be completed prior to the day of the contest.

1. Identify required personnel.
 - a. 1 contest director. This individual is in charge of the contest and has final say on issues involving judging solutions.
 - b. 1 or 2 additional judges. The contest director along with the additional judges will judge solutions submitted by the contestants. Coaches may act as judges.
 - c. 1 scorekeeper and archivist. These may be two separate positions, but with a small number of teams it is possible for one individual to do both jobs. The archivist backs up solutions submitted by teams prior to them being judged. The scorekeeper records successes and failures of contestant's solutions using the provided scoring program. Coaches may fill this position.
 - d. 1 or 2 runners. The runners pick up solutions from the contestants and take them to the judging area to be archived, judged, and scored. The runners also return judged submissions to the teams.
 - e. 1 room monitor. This person will check teams in, seat them, and circulate in the room to see that all teams are adhering to contest rules both before and during the contest.

2. Create name tags for the above personnel.
3. Identify when you will run the contest during the district meet. If your meet is held on one day there is a 2 hour slot in the conflict pattern for hands on. If your meet is held over two or more days it is permissible to run the hands on portion of the contest on a different day than the written portion of the computer science contest.
4. Identify where you will hold the contest. There needs to be space and power for the teams. Each team should have at least 5' of table space and 3 chairs. There should be a clock visible for all contestants. The judging area should be separated from the contestants' area but close by to allow a timely flow of solutions and results. Determine where the contest results and clarifications will be posted.
5. Determine if you will provide computer systems for the contestants or require them to provide their own systems. Most meet hosts require contestants to provide their own computer systems.
6. Create team packets. For each team you will need:
 - a. A team number, 1 to n.
 - b. An envelope (10 x 13) marked "Precontest Materials" that contains a copy of the dry run problem, a run sheet, and a run envelope for the dry run problem. The run sheet should be filled in with the team number and problem number, which for the dry run is problem number 0. Clearly label the envelope as Precontest Materials.
 - c. A large manila envelope (10x13) that contains each teams actual contest materials including. Clearly label the envelope as "Official Contest Materials – DO NOT OPEN UNTIL TOLD TO BY THE CONTEST DIRECTOR". In each envelope, put:
 - i. a copy of the problem set.
 - ii. 3 manila run envelopes (9x12)
 - iii. 6 run sheets with team number and problem number filled in. UIL is providing one run sheet and you must make copies of it.
 - iv. 4 clarification sheets. UIL is providing one clarification sheet and you must make copies of it.
 - v. a disk containing the sample data files as stated in the problems. UIL provides this data on the judging CD; contest directors make one copy per team.
 - d. Signs with team number and school name.
 - e. Scratch paper and pencils.
7. Prepare extra copies of the actual problem set and judges output for the judges.
8. Make copies of the Acceptance slips. UIL provides one copy of this. You should make 6 copies per team. The acceptance sheets are a receipt for teams when they correctly solve a problem.
9. Prepare signs for other stations including:
 - a. Judging stations
 - b. Archive and scorekeeper station
10. Install the judging software on the judging stations. See the instructions on installing the judging environment included with these materials. You are not required to use the provided judging environment. It is included for districts that

have not had a great deal of experience in running and judging hands on contest. **It is strongly recommended you install and verify the judging environment works several days prior to the day of the contest. This will allow you enough time to resolve any problems you may encounter due to your school's computer systems and / or security measures.**

11. Ensure the judge's data has been installed and is available on the judging stations. If you use the provided judging environment the judging data should be installed automatically.
12. Copy the judges data files onto disks. These are to be provided to teams when other contest materials are returned.
13. Test the judging environment on a dry run solution. A solution to the dry run is provided on the judging disk or can be downloaded from the UIL web site at www.cs.utexas.edu/~scottm/uil.
14. If you wish to use the provided scoring program install that software on the computer that will be used by the archivist / scorekeeper. Instructions for the scoring program are on a separate sheet.

Tasks to be completed the day of the contest: The following items should be completed on the day of the contest.

1. Put up signs identifying each station and team area.
2. Ensure stations are set up including judging stations, archivist and scorekeeper station, runner's stations, display area, and coaches' area.
3. Train judges on how to use the judging environment.
4. Train archivist and scorekeeper on their duties.
5. Ensure Precontest Material envelopes and Official Contest Materials envelopes are ready for distribution.
6. **60 minutes prior to the start of the contest. As teams arrive:**
 - a. the monitor will check teams in and confirm the members' names.
 - b. give teams their Precontest Materials and explain to each team the process for submitting their dry run solutions
 - c. allow teams to set up their computer system
 - d. allow teams to complete the dry run and submit their solutions. Coaches may be present during this process.
 - e. Assemble archivist, runners, and judges in the judging area for instructions. They will practice their jobs by collecting, archiving, and judging the dry run as contestants complete them. Note: Some students competing in the contest may be delayed due to participation in other subject areas. Be flexible in setting the time for completion of the dry run and the beginning of the actual contest. In no event should it be earlier than the scheduled start time of the contest.
7. **30 minutes prior to the start of the contest.**
 - a. ensure all previously written programs have been removed from the contestants' computer systems.

- b. ensure teams have a single computer system. (more than one monitor is not allowed. If a team has an external keyboard for their laptop, the keyboard on the laptop must be covered.)
- 8. Contest start time** (remember the flexibility in part 6e above)
- a. Assemble contestants and coaches for instructions. Go over contest rules and procedures and answer any questions.
 - b. Ask the coaches to leave. Distribute Official Contest Materials

Conducting the Contest:

1. Announce Start. Contestants may open their contest envelope and have one hour to submit solutions.
2. Teams may work the problems in any order. Teams may make submissions to multiple problems at the same time. (There is no need for a team to wait for the results for a given problem submission before submitting a solution to a different problem.)
3. When a team has a solution ready for submission they label their disk and run sheet with the proper problem number, place their source code for their solution on the disk. **Contestants must submit their source code - the .java file - not the compiled code.** The disk with the solution and the appropriate run sheet are placed in a run envelope and held up for a runner to retrieve.
4. The runner delivers the contestants' submission to the archivist's station. The archivist records the team number and problem number for the submission as well as the time the submission was received. The archivist copies the submission to the archive station computer.
5. The submission is now moved to the judging station. If there are multiple judges it works best for each judge to handle certain predetermined problems.
6. Judges use the judging environment to compile the submission and run it using the judge's data. If not using the judging program, check the output against the judges' output. If using the judging program, **refer to the instructions on how to use the judging environment. If questions arise, the contest director will make the final determination for submission. The guidelines for judges are:**
 - a. White space differences at the ends of lines or after the last line of output are **never** significant.
 - b. If the differences do not seem material to the problem being solved, err on the side of accepting the solution. For instance, if a problem is about performing a complex calculation, be flexible with output formatting. On the other hand, if the problem is all about formatting, then be a stickler.
 - c. Above all, be consistent with your judging.
7. If a submission is correct mark accept on the run sheet and fill out an acceptance sheet for the problem.
8. If a submission is incorrect mark reject on the run sheet and mark **one** of the comments on the run sheet. At the state meet we generally only use a small number of the available comments:
 - a. "Does Not Compile" is used for submission that suffer compile errors.

- b. "Run-time Error" is used for submissions that suffer a runtime error or exception.
 - c. "Failed Judges' Test Data" is used for any cases where the submission compiles and runs but whose output does not match the expected answers within the guidelines given in step 5.
 - d. "Time-Limit Exceeded" is used when a submission results in an infinite loop and the program does not end. None of the problems in the district problem set require a large amount of computation. A guideline for when to halt a team's program is 2 minutes.
9. After judging the solution and marking the run sheet, the submission disk and run sheet go back into the run envelope. If the submission is correct, an acceptance sheet is included as well.
 10. The submission goes back to the scorekeeper. Correct submissions are awarded 60 points. Incorrect solutions are penalized 5 points if and when the problem is correctly solved. Here is an example. Team 1 submits a potential solution to problem 2. The first submission is judged to be incorrect. Team 1 submits a second potential solution for problem 2. The second submission is judged to be incorrect. Team 1 submits a third potential solution for problem 2. The third submission is judged to be correct. Team 1 is awarded $60 - 2 * 5 = 50$ points. If a team has incorrect submissions for a problem and never submits a correct solution to that problem they are **not** penalized any points.
 11. After the scorekeeper has finished recording the results of the submission the run envelope with the disk, run sheet, and acceptance sheet for correct solutions is taken by a runner back to the submitting team.
 12. If a team's solution is judged incorrect the team may rework their solution and resubmit their new solution. Teams may make as many submissions for a given problem as they wish.
 13. Submissions should be maintained in a first in first out order. As judges become available they should judge the oldest run envelope.
 14. The clarification request form is used to pass information between a team and the judges. The clarification forms are filled out by a team and given to a runner to take to the contest director. The purpose of the form is to resolve ambiguities or misstatements in a problem. They are **not** to be used to give teams an advantage, extra information, or hints on how to solve a problem. The contest director must decide on the appropriate response in consultation with the other judges. It may well be that the appropriate response is for the team to read the problem statement more carefully and look at the given examples. If a clarification is in fact required due to ambiguity or a problem misstatement all teams should be made aware of the issue involved and the clarification.
 15. After 45 minutes teams should be given a 15 minute warning.
 16. At the one hour mark teams shall be told to stop and no more submissions are accepted. A team may turn in a solution at the stop signal if it is already copied to disk and in a run envelope.
 17. Complete judging of submissions.

18. Complete scoring. Teams are ranked based on points earned. The maximum possible score is 360. Ties are not broken. Please remember the results of the hands on contest do not affect on which individuals and team advance to the regional competition. Nor does it affect the district sweepstakes competition. At the district level those are based solely on the results of the written test.
19. Verify grading with contestants and resolve any discrepancies.
20. Collect all official contest materials. These may be returned to teams when other official district materials are returned.
21. Assemble coaches and contestants again and announce results.

Other Issues:

As contest directors, you are designated UIL officials, and as such you have the authority to make decisions regarding the management of your contest to ensure that it is conducted according to UIL rules. You also have the authority to settle any disputes that might arise in accordance with UIL rules, though we certainly hope there won't be any of those.

However, if a situation should come up that you are not sure how to resolve, or if you have any questions regarding rules, procedures, etc., please feel free to contact Mike Scott at scottm@cs.utexas.edu or (512) 217-4325 if a more immediate response is required.

A few words on what media to use for submission of material: The suggested media is floppy disks but alternatives to floppy disks for hands-on programming may be used. Contest rules do not require that contestants use floppy disks, but we continue to recommend them as the best media for the contest -- copy times are faster than for burning CD's and they are more readily re-usable, and they are still much cheaper than flash drives. We do realize that many new computers do not include floppy drives. We recommend that teams bring an external floppy drive, but you may have some teams show up who do not have one and want to use other media. There is nothing in the rules that would prohibit the use of other types of media, but they need to be aware of the potential disadvantages. For example, you may have prepared your sample data for distribution to contestants on floppy disk, and it may not be feasible for you to make copies in other formats. In that case, contestants without floppy drives would need to create their own sample input data using what's printed in the problem set. (What they get on disk is identical to the sample data printed in the problem set.) For flash drives, they need to understand that they're not going to get their drives back immediately, so if they only have one or two flash drives it may make it difficult for them to submit multiple solutions. Judging should always be "first in, first out" regardless of media type, so a team with a flash drive should not receive priority over a team using floppies.

In terms of judging with different types of media, the only consideration is being sure that you're reading from the correct drive. The judging script is set up to read from a single drive, normally the A drive. If there is a mix of submission media one solution is to

change the location for the judging program to a directory on the judging computer and copy all submissions to that local directory.

Finally, we would like your feedback. Please complete the UIL Computer Science District Hands On Pilot Evaluation Form. You may mail, email, or fax your comments. If you want to mail your comments please mail the completed form to:

**Mike Scott
Department of Computer Sciences
Taylor Hall 2.124
1 University Station C0500
Austin, TX 78712-0233**

If you wish to fax the form please fax it to Mike Scott at (512) 471 - 8885. If you wish to email the form an electronic version is on the materials CD in plain text and Word format. Email the completed form to scottm@cs.utexas.edu.

Thank you for your willingness to participate in the pilot of the UIL Computer Science hands on programming competition at the district level and all of your hard work.