

University Interscholastic League



Computer Science

Contest Introduction

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State Contest Advisor

For new coaches and contestants.

Before We Get Started

Remember to register your attendance and complete session evaluations.

Session numbers are in your program.



Attendance



Online Handouts



Session Evaluations



In This Session

- Contest introduction, including
 - general rules
 - contest structure and scoring
 - the hands-on contest
- State written test
- Sample hands on questions



Contest Directors & Test Writers

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What is the Computer Science Contest?

- A competition that challenges students to apply computing and algorithmic concepts and skills
- Tests knowledge of algorithms, computation, and object oriented programming
 - using the Java programming language
- Allow students to expand their knowledge of computer science beyond what they learn in the classroom and to foster their interest in the field



Background

- Contest established in the 1990 – 91 school year
- Modeled on the College Board's Advanced Placement Curriculum for computer science
 - plus some additional topics
- Brought computers into UIL competition for the first time with State Meet hands-on programming
 - Modeled on ACM programming contest
 - Programming was later added to regional and district and is also now included with UIL invitational materials



Programming Language

- UIL - same language as the AP curriculum
 - if AP changes, we will too
- Pascal for 8 years. C++ for 5 years. And now several years in Java.
 - language just a tool to test concepts
 - example: sorts are essentially the same
- What version of Java?
 - the most recent version as of September of each school year



General Rules

- As with other UIL academic contests
 - Participants must meet eligibility requirements
 - A school may enter up to four contestants in the district competition



Contest Structure

- Two components: individual and team
 - The same contestants from a school compete in both components
- District, Regional and State competitions consist of:
 - a 45 minute, 40-question written exam, for the individual competition and the team competition (counts for half of team score)
 - a two hour, 12-problem hands on programming contest for teams



The Individual Component

- At all levels of competition, individual places are determined solely by written exam scores.
- All contestants compete for individual honors at all levels of competition
- Individuals placing first, second, and third advance to the next level of competition



The Team Component

- ALL team members **MUST** take the written exam
 - Three members participate in programming
- At all levels of competition team placement is determined as follows:
 - top three team member written scores + programming score = overall team score
- First-place and wild card teams advance to the next level of competition



Team Entries and Scoring

- A school may enter up to four contestants, or up to six at district with approval of the district executive committee
 - If more than four entries are allowed at the district contest, the top four scoring individuals on the written exam will constitute the school's team
 - All four members of first place teams and wild card teams advance to the next level of competition
- A school must enter at least three contestants to participate in the team competition
- The top three written exam scores from a school are counted towards the team score plus the score from programming
- The same contestants compete for both individual and team awards



Participation Requirements

- ALL contestants **MUST** take the written exam at all levels of competition
- Teams **MUST** participate in programming in order to qualify for team placement or advancement
 - Exception – if only one team is entered in the district contest, conducting the programming session is encouraged but not required (if two or more are entered, programming is mandatory)



Scoring Rules – Written Exam

- 40 questions
- SIX points awarded for correct answer
- TWO point deduction for each incorrect
- No points given or deducted for unanswered questions
- Questions may be skipped
- A 15 minute verification period is held prior to announcing official results
- Verification is your chance to ensure that grading and tabulation are correct



Scoring Rules – Programming

- 12 programming problems
- 60 points awarded for a correct answer
- 5 points subtracted for each incorrect answer only if a team eventually gets a correct answer
- Incorrect solutions will be returned and may be reworked and resubmitted
 - judges do not provide a detailed explanation of why a solution is incorrect



What About Ties?

- In individual competition ties are broken by determining the highest percentage of correct answers
 - Example:
 - attempting 30 questions with 20 correct
 $= 20 * 6 - 10 * 2 = 100$
percent correct = $20 / 30 = 66.7\%$
 - attempting 22 questions with 18 correct
 $= 18 * 6 - 4 * 2 = 100$
percent correct = $18 / 22 = 81.8\%$ (wins the tie break)
- If a tie still exists it will not be broken



Ties, continued

- In team competition, ties are broken by the team that has a higher score on the programming portion
 - if a tie still exists the total team score on the written exam is considered
 - if a tie still exists it will not be broken



Wild Cards

- The highest scoring second place team among all districts in a given region advances to the regional meet
 - one wild card per region
- The highest scoring second place team among all regions advances to state
 - one wild card per conference
- Districts must report their team scores with contest results on time to be eligible for the wild card



Written Contest Materials

- Pencils and erasers
- Scratch paper is provided
- No calculators



Written Contest Format

- A 45-minute exam consisting of 40 questions
 - Questions 1-38 are multiple choice
 - Last two questions are free response
 - These will have discrete short answers
- Answers are recorded on the answer sheet
- Topic list provides areas covered
 - Specifies topics for first 15 questions
- Old exams are very useful for practice



Programming - Materials

- In programming three members of a team participate
 - coach's choice
- Each team may bring two published reference texts
 - includes textbooks and language manuals
 - books should be reasonably free of written notes
- For “sneaker net” contests, each team must bring media for submitting solutions to judges, typically USB flash drives.
 - Bring several flash drives (at least 3 or 4), since some drives may still be in the judging room when a team has another solution ready to submit
 - Smaller capacity drives are fine – better to have more drives than larger capacity



Programming - Computers

- Each team shall be prepared to bring one computer to use for competitions
 - some sites may provide computers but check with local contest director
 - most district sites, regional sites and state require teams to bring their own computers
 - Mac users may need to bring an additional computer for the judging station
- printers are allowed, but not required



Programming - Computers

- Each team may use **ONLY ONE** computer
 - one monitor, one keyboard, one mouse
 - no dual monitor or dual keyboard/mouse systems
 - you can bring a backup computer
 - *NOTE: The allowance for multiple computers in spring 2021 contests was part of a group of temporary modifications to UIL rules due to COVID-19. That authorization has expired, so the contest reverts to the one computer rule as specified in the UIL C&CR.*



Programming - Computers

- What software can be on the computer
 - operating system
 - standard software preloaded on new computers: office, explorer, anti-virus
 - A Java compiler and IDE
 - Built in libraries, library documentation, and help functions may be used during the contest



Programming - Computers

- What CANNOT be on your drives:
 - Solutions, data files, templates, from previous UIL competitions or any other programming competitions
 - Programs written for class
 - Any other program written by contestants or coaches



Programming - Judging

- Computer setup for judging will vary from site to site
 - Most sites will have judging stations in a room separate from the contest room
 - other arrangements possible
 - Most regional sites and the state contest use a networked contest system
- Check with your host site ahead of time to find out what procedures will be used



Programming - Judging

- Contestants submit Java source code
- Judges recompile and run on test cases
- No major problems with using Java thus far



Programming Contest Format

- A two hour programming contest consisting of 12 problems
 - varying degrees of difficulty, but all worth 60 points
 - finding the easy ones is part of the competition
- Plan to arrive early to allow time to set up equipment and have systems verified
- Prior to the beginning of the contest teams will work a simple dry run problem
 - a system check for contestants and judges
 - not necessary for all teams to complete the dry run successfully before beginning the contest



Programming Contest Format

- Typically, contestants work in one room while judges work in another nearby room
- Teams submit solutions as they finish them over the contest network or on a flash drive (along with a run sheet)
 - for “sneaker net” contests, runners transport materials between contestants and judges
- For a correct solution, judges return an acceptance notice over the network, or return the flash drive and an acceptance form



Programming Contest Format

- When a team submits an incorrect solution, the judges respond over the network or return the flash drive and run sheet
 - general comment on problem
 - syntax error
 - runtime error
 - failed test case
 - exceeded time limit
 - NO information on why solution is incorrect
 - teams may rework the solution and resubmit it



Programming Contest Format

- Teams can submit a clarification request if they believe the problem is unclear
 - many times the response from judges will be to read the question more carefully
 - judges will not explain unfamiliar concepts during the competition
- Standings may be posted periodically during the course of the contest



Programming Contest Strategy

- Break up the problem pack
- Find the easy problems
- One person working on an easy problem on computer
- Two others working other problems on paper
- Problems may be worked in any order
- Know when to give up on a problem
 - computer time is a scarce resource



Returning Papers

- If there are no unresolved questions then at the district level entries may be returned no sooner than the end of the last contest day of the district week
- If there are no unresolved questions then at the regional level entries may be returned to contestants at the end of the day on Saturday of region weekend



Frequently Asked Questions

- Can team contestants receive individual awards if they did not place in the individual competition at the previous level competition?
 - Yes. Team contestants are in the mix for individual honors, even if they did not place in the top three at the previous level of competition



Frequently Asked Questions

- Do contestants who advance only as individuals participate in programming?
 - No. Contestants who advance as individuals only take the written test at the next level of competition



Frequently Asked Questions

- If a team gets a solution correct on the second or third or later try do they still receive the 5 point deduction?
 - Yes



Frequently Asked Questions

- What if one of our team members is sick or otherwise unable to compete at regionals or state? May we substitute?
 - Yes. Advancing teams may insert a substitute for one and ONLY ONE team member who is unable to compete at the next level of competition.
 - If more than one member is unable to compete the alternate team will advance
- Can substitutes win individual awards?
 - Yes



Preparing for The Contest – Online Resources

- UIL
 - www.uiltexas.org/academics/stem/computer-science
- Includes resource page with links to
 - java compiler and IDEs
 - second party materials
 - references
 - online programming problems



Preparing for the Contest - Books

- Building Java Programs
 - Stuart Reges & Marty Stepp, Pearson, www.pearson.com
- Introduction to Java Programming
 - Y. Daniel Liang, Pearson, www.pearson.com
- Java Language Specification
 - <https://docs.oracle.com/javase/specs/>
- Your classroom textbook



Preparing for the Contest Development Tools

- IDE (interactive development environments) are tools that allow you to write Java programs
- You don't have to use one
- You can use whichever one you want
- Demos of
 - command line
 - textpad
 - Eclipse
 - BlueJ



IDE Information

- Eclipse
 - <http://www.eclipse.org>
- BlueJ
 - <http://www.bluej.org/>



Preparing for the Contest

Practice problems

- TopCoder
 - <http://www.topcoder.com/>
- Programming Challenges
 - <https://uva.onlinejudge.org/>
 - online problems and judge
- Coding Bat
 - <http://codingbat.com/>



Preparing for the Contest

Practice problems

- USA Computing Olympiad
 - <http://www.usaco.org/>
- Project Euler
 - <https://projecteuler.net/>



Practice Test 2022

- Review Questions
- Reference Sheet
 - use this to help answer questions
- Topics List
 - check the CS page of the UIL website for the final 2022-2023 list



Questions

- www.uiltexas.org/academics/stem/computer-science