

UIL Practice Test  
2007 - 2008  
Commentary on the Exam

In general the first fifteen questions will be the easier questions and the last ten will be the hardest. This may vary somewhat from test to test. The first fifteen questions will be taken from these topics

1. base conversion and arithmetic
2. variable processing, mathematical operators, and mathematical expressions (2 questions)
3. single loops
4. 1D array questions
5. Boolean expressions and logic
6. if and if/else statements
7. classes and object manipulation (2 questions)
8. Math class methods
9. printf
10. print and println
11. String class methods and String manipulation
12. bitwise operators
13. methods and method return values

Commentary on questions from the practice exam.

1. The first question involves mathematical operations on numbers of bases other than 10. Base 16, 8, and 2 are used. Hexadecimal digits convert to four binary digits.  $A_{16} = 10_{10} = 1010_2$ .  $8_{16} = 8_{10} = 1000_2$ .
2. Simple variable processing and expressions. % is the remainder operator.
3. Loops. Typical question involving single loop.
4. String manipulation. First character in a String is at position 0. Refer to the quick reference guide for details on the substring method.
5. 1D array question. Elements of arrays are automatically initialized. (ints = 0, double = 0.0, boolean = false, object variables = null). Arrays use indices starting at 0.
6. Simple variable processing and expressions. The value in the int x is automatically cast to 1.0 and the subtraction is floating point subtraction because one of its operands is a floating point number.
7. Boolean expression and logic. Construct a truth table. 8 total combinations of a, b, and c.
8. Simple if / else
9. Simple question about syntax for classes.
10. Simple question about code that makes use of a class. This is referred to as "client code".
11. Exclusive or bitwise operator. Convert values to binary and then apply operator.
12. Math class method
13. print, println question
14. printf question
15. Simple method call question.
16. An involved tracing question.
17. Requires the contestant to be familiar with the selection sort algorithm. (It is one of the algorithms explicitly stated on the topic list.) 2d array declaration. Question 6 contains an example.
18. A simple ArrayList question.

19. Tracing a simple recursive method.
20. A question about the effects of casting
21. A question involving the split method. Advanced versions will require contestants to be familiar with regular expressions.
22. String concatenation.
23. A question on initialized arrays and the enhanced for loop.
24. if statement. Math.random method returns values between 0 and 1 with a uniform distribution. Approximately half of the values will be less than 0.5.
25. A 2D array question. Work can be minimized because only one element is printed out and operations are independent.
26. More operators.
27. A simple question on Scanner. Note, the second line "value2 is 12" is not actually used by the given code.
28. A simple tracing question involving while loops.
29. Simple class / object questions.
30. Question about the nature of object variables in Java. All Java object variables are references.
31. 31 - 34 refer to a complicated algorithm. This is an algorithm to determine the minimum edit distance between two strings. That algorithm is not on the topic list, but notice it only involves concepts that contestants should be familiar with early in their second year of computer science. Strings, 2d arrays, decision making with ifs, and loops, First year contestants should be able to answer question 31 and possibly 32.
32. 2d array declaration. Question 17 contains an example.
33. An involved question due to the tracing required.
34. Same as 33.
35. - 38. The mystery structure is a binary search tree.  
The find method is finding the height of the tree. In the question the tree is empty so the tracing is simple.
36. Values are added to the binary search tree. The show method is performing a pre order traversal of the binary search tree.
37. Height of a non empty tree.
38. The structure is a binary search tree. The implementation of the add maintains the binary search tree property,
39. Question regarding LinkedLists and iterators.
40. The iterator allows  $O(N)$  access to all of the elements in the LinkedList in order based on position in the list.