# Computer Science Answer Key
# UIL District 1 2014

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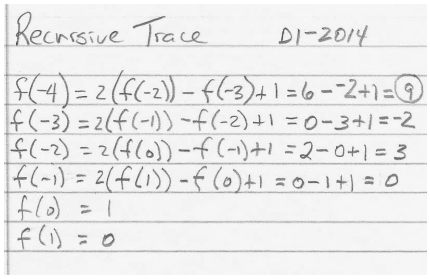
|---|---|---|---|---|---|---|---|
| 1) | A | 11) | B | 21) | E | 31) | E |
| 2) | A | 12) | B | 22) | D | 32) | B |
| 3) | D | 13) | C | 23) | D | 33) | A |
| 4) | D | 14) | B | 24) | A | 34) | E |
| 5) | B | 15) | D | 25) | E | 35) | B |
| 6) | D | 16) | C | 26) | B | 36) | B |
| 7) | E | 17) | D | 27) | D | 37) | D |
| 8) | D | 18) | E | 28) | A | 38) | D |
| 9) | B | 19) | C | 29) | A | 39) | C |
| 10) | A | 20) | C | 30) | C | 40) | A |

**Note to Graders:**

- All provided code segments are intended to be syntactically correct, unless otherwise stated (e.g. error is an answer). **Ignore any typographical errors.**
- Any necessary Standard Java 2 Packages are assumed to have been imported as needed.
- Assume any undefined (undeclared) variables have been defined as used.

# Brief Explanations:

1. $10101_2 + 10000_2 = 21_{10} + 16_{10} = 37_{10} = 45_8 = 25_{16} = 100101_2$
2. For Boolean AND to be true, both inputs need to be true
3. The Math.ceil method returns the "rounded up" decimal value, in this case, 4.1573 goes up to 5.0
4. 13.7 times 2 is 27.4
5. The 'm' is replaced with 'k', making the new String "bikinitop"
6. 9/2 is 4, 6.5 * 2 is 13.0, and 4 – 13.0 is 9.0.
7. This is a runtime error (null pointer exception) since null cannot be added to an integer.
8. ~ means complement, or simply put, opposite, minus 1. ~50 is -51. -51/7 is -7, which is then multiplied by 8 (<<3) making -56. ~(-56) becomes 55.
9. The matching case for 'e' outputs the word "Dude", and stops at the break
10. This code counts all the letters in "red", "white", and "blue" that are NOT in "yellow", which are "rdhitbu"
11. The job of the toString method is to include all of the instance values of the object in some form, so the return statement that does that is the best answer, even though **return "6 string acoustic"** will do the job for this particular object, but not for an object with different values.
12. The Object class is the origin of the toString method
13. Overriding is the process of redefining a method inherited from a parent class. Overloading is when you have several methods in the same class with the same name, but different parameter signatures.
14. This method simply adds up the digits in each number. 637 and 790 both have the greatest sum, but since 637 came first, it is the answer.
15. This loop never happens since x==0 evaluates to false at the beginning, so there is no output.
16. List position 2 gets the value 6 (the element in position 5), and list position 1 gets the value 5 (the element in position 4).
17. This method simply calculates and returns the 3rd side of a right triangle...
18. …which is the Pythagorean theorem.
19. The first ***different*** letters in these two strings are 'u' and 'l', and 'u' has an ASCII value 9 greater than 'l'.
20. The hex value B4 is simply 11(B) times 16, or 176, plus 4, or 180, which has a binary value of 10110100.
21. Since 24 mod 7 is 3, the ternary operator evaluates to false, and 24+3 is the result.
22. Any integer right shifted 32 positions is back to where it started, actually a right circle 32 to be precise. The binary value of 100 is 1100100.
23. The log of E is 1.0.
24. The minimum value for an int is -2147483648, which in binary is 1 with 31 zeros.
25. See the recursive trace on the right for the solution to this problem.
26. List1 only adds even numbers, while List2 adds all of them. The removeAll indeed removes all of the evens from List2, leaving the odds, but the output only asks for List1, which contains the evens.
27. This sequence effectively pushes three characters in priority order, then pops the front two, and repeats this process throughout the end of the string. In the first three, "UIL", the "U" remains since "I" and "L" are alphabetically in front of the "U", so they get popped.




28. Even though j is an int, the /= shortcut has an automatic cast, so 100 divided by 20.0 still returns 5. k gets 20.0 / 5, which is 4.0.
29. The Boolean expression P OR Q XOR P simplifies to just P OR Q, which results in true for all combinations except for false false.
30. This is a simple Digital Electronics diagram, with A and NOT B going into a NOT AND gate, so the expression is NOT(A AND NOT B).
31. An interface requires all methods to be designated public for it to compile, so the fix is to put the word "public" before each method in both the interface and the class. {} is a sufficient implementation for the A1 void method, which is the way you would simply ignore a method you do not wish to implement with anything significant.
32. Given the description of what each method should do, the output here is obvious…"HelloWorld0".
33. A TreeMap is similar to a mathematical function, in the fact that there can only be one mapping per key (for every x this is one and only one y). There can be, however, duplicate values, like the 7 mapped by both "b" and "f". When the "c" is mapped again with the 3, the 4 is removed. But then the "c" mapping is removed altogether, so there is no "c" mapping at the output. Since it is a Tree mapping, the keys are in natural order.
34. The most efficient of all Big O classifications is O(1).
35. The sequence is this: push 3, push 5, push 9, pop 9, push 6, pop 6, pop 5, push 2, and push 7. The 5 was the last value popped.
36. A*0 is simply false, and goes away. B OR 1 simplifies to true since OR with true is always true, therefore the simplified expression here is just TRUE, or 1.
37. The diagonal spanning from row 7, col 1 up and to the left to row 1, col 7 has 7 1s in it, the longest in this matrix.
38. a%10 results in 5, b/10 is 3, and b%10 is 4. The sum 5+3+4 is 12.
39. An adjacency matrix is a classic way to express a graph situation. Study the example carefully and it will make sense.
40. The sequence of values through the loop execution are: 5.0 and 20.0 to start, then 12.0 and 18.0, 14.0 and 17.0, 16.0 and 16.0, and finally 16.0 15.0.