Computer Science Contest #1718-08 Key

January 06, 2018

1) D

2) B

3) C

4) A

5) A

6) A

7) C

8) D

9) A

10) D

11) B

12) E

13) B

14) B

15) C

16) D

17) B

18) C

19) A

20) B

21) A

22) B

23) C

24) C

25) A

26) A

27) B

28) D

29) C

30) E

31) E

32) D

33) B

34) A

35) D

36) B

37) A

38) D

39)

40) -78

**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.

1. Simple base conversion problem. 100012 = 17 , FD16  = 11111101, 100012 + 111111012 = 10E16

2. Simple order of operations

3. %S prints a string in all capital letters

4. Strings are immutable, s is not set equal to anything new

5. Simple Boolean logic

6. Math.floor() returns a double rounded towards zero

7. Simple math

8. The switch statement works like a water fall, multiply by 6 then by -1

9. Simple loop

10. First call sets arr[0] = 4

11. The loop stops at ‘b’ (int)(1.0+2-0.3+4)=6

12. The loop runs 9 times

13. 10>>2^20+2 = (10>>2)^(20+2) = 20^22 = 2

14. 255 overflows byte. 255 can be though of as (127 + 1 + 127). Adding the 1 overflows to -128, -128 + 127 = -1

15. The first value is removed and readded to the end of the list

16. The ternary operator uses the smaller type unless both values can’t fit in the smaller type. In that case it uses the larger type

17. Simple boolean algebra

18. List retains all the values in List2

19. The sign of the result of modulo is the same as the left side

20. A do while loop always runs at least once

21. The methods recursively call eachother until one terminates 1, 6, 8, 13

22. Because the or in the second if statement is bitwise, ++x is run regardless of the left side of the or.

23. The parent toString overrides, so the sqFt variable in the SkyScraper class is the one that is used.

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25. In the first constructor of Building there is a call to it’s other constructor. BuildingCount is incremented twice.

26. arr and arr2 reference the same object

27. Basic recursion

28. Basic recursion

29. 1010=1013, 1015=2610

30. The elements are popped off the stack in the reverse order they were put on. They are then taken out of the queue in reverse order.

31. A priority queue’s toString is the same as inserting the values into a minheap and reading it level order

32. Duplicate values are not allowed in a set

33. When comparing Lists, if the values are the same they are equal

34. The sign bit is shifted all the way to the right.

35. Regex used for matching to numbers, the $1 references the first capture group. In this case the first capture group is just the number

36. The binary tree looks like this:

B

A I

N

R

Y

37. A complete graph has (N^2-N)/2 edges

38. Worst time runtime is N^2

39. The C can be factored out which gives you the definition of XOR or C

40. Since the left most bit is 1 the value is negative. Starting from the right find the first 1, that value stays one then all values after it are opposite. 01001110 = 78, but it’s negative so -78.