Computer Science Contest #1213-07 Key

December 01, 2012

1) A
2) A
3) D
4) A
5) B
6) D
7) E
8) B
9) A
10) A

11) A
12) A
13) A
14) B
15) A
16) A
17) D
18) A
19) A
20) A

21) E
22) B
23) B
24) D
25) E
26) B
27) D
28) B
29) A
30) E

31) A
32) B
33) D
34) C
35) D
36) D
37) C
38) D
39) E
40) E

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. 123_8 = 001010011_2, 22_{16} = 00100010_2, 001010011_2-00100010_2 = 110001_2
2. x = 5, y = 5+5 = 10, x = 10+2 = 12, printing 10+12 = 20
3. x = 12, x += 12 (post-increment), printing 24
4. num starts out as 1, and is incremented 5 times
5. last instance of "st" is as character index 6 of the string
6. array values are initialized to 0, val = 0+0, val += 5, printing 5
7. operator precedence: val | val2 ^ val3 -> val | (val2 ^ val3) -> false | (false ^ true) -> false | true -> true
8. else associates to the nearest if
9. double multiplication
10. calls the String toString
11. Math.floor always rounds down
12. The "(" wraps the output in parenthesis if it is negative, the ".2" makes it print 2 decimal places.
13. the "\" is escaped
14. things is initialized with to contain two arrays so the length is 2
15. i goes from -1 to 5 and prints every time
16. the index of "l" is 2, the substring is from 4 to 5 (not including the 5th character if any), "o" is the output
17. "&" operator cannot be applied to doubles
18. trfafa = (true || fa) && false = false
19. The first remove uses ArrayList.remove(int). The second remove uses ArrayList.remove(Object) because "four" is an Object (an Integer)
20. num2 = 122 % 10 = 2, num3 = 2 % 2 = 0, num2+num3 -> 2+0 = 2
21. (300/10>20), print 300, 300 -= 30, (270/10>20), print 270, 270 -= 30, (240/10>20), print 240, 240 -= 30, (210/10>20), print 210, 210 -= 30, (180/10>20) NO
22. "\\d+" matches one or more "digit" characters
23. "-" doesn't match "\\d"
24. 5 is passed into the constructor of A, the instance variable a is set to 5+1 = 6, a is printed
25. 4 is passed to the constructor of B, 4*2 = 8 is passed to the super constructor of B (which is A), the instance variable a is set to 8+1 = 9, the instance variable b is set to 4, a and b are printed
26. Same procedure as question 25, but starting with the value 23
27. The loops will get the values from items (2, 0), (1, 0), and (2, 1) (in for format (row,column) or the matrix)
28. c is incremented by 2 three times
29. rec("-56") -> -rec("56") -> -56
30. rec("-1+12") -> -rec("1+12") -> -(rec("1")+rec("12")) -> -(1+12) -> -13
31. ne1 = 30, cha = 5, lah = 7, gah = 15, 5-7-15 = -17
32. based on the preorder traverse, we know that 1 is the root, 2 is the right child of 1, 3 is the right child of 2, 4 is the right child of 3, 5 is the right child of 4, and 6 is the right child of 5. Because this tree has essentially degenerated into a linked list, the postorder traversal will be the reverse of the preorder traversal
33. All the elements of "st" are popped out
34. A LinkedList returns true when the item is added to the list
35. The order is reversed by the stack
36. num%10 will get the rightmost digit, num /= 10 will chop off the right most digit
37. If the element does not exist in the Map, it will return null
38. Order of operations: (5&4)|(3<<2) = 4|12 = 12
39. "[a-z]{2,2}" matches any 2 adjacent lower case characters
40. "(dd|a|f)" matches a "dd", an "a", or an "f"