Computer Science Contest #1112 – 02 Key

October 22, 2011

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

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

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

31) C
32) D
33) A
34) B
35) D
36) E
37) B
38) D
39) D
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. 24 base 9 is 22 in base 10 + 20 base 7 is 14 base 10 = 36 base 10
2. 6 + 8 = 14
3. 8 + 2 = 10 – 3 = 7 * 2 = 14
4. The for loop iterates 24 times.
5. Substring(3,7) starts and 3 and goes up but not including 7 to get rain + ing = raining
6. ar[3] gets 2 – ar[2] gets 9 * 3 = 27
7. true and false = false true xor false = true and ! false = true which is true
8. 9 > 10 is false so the lsat else is triggered resulting in 5 being taken away from 10 = -5
9. 2 * 4.0 = 8.0 + 7 = 15.0 – 6 = 9.0
10. 32767 can be stored in an Integer, Character, or Short – 32767 is incompatible with Long and Double
11. 3 to the power of 2 is 9.0 as Math.pow() returns a double
12. Printf("%0,4d") creates a right-alingned column of 4 full of 0s and places in a 99 for 0099
13. To print \ you must put in \\ - \" is required to print out a "
14. mat[1] refers to an array with a length of 7
15. 27 *s are printed out by the nested loops
16. The code which uses w+ changes any group of 1 or more numbers to a single 0
17. And happens before or when dealing with bitwise operators. 010010 & 101001 = 0 | 010010 = 18
18. b1 is increased to 2 which is greater than 1 making the entire statement true, but as | & are non-short circuit operators, the remaining b1++ operations occur increasing the value of b1 to 4 + 10 = 14
19. Add has two forms – 1 which addes at the end and 1 that adds at a location – set changes a location to a specific value – sort puts all elements in natural order
20. % is looking for the remainder – 2 % 7 == 2 - 34 % 17 = 0 * 7 = 0
21. The loop looks for sections where both strings contain the same letter and it counts the length of each run – the value is doubled and then added to the num variable
22. Float types are not treated like Strings to save memory as Java instantiates multiple Objects with the sam e value.
23. Integer types are treated like Strings as Java tries to save memory by not instantiating Objects with the sam e value.
24. String is the appropriate return type for the toString method.
25. 5 + 5 + 12 = 22
26. 6 + 4 = 10 + 4 = 14 + 8 = 22 + 8 = 30 + 8 = 38 super access the parent method
27. The sort shown is an insertion sort – insertion is always moving items up or down in order to insert a new item
28. The items are printed out in order to the nature of the insertion sort
29. 43 >= 0 43/3 = 14 >= 0 14/3 = 4 >= 0 4/3 = 1 >= 0 1/3 = 0 which is ! >= 0 returns 1 + 1 + 1 + 1 + 1
30. 292 >= 0 292/3 = 97 >= 0 97/3 = 32 >= 0 32/3 = 10 >= 0 10/3 = 3 3/3 = 1 >= 0 1/3 = 0 which is ! >= 0 returns 1 + 1 + 1 + 1 + 1 + 1 + 1
31. 45 % 90 = 45 * 2 = 90
32. << is multiply by 2 and >> is divide by 2 & is the bitwise and where both binary digits must be 1 for a 1 to go into the result
33. Stack is the only class / interface with push. Collection and List do not contain push.
34. pop() is the only method that will work. Remove() requires a parameter and get does not remove.
35. ant dog bob cat is what is printed as this is the reverse of what was pushed onto the stack
36. The nested loops are accessing the boolean array and toggling the true to false and false to true. The inner loop is dependent on the outer loop and jumps move values each time the outer loop iterates.
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38. 256 >> 7 = 2 18 >>> 3 = 2 2 | 2 & 2 = 2
39. Splits around the ? mark and only leaves "" strings at the beginning – total splits = 7
40. Looks to change all strings with 1 or more non-whitespace letters to "" and all other strings to "e"