

Computer Science Contest #1314-10 Key

January 18, 2014

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

Note to Graders:

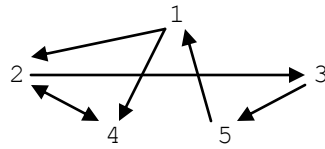
- All provided code segments are intended to be syntactically correct, unless otherwise stated (e.g. error is an answer). **Ignore any typographical errors.**
- Any necessary Standard Java 2 Packages are assumed to have been imported as needed.
- Assume any undefined (undeclared) variables have been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

Brief Explanations:

1. $5 = 101$, $66 = 1100110$, $101 * 1100110 = 111111110 = 1FE$.
2. $x = 26$ then $y = 10$, then $z = 26/11 = 2$, then $x = 27$, $y = 11$, then $29 - 11 = 18$.
3. The value x is a hexadecimal value, but the loop will take the last digit off of the octal value of the number and add them to a String. So, $0x316 = 0b1100010110$, every three digits is the octal digit: $110, 010, 100, 1 \Rightarrow 6241$.
4. $i = 1, 2, 3$, and 4 . The substring will grab the letter before i and i . Those letters are WA , AL , LL , and $L-$. $-E$ would not be grabbed.
5. This code will go to the middle character of each string, mod it by the length of the array, and place the String into that particular location in the array (not swapping it).
6. $20 * (60/2 + 20 - 15) = 700$.
7. $\sim(\sim c + a) \sim (aba + c) = \sim \sim c \sim a \sim (ab + c) = c \sim a \sim (ab) \sim c = c \sim c \sim a (\sim a + \sim b) = 0 * \sim a (\sim a + \sim b) = 0 \rightarrow \text{false}$ at all times.
8. make sure you pay attention to which element is replaced in the code.
9. you must instantiate a class by going `class name = new class(parameter);`
10. the number of deeds is 12 and the max is 26. $12/26$ is less than 0.5.
11. $>>$ has a greater precedent than $\&$ so $48 >> 2 \rightarrow 12$, then $33 \& 12 \rightarrow 0$
12. Inclusive means including the 4 and the 8, so the random number can be $[4, 5, 6, 7, 8]$. 5 total numbers with the smallest value being 4.
13. the $-$ sign means to left justify but to set assign 10 spaces for the number, the entire string will print out even if it exceeds the number of spaces allotted.
14. `4 \n` and one `println` = 5 lines. The loop occurs 10 times = 50.
15. this is just a plug and play method, plug the values in and get a solution. Note, all distractors are far apart so your math can be fast.
16. Index 3 is the letter A, not the letter N.
17. `x[2][1]` is the row index 2 and col index 1.
18. The triangle with the circle is not, the moon is or, and the D is and.
19. `add(x,y)`, will always add at the x location and move everything over.
20. $x \% y$ is modulus and will get 30, finally will always happen, there is no exception.
21. although x is 5, it becomes 15 and will continue the loop before the condition is checked.
22. regardless of what was being added, the size will remain 15
23. the second for loop will replace over the first for loop, not append to it
24. Although Player has no abstract methods in it, it can still be declared as an abstract class.
25. the only way to set `abil` and `pts` in a constructor is to call the super method and it must match the parent class constructor's parameter list.
26. BallPlayer expects a 2 element parameter list, Player expects a 1 element parameter list. QPlayer should extend Player rather than BallPlayer.
- 27&28. the loop continues until it hits a value that is already zero, not just the first zero
29. $m(7) = 7 + m(4) + m(3) = 7 + 8 + 5 = 20$
 $m(4) = 4 + m(1) + m(0) = 4 + 3 + 1 = 8$
 $m(3) = 3 + m(0) + m(-1) = 3 + 1 + 1 = 5$
 $m(1) = 1 + m(-3) + m(-4) = 1 + 1 + 1 = 3$
30. $m(m(4)) = m(8) = 8 + m(5) + m(4) = 8 + 12 + 8 = 28$
 $m(5) = 5 + m(2) + m(1) = 5 + 4 + 3 = 12$
 $m(2) = 2 + m(-1) + m(-2) = 2 + 1 + 1 = 4$
- 31&32.

```
graph TD
    46 --- 43
    46 --- 49
    43 --- 20
    43 --- 44
    49 --- 47
    49 --- 49
    20 --- 24
    44 --- 24
    47 --- RM
    24 --- LM
```
33. `m.values` prints out the values each key points to
34. the `keySet` will return the set in order because it is a `treeSet`.

35. Here is the graph



36&37. A priority queue holds its information as a min heap binary balanced tree where the parent node is always smaller than both children. When a value is removed, the right most leaf in the lowest level is placed at the root and filters down the tree, exchanging itself with the smallest child node until it is in its proper place.

38. the String will split on a r or an m.

39. since the String starts on an r, the first element of the array will be an empty string

40. there are three Strings: e, e, and be that have e in them.