

Computer Science Contest #1314-08 Key

December 07, 2013

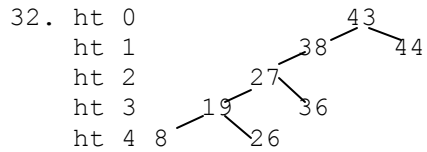
- |         |       |
|---------|-------|
| 1) E    | 21) E |
| 2) C    | 22) B |
| 3) D    | 23) D |
| 4) A    | 24) E |
| 5) A    | 25) B |
| 6) E    | 26) B |
| 7) D    | 27) E |
| 8) D    | 28) 6 |
| 9) D    | 29) B |
| 10) C   | 30) E |
| ■       | ■     |
| 11) A   | 31) C |
| 12) A   | 32) B |
| 13) E   | 33) A |
| 14) B   | 34) D |
| 15) D   | 35) B |
| 16) A   | 36) B |
| 17) -67 | 37) A |
| 18) E   | 38) A |
| 19) E   | 39) D |
| 20) B   | 40) D |
| ■       | ■     |

**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.  $127_{10} = 1111111_2$  and  $17_{16} = 10111_2$ .  $1111111_2 - 10111_2 = 1101000_2 = 104_{10} = 68_{16}$ .
2.  $BE_{16}/10_2 = 95_{10}$  which is equivalent to  $5F_{16}$ , but the output will be in base 10
3. The values sum would be 100, 98, 86, 64, and 32. The loop ends at 32.
4. `compareTo` on a String will find the difference the first characters that are different between the two strings, in this case the P and the X.
5. I hope you noticed that the list only checked the first 10 elements. This is a good example of parallel arrays.
6.  $n=26, m=21 \rightarrow n++\%--m$  will make  $m=20$ , the expression  $26\%20=6$ , and then  $n=27$ . Now the expression is  $6+(27++ + 20++) = 53$  and  $n=28$  and  $m=21$ . Then  $n=53$ .
7. It could have also have been `steal || !(pass || receive)` using DeMorgan's Law.
8. Since 5 is neither case it does nothing.
9. The roll must exceed the difference, so there are only 2 successes, which returns -3.
10. `diff` becomes 1. There are 7 successes - 5 skill = 2.
11.  $13 \ll 4 \gg 1 \rightarrow 13 \ll 3 \rightarrow 13 * 2^3 = 13 * 8 = 104$ .
12. The answer is 2 and the square root of 8. All the answers were a square root that can easily be guessed.
13. `\r` is like `\n` except it stays on the same line and erases what was previously printed.
14. Finally a B answer! `%b` means Boolean, not binary.
15. `k = W r w o` which will become `Wrwoomod` when read left to right  
    `o m o d`
16. there is no out of bounds error because the second index is exclusive.
17. expect more open ended questions on the test, this is new to the contest this year. The second row cancels itself out.
18. the triangle logic gate with the circle is a not and the D logic gate is an and.
19. `fc.set(3,"Sporting")` will be out of bounds because the size of the ArrayList is 3 at that moment.
20. `catch` will happen if there is an exception, `finally` will always happen, no matter what.
21. The `do while` is a dangerous loop because you must understand when you are escaping the loop compared to the action of the loop, here the loop stops when `health` is below or equal to zero.
- 22&23. The first question is a follow the rabbit problem, just follow the code to the solution. The second question tests to make sure you know that the array is past like an object and changes can be permanent.
24. abstract classes are extended, interfaces are implemented.
25. an abstract class cannot be instantiated.
26. although it is being held as a Shinot class, the `toString` method of the instantiated class would be used when `toString` is called.
27. The method takes the array and does a perfect shuffle thought the array.
28. A perfect shuffle will always resort itself in a timely fashion. A 52 card shuffle will sort itself back in order on the 8<sup>th</sup> shuffle. In this case, it took 6 shuffles.
29. `wham(8) = 8 + wham(11) = 8 + 11 = 19`
30. `wham(5) = 5 - wham(3) = 5 - 1 = 4`  
    `wham(3) = 3 - wham(1) = 3 - 2 = 1`  
    `wham(1) = 1 - wham(-1) = 1 + 1 = 2`  
    `wham(4) = 4 + wham(7) = 4 + 3 = 7`  
    `wham(7) = 7 - wham(5) = 7 - 4 = 3`
31. A Map could have members as a key and duties as the value.



33. A tree set is sorted by key value.  
 34. The values are returned in key value order.  
 35. putAll puts all of map2 into map1 replacing any duplicates.  
 36&37. A priority queue uses a min heap to store its value. A min heap is a binary tree whose parent node is always lesser than its two child nodes.  
 38. 131 = 1110001, 43 = 101011, 103 = 1100101, 1110001 | 101011 & 1100101 = 1110001 | 100001 = 1110001.  
 39. [^ae]+ means that the letters between M and s cannot be a or e.  
 40. [iy] means the split will occur on any i or y.