

Computer Science Contest #1314-06 Key

November 16, 2013

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

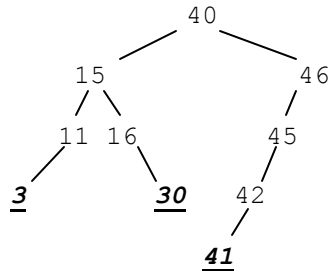
**Note to Graders:**

- 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.  $41_{16} = 1000001 - 1001 = 111000 = 56_{10}$ .
2. n will store the decimal value of  $b101111 = 47$ . Then k becomes 48.  $48/3$  is 16.
3. i will be 0,1,2,3,and 4(because str is growing), and will add to str +,-,-,+,and +.
4. The string will replace all the 't' with '\_'.
5. The array will add the element at index i with the element at index i-1 and place it into the location of i-1. i will increase by 2 every iteration.
6. This is a new type of question that appeared last year, you have to use mathematical logic in order to solve it. The close approximation of 29.3 is 25, so  $25/5$  would be 5.
7. Let A = kingDead, B = winJoust, and C = savePrincess. The literal translation would be !A(B+C)+A!BC which is not an answer choice, so you must simplify to !AB+!AC+A!BC which is an answer choice.
8. Strawberry has a length of 10.  $10\%7$  is 3, x becomes "Wine"
9. Of the five choices given, only the new TimeTraveler(kb.nextLine()) fits both statements. addTraveler would have worked for the second line if it was who.addTravler(kb.nextLine()), but that was not an option.
10. Because the previous question required an instantiation each time, addTraveler is never called, therefore regen++ is never called and regen stays at 0.
11.  $2431>>3$  is  $2431/2^3$  or  $2431/8 = 303.875 = 303$ (due to int division)
12.  $23-(-16)+1=43$ . You have to add 1 because you are including both end pts.
13. The nested for loop will call "t\tt" 15 times, each call prints t twice. \t is a tab.
14. There are 36 spaces set aside for the printf, st uses 4, x uses 5, st2 uses 5 for a total of 14 spaces. So the remaining 22 are spaces.
15. The method expects to return a double. Answer A calculates the correct answer and returns the value. Answer D does not calculate the correct answer.
16. Strings are immutable, so the first two replace calls do not change x.
17. New to the UIL test this year is the open-ended question, which will have a simple short answer. The written code reflects the matrix along the diagonal axis(bottom left to top right). Next year's new case study, picture lab, will be concentrating on code like this.
18. Another new item to the test will be the logical diagram. The difference between the AND and the OR is that an AND has a straight back while the OR has a curved back.
19. `list.add(list.size(),13)` is the same as saying `list.add(13)` so there is no runtime error.
20. The i is always modulated by the length of the String. So it will not go out of bounds.
21. The index keeps increasing before the loop runs out, so there is an error.
22. The method parameters assign dec2 then dec1, so `dec1 = 3` and `dec2 = 2`.
23. To get ALIVEGOOD, dec1 must not be 1 and dec 2 must be 1.
24. A parent reference can point to an instantiate child object, it just won't be able to use the child's object methods.
25. In order to use `moveDown`, pup must be a `SideScroll` and you must cast pup to `SideScroll` befor using `moveDown`.
26. Since pup was declared as a `SideScroll`, `moveForward` would be the `SideScroll` method.
27. The method arranges the array using a radix sort based on the modulus sent up. For the first one, the values will be 0 or 1.
28. The second call uses the modulus of 5. They do put it into sorted order within the radix however.

29. Since  $x$  must remain 0, 1, or 2 for the recursion to continue, then when  $x$  increases 3 consecutive times it will, without a doubt, be greater than 2 and the recursion will end.
30.  $(1, 1)$   $0.75 > .5$  and  $0.46 < .5 \rightarrow (0, 2)$   $0.27 < .5$  and  $0.06 < .5 \rightarrow (1, 3)$  which makes the answer 2.
31. 4 bytes in an int, 8 bits in a byte  $\rightarrow$  32 bits
- 32.



33. The TreeSet is an ordered Collection that has no duplicates.
34. When combining two sets, no duplicates will hold over.
35. retainAll only retain values that are common in both sets.
- 36&37. offer adds to the back, push adds to the front, add adds to the back, pop removes from the front, poll removes from the front, peek looks at the top, iter.add adds behind the iterator each time.
38.  $65 = 1000001$ ,  $97 = 1100001$ ,  $65 \wedge 97 = 0100001 = 32$ . It does not convert to a character.
39. The String must start with a P and have pp somewhere inside.
40. Count the number of p, but only count 1 p for the last grouping of p. Split will create a null element because the String starts with a p, but will not create null elements at the end.