

## Computer Science 235

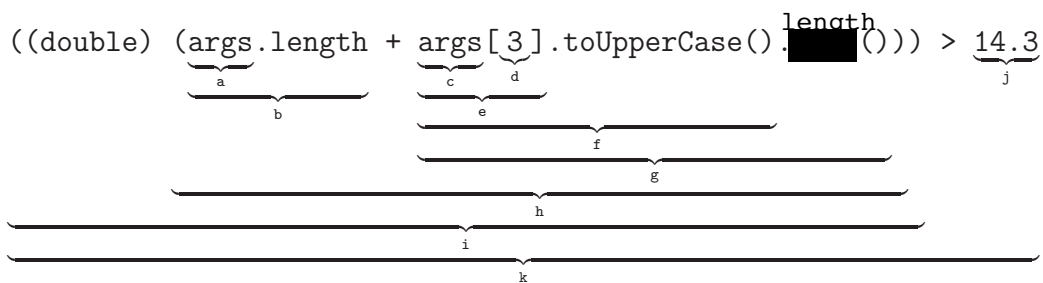
### Test 1

Oct 4, 2006

Questions 1-14 are based on the program on the last page. When asked for a variable's scope, give a range of line numbers. When asked to give an example, include also the line number. (2 points each.)

1. What is the scope, in line numbers, of `userName`?
2. On what line is the declaration of `userName`?
3. On what line is the initialization of `userName`?
4. What is the scope, in line numbers, of `askAgain`?
5. What is the scope, in line numbers, of `fDegrees`?
6. What is the scope, in line numbers, of `currentTemp`?
7. Give an example of a literal, and name its type.
8. Give an example of a formal parameter, and name its type.
9. Give an example of an expression used as an actual parameter, and name its type.
10. What is the signature of the method in lines 45-47?
11. Give an example of an explicit type cast.
12. Give an example of an automatic type cast.
13. Give an example of an escape sequence.
14. The methods in lines 45-47 and 49-51 have the same name. What is this called, and how can they be disambiguated?

15. Find the type of each labeled expression. (2 points each.)



a.

g.

b.

h.

c.

i.

d.

j.

e.

k.

f.

16. Write a method which, given an integer, will compute how many digits the integer has. (You may assume the integer is positive, if it makes it easier for you to think about.) Hint: think about how you can use `/`. (10 points.)

17. Write a method which, given two integers  $n$  and  $m$ , will display to the screen an  $n$ -by- $m$  box of asterisks. For example, given 3 and 5, it will draw

```
***  
***  
***  
***  
***
```

(10 points.)

18. Write a method which will cast an entire array from double to int. That is, given an array of doubles, it will return an array of ints of the same size as the first array, with each element cast to an int. For example, given the array

23.6	54.2	-4.5	6.0	984.2	94.2
------	------	------	-----	-------	------

, it will return the array 

23	54	-4	6	984	94
----	----	----	---	-----	----

(15 points.)

19. Write a method which, given two strings (say, *str* and *s*), determines whether or not *s* is a substring of *str*. For example, given *str* = “metamorphosis” and *s* = “amo”, it will return `true`. Given *str* = “palindrome” and *s* = “lindy”, it will return `false`. (15 points.)

Hints:

1. Remember the String method `substring(int beginIndex, int endIndex)` which will return the substring from index `beginIndex`, inclusive, to `endIndex`, exclusive.
2. Be careful about comparing two Strings.
3. Notice that if *s* is longer than *str*, it has no chance of being a substring.

You may use only the following methods on class String:

`charAt(int pos)`   `length()`  
`substring(int begin, int end)`   `substring(int begin)`  
`equals(String s)`

```
1
2  import java.util.Scanner;
3
4  public class Convert {
5
6      static String userName;
7
8      public static void main(String[] args) {
9
10         Scanner keyboard = new Scanner(System.in);
11
12         System.out.print("Please enter your name--> ");
13         userName = keyboard.nextLine();
14
15         double currentTemp = 0;
16
17         for(boolean askAgain = true; askAgain; ) {
18
19             System.out.println("Current temp: " + currentTemp);
20             printMenu();
21             char query = keyboard.nextLine().charAt(0);
22
23             switch(query) {
24                 case 'A': case 'a':
25                     currentTemp = convert((int) currentTemp);
26                     break;
27                 case 'B': case 'b':
28                     currentTemp = convert(currentTemp);
29                     break;
30                 case 'C': case 'c':
31                     System.out.println("New temp--> ");
32                     currentTemp = keyboard.nextDouble();
33                     keyboard.nextLine();
34                     break;
35                 case 'D': case 'd':
36                     askAgain = false;
37                     break;
38                 default:
39                     System.out.println("That wasn't even a choice");
40             }
41         }
42         System.out.println("Goodbye");
43     }
44
45     static double convert(int fDegrees) {
46         return (5 * (fDegrees - 32.0)) / 9;
47     }
48
49     static int convert(double cDegrees) {
50         return (9 * ((int) cDegrees) / 5) + 32;
51     }
52
53     static void printMenu() {
54         System.out.println("A. Convert to Celsius\n" +
55             "B. Convert to Fahrenheit\n" +
56             "C. Enter a temperature\n" +
57             "D. Quit\n\n" +
58             userName + ", what is your choice?");
59     }
60
61 }
62
```