Wed Jan 30, 2013 • C212/A592 Early Evaluation Exam • Name/Username: _____

True or false?

1. A method has exactly one `return` statement.
2. A method has at least one `return` statement.
3. A method has at most one return value.
4. A method with return value `void` never has a `return` statement.
5. When executing a `return` statement, the method exits immediately.
6. A method without parameter variables always returns the same value.

Consider these methods:

```
public static double f(double x) { return g(x) + Math.sqrt(h(x)); }
public static double g(double x) { return 4 * h(x); }
public static double h(double x) { return x * x + k(x) – 1; }
public static double k(double x) { return 2 * (x + 1); }
```

Determine the results of the following method calls:

7. `double x1 = f(2);`

8. `double x2 = g(h(2));`

9. `double x3 = k(g(2) + h(2));`

10. `double x4 = f(0) + f(1) + f(2);`

What do these loops print?

11. `for (int i = 1; i < 10; i++) { System.out.print(i + " "); }`
12. `for (int i = 1; i < 10; i+=2) { System.out.print(i + " "); }`
13. `for (int i = 10; i > 1; i--) { System.out.print(i + " "); }`

Write a loop that computes:

14. The sum of all even numbers between 2 and 100 (inclusive).

15. The sum of all odd numbers between a and b (inclusive).

16. What are nested loops? Give an example where nested loops are usually used.

How many iterations do the following loops carry out?

17. `for (int i = 1; i <= 10; i++) ...`

18. `for (int i = 0; i <= 10; i++) ...`

19. `for (int i = 10; i > 0; i--) ...`

20. `for (int i = -10; i <= 10; i++) ...`

21. `for (int i = -10; i <= 10; i = i + 2) ...`

22. Explain the difference between

```
s = 0;
if (x > 0) { s++; }
if (y > 0) { s++; }
```

and

```
s = 0;
if (x > 0) { s++; }
else if (y > 0) { s++; }
```

23. Suppose that `x` and `y` are variables of type `double`. Write a code fragment that sets `y` to `x` if `x` is positive and to `0` otherwise.

Suppose the value of `b` is `false` and the value of `x` is `0`. What is the value of each of the following expressions?

24. `b && (x == 0)`

25. `b || (x != 0)`

26. `!b && (x == 0)`

27. `!b || (x != 0)`

Simplify the following expressions. Here, `b` is a variable of type `boolean`.

28. `b == true`

29. `b == false`

30. `b != true`

31. `b != false`

Simplify the following statements. Here b is a variable of type boolean and n is a variable of type int.

32. `if (n == 0) { b = true; } else { b = false; }`
33. `if (n == 0) { b = false; } else { b = true; }`
34. `b = false; if (n > 1) { if (n < 2) { b = true; } }`
35. `if (n < 1) { b = true; } else { b = n > 2; }`

36. Make up an example in Java that demonstrates what is known as "the dangling `else` problem" using the following statement: *"A student with a GPA of at least 1.5, but less than 2, is on probation. With less than 1.5, the student is failing."*

What are the values of the following expressions assuming that n is `17` and `m` is `18`?

37. `n / 10 + n % 10`
38. `n % 2 + m % 2`
39. `(m + n) / 2`
40. `(m + n) / 2.0`
41. `(int) (0.5 * (m + n))`

What are the values of the following expressions? In each line, assume that

```
String s = "Hello", t = "World";
```

42. `s.length() + t.length()`
43. `s.substring(1, 2);`
44. `s.substring(s.length() / 2, s.length())`
45. `s + t`
46. `t.substring(0, 1) + s.substring(1, 4)`

47. Write a program that prints the following three characters when called: `\n"` (in other words, the three characters that your program should print need be: 1. backslash, 2. n and 3. double quote).

48.What does the following code print:

```
int i = 3, j = 5, a;

a = i++ + j++;

System.out.println( "(" + i + ", " + j + ", " + a + ")" );
```

49. Write an expression that evaluates to a random integer in the interval `[0, 100]`. Note: a random integer in the interval `[0, 100]` is the same as a random integer in the interval `[0, 101)` where by square bracket we denote a *closed* interval (one that includes its end(s)) and by round parenthesis we denote an *open* interval (which is one that does not include its end(s)).

50. What is the difference between `'a' + 'b' + ""` and `'a' + ('b' + "")` if any?

51. What does this code print?

```
String a = "tomato";

String b = "tom" + a.substring(3);

System.out.println( a == b);
```

52. Does this program ever terminate? If it does, how many iterations does it take? If it doesn't, why does it not terminate?

```
int i = 10;

while (i > 0) ; {

    i = i – 1;

}
```

The exam is closed-book and 75 minutes long. In labs you will receive back your exams to grade them.