

Name: _____

CS 141: Introduction to (Java) Programming: Exam 2*Instructor • Willamette University • Fall 2011*

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1. (4 pts) Which of the following is true about methods?
 - a. Method can have multiple parameters and can return at most one return value.
 - b. Methods can have only one parameter and can return only one return value.
 - c. Methods can have multiple parameters and can return multiple return values.
 - d. Methods can have one parameter and can return multiple return values.

2. (4 pts) Which of the following is the correct first line for a method definition that takes two parameters of type int and returns true if the first value is greater than the second value?
 - a. public static boolean m(int a, b)
 - b. public static boolean m(int a, int b)
 - c. public static int m(bool a, bool b)
 - d. public static void m(int a, int b)

3. (4 pts) What is the output of the following

```
int x = 0;
for (int i=3; i < 5; i++) {
    x = x + 1;
    for (int j = 0; j < 3; j++) {
        x = x + 1;
    }
}
System.out.println("x = " + x);
```

Ans: _____

4. (4 pts) What is wrong with the following code?

```
public static char grade(int score)
{
    if (score >= 9)
    {
        return 'A';
    }
    else if (score >= 8)
    {
        return 'B';
    }
    else if (score >= 6)
    {
        return 'C';
    }
}
```

- No return statement for all possible logic paths
 - Invalid parameter types
 - Invalid return type
 - None of the above
5. (4 pts) What is the syntax error in the following method definition?

```
public static int area(double r)
{
    double a;
    a = 3.14 * r * r;
    return r * r;
}
```

- The variable `a` is set but never used.
 - The value that is returned does not match the specified return type.
 - The method does not return the value `a`.
 - The method does not specify a return type.
6. (4 pts) Recursion: What is the output if the method call is `testmyval(6)` in the following code snippet?

```
public static void testmyval(int nval)
{
    if (nval > 0)
    {
        testmyval(nval - 2);
    }
    System.out.print(nval + " ");
}
```

- 0 2 4 6
- 0 0 0 0
- 6 6 6 6
- 6 4 2 0

7. (3 pts each, 9 pts total) For the code below:

```

1 public class DoSomething{
2   public static double result = 0;
3
4   public static void main(String[] args) {
5     int n = 3;
6     result = prod(n);
7     System.out.println("result = " + result);
8   }
9
10  public static double prod(int t) {
11    double b = 1.0;
12    for (int n = 1; n < t; n++) {
13      b = b*n;
14    }
15    return times(b);
16  }
17
18  public static double times(double s) {
19    double t = s*2;
20    return t;
21  }
22}

```

- a. (3 pts) What is the scope of the variable `result`?
 - i. the entire `main` method
 - ii. lines 6 and 7
 - iii. the entire class
 - iv. none of the above

 - b. (3 pts) What is the scope of the variable `n` in the method `prod`?
 - i. the entire `main` method
 - ii. the entire method `prod`
 - iii. the entire class
 - iv. lines 12 - 14
 - v. none of the above

 - c. (3 pts) What is the scope of the parameter `t` in the method `prod`?
 - i. the entire `main` method
 - ii. the entire method `prod`
 - iii. the entire class
 - iv. the entire method `prod` and the method `times`
 - v. none of the above
8. (4 pts) Which one of the following statements is true about passing arrays to a method?
- a. By default, arrays are passed by reference to a method.
 - b. Arrays are passed only if size is specified as another parameter.
 - c. Arrays when updated in a called method are not reflected to the calling method.
 - d. By default, arrays are passed by value to a method.

9. (4 pts) Which one of the following statements is true when declaring an `ArrayList` as a method parameter?
- An `ArrayList` declared as a method parameter is a constant value by default.
 - An `ArrayList` value cannot be modified in a method when the array list is declared as a parameter.
 - An `ArrayList` value can be modified inside the method.
 - An `ArrayList` declared as a method parameter should be accompanied with its size.

10. (4 pts) How many elements can be stored in an array with 3 rows and 6 columns?

Ans: _____

11. (2 pts each, 10 pts total) Suppose you have a 2D array of `Strings` called `names` with 4 rows and 3 columns. Match the following types:

- `String`
- `int`
- 2D array of `Strings`
- 1D array of `Strings`

with each of the following:

- | | |
|---------------------------------|--|
| i. <code>names.length</code> | corresponding type (circle one): A B C D |
| ii. <code>names[1]</code> | corresponding type (circle one): A B C D |
| iii. <code>names</code> | corresponding type (circle one): A B C D |
| iv. <code>names[2][0]</code> | corresponding type (circle one): A B C D |
| v. <code>names[2].length</code> | corresponding type (circle one): A B C D |

12. (4 pts) What is the output of the following statements?

```
ArrayList<String> names = new ArrayList<String>();
names.add("Amy");
names.add(0, "Allen");
names.remove(1);
names.add("Frank");
names.add(1, "Kelly");
for (String s : names)
{
    System.out.print(s + ", ");
}
```

- Amy, Frank, Kelly,
- Allen, Kelly, Frank,
- Amy, Kelly, Frank,
- Allen, Kelly,

13. (4 pts) What is the output of the following code snippet:

```
public static void main(String[] args) {
    int[] myNums = {10,10,10};
    timesTwoArray(myNums);
    System.out.println("main: " + Arrays.toString(myNums));
}

public static void timesTwoArray(int[] nums) {
    for (int i=0; i < nums.length; i++) {
        nums[i] = 2*nums[i];
    }
    System.out.println("timesTwoArray: " + Arrays.toString(nums));
}
```

- timesTwoArray: [20, 20, 20]
main: [20, 20, 20]
- timesTwoArray: [20, 20, 20]
main: [10, 10, 10]
- main: [20, 20, 20]
timesTwoArray: [20, 20, 20]
- main: [10, 10, 10]
timesTwoArray: [20, 20, 20]
- none of the above.

14. (4 pts) What does the following code output?

```
for(int i=0; i<6; i++)
{
    for(int j=i; j>=0; j--)
        System.out.print(j+" ");
    System.out.println();
}
```

- | | |
|---|---|
| <ol style="list-style-type: none"> 0
0 1
0 1 2
0 1 2 3
0 1 2 3 4
0 1 2 3 4 5 | <ol style="list-style-type: none"> 5 4 3 2 1 0
4 3 2 1 0
3 2 1 0
2 1 0
1 0
0 |
| <ol style="list-style-type: none"> 0
1 0
2 1 0
3 2 1 0
4 3 2 1 0
5 4 3 2 1 0 | <ol style="list-style-type: none"> 0 1 2 3 4 5
1 2 3 4 5
2 3 4 5
3 4 5
4 5
5 |

15. (4 pts) The local fraternity (Alpha Kappa Gamma) and sorority (Sigman Delta) have written a program to mix together letters from their names to produce a secret code word to be used by members to get into a special party. Show what code word their program will print out.

```
String[] greeks = { "kappa", "gamma", "sigma", "delta" };  
  
for(int i=greeks.length-1; i>=0; i--)  
{  
    for(int j=0; j<=i; j++)  
    {  
        System.out.print(greeks[i].charAt(j));  
    }  
}
```

Ans: _____

16. (10 pts) Programming – Methods: Write a method that computes the area of a rectangle by multiplying its length by its width, and then returns `true` if the area is larger than 30. The length and width parameters are `double` values.

17. (19 pts total) Programming - 2D Arrays: Write code (e.g. that would go in `main`) that does the following:

a. (4 pts) Declare and create a 2D array of `doubles` with 10 rows and 5 columns:

b. (7 pts) Write code to fill the array with random numbers (e.g. use `Math.random()`):

c. (8 pts) Write code to sum the values within each row and print the resulting row sums: