Name: _____

CS 141: Introduction to (Java) Programming: Exam 2

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1. (4 pts) Which of the following is true about methods?

   a. Methods can have only one parameter and can return only one return value.

   b. Method can have multiple parameters and can return at most 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 int m(bool a, bool b)

   b. public static boolean m(int a, b)

   c. public static boolean m(int a, int 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';
   }
}
```

   a. Invalid return type
   b. Invalid parameter types
   c. No return statement for all possible logic paths
   d. 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;
}
```

   a. The variable `a` is set but never used.
   b. The method does not return the value `a`.
   c. The value that is returned does not match the specified return type.
   d. 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 + " ");
}
```

   a. `6 6 6 6`
   b. `0 0 0 0`
   c. `0 2 4 6`
   d. `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 parameter `t` in the method `prod`?
      i. the entire class
      ii. the entire `main` method
      iii. the entire method `prod`
      iv. the entire method prod and the method `times`
      v. none of the above

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

8. (4 pts) Which one of the following statements is true about passing arrays to a method?

   a. Arrays are passed only if size is specified as another parameter.
   b. Arrays when updated in a called method are not reflected to the calling method.
   c. By default, arrays are passed by reference to a 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?

   a. An `ArrayList` declared as a method parameter is a constant value by default.
   b. An `ArrayList` value can be modified inside the method.
   c. An `ArrayList` value cannot be modified in a method when the array list is declared as a parameter.
   d. 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 4 rows and 6 columns?

    Ans: _____

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

    A. 2D array of `String`s
    B. 1D array of `String`s
    C. `int`
    D. `String`

    with each of the following:

    i. `names.length` corresponding type (circle one): A B C D
    ii. `names[1]` corresponding type (circle one): A B C D
    iii. `names` corresponding type (circle one): A B C D
    iv. `names[2][0]` corresponding type (circle one): A B C D
    v. `names[2].length` 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 + ", ");
}
```

   a. `Amy, Kelly, Frank,`
   b. `Amy, Frank, Kelly,`
   c. `Allen, Kelly,`
   d. `Allen, Kelly, Frank,`

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));
}
```

a. main: [20, 20, 20]
   timesTwoArray: [20, 20, 20]

b. main: [10, 10, 10]
   timesTwoArray: [20, 20, 20]

c. timesTwoArray: [20, 20, 20]
   main: [20, 20, 20]

d. timesTwoArray: [20, 20, 20]
   main: [10, 10, 10]

e. 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();
    }
```

a.
```
0
1 0
2 1 0
3 2 1 0
4 3 2 1 0
5 4 3 2 1 0
```

b.
```
5 4 3 2 1 0
4 3 2 1 0
3 2 1 0
2 1 0
1 0
0
```

c.
```
0
0 1
0 1 2
0 1 2 3
0 1 2 3 4
0 1 2 3 4 5
```

d.
```
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 called `checkSize` that computes the area of a rectangle by multiplying its length by its width, and then returns `true` if the area is smaller than 40. 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` called `nums` with 20 rows and 5 columns:

    b. (7 pts) Write code to fill `nums` with random numbers (e.g. use `Math.random()`). Use the length variable for arrays rather than explicitly using the values 20 and 5.

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