Final Exam F2021

Please **DO NOT START** the exam until instructed, out of fairness to all students. 110 minutes.

Score: _____ / 94 pts

Name: _____

1. What is the output of the following code? (24 points)

```java
import java.util.ArrayList;
import java.util.Arrays;
public class Exam{
    private ArrayList<String> list;
    private static String color = "yellow";
    private static int count = 3;
    private int number;
    private int[] ages = {12};

    public Exam(int number){
        number = number;
        count++;
    }

    public int[] func1(){
        this.ages[0] = 11;
        return ages;
    }

    public static void main(String[] args){
        int count = 2;
        int num1 = 5;
        Exam exam1 = new Exam(num1);                    WRITE OUTPUT HERE:
        System.out.println(exam1.color);          _____
        System.out.println(exam1.count);          _____
        System.out.println(exam1.list);           _____
        System.out.println(exam1.number);         _____
        System.out.println(Arrays.toString(exam1.ages)); _____

        Exam exam2 = new Exam(7);
        System.out.println(exam1.color);          _____
        System.out.println(exam1.count);          _____
        System.out.println(exam1.list);           _____
        System.out.println(exam1.number);         _____
        System.out.println(Arrays.toString(exam1.ages)); _____

        exam1.color = "blue";
        int[] array = exam1.func1();
        array[0] = 2;
        exam1.list = new ArrayList<String>();
        exam1.list.add("bird");

        System.out.println(exam1.color);          _____
        System.out.println(exam1.count);          _____
        System.out.println(exam1.list);           _____
        System.out.println(exam1.number);         _____
        System.out.println(Arrays.toString(exam1.ages)); _____

        System.out.println(exam2.color);          _____
        System.out.println(exam2.count);          _____
        System.out.println(exam2.list);           _____
        System.out.println(exam2.number);         _____
        System.out.println(Arrays.toString(exam2.ages)); _____

        System.out.println(count);                _____
        System.out.println(color);                _____
        System.out.println(num1);                 _____
        System.out.println(Arrays.toString(array)); }} _____
```

3

2. What is the output of the following code? (15 points)

```java
import java.util.Arrays;

public class Exam2{

    public static void main(String[] args){
        int one = 1;
        int[][] numbers = {{3, 4}, {one}, {}};


        System.out.println(one);
        System.out.println(numbers[0][0]);
        System.out.println(numbers[0][1]);
        System.out.println(Arrays.toString(numbers[1]));
        System.out.println(Arrays.toString(numbers[2]));

        one = 2;
        System.out.println(one);
        System.out.println(numbers[0][0]);
        System.out.println(numbers[0][1]);
        System.out.println(Arrays.toString(numbers[1]));
        System.out.println(Arrays.toString(numbers[2]));

        numbers[1][0] = 7;
        numbers[2] = new int[1];
        numbers[2][0] = 0;
        numbers[0][0] = -1;

        System.out.println(one);
        System.out.println(numbers[0][0]);
        System.out.println(numbers[0][1]);
        System.out.println(Arrays.toString(numbers[1]));
        System.out.println(Arrays.toString(numbers[2]));
    }
}
```

WRITE OUTPUT HERE:

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3. What is the output of the following code? (10 points)

```java
import java.util.Arrays;

public class Exam3{

        public static int[] func1(int one, int[] num){
                one++;
                num[0] = 11;
                int[] arr = num;
                arr[0]++;
                return arr;
        }

        public static void main(String[] args){
                int one = 1;
                int[][] numbers = {{3, 4}, {one}, {}};
                System.out.println(one);
                System.out.println(numbers[0][0]);
                System.out.println(numbers[0][1]);
                System.out.println(Arrays.toString(numbers[1]));
                System.out.println(Arrays.toString(numbers[2]));

                numbers[2] = func1(one, numbers[1]);
                numbers[1][0] = 7;
                System.out.println(one);
                System.out.println(numbers[0][0]);
                System.out.println(numbers[0][1]);
                System.out.println(Arrays.toString(numbers[1]));
                System.out.println(Arrays.toString(numbers[2]));
        }
}
```

WRITE OUTPUT HERE:

_____

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_____

_____

4. Complete the code below that performs the following functionality: (20 points)

Write code that returns an `ArrayList` of all strings that have a length of at least 3 characters in an input array of strings. Your answer must correctly use generics.

```
import java.util._____;

public _____ longerStrings(_____ inputArray){
```

```
        return _____ ;
}
```

5. Complete the code below that performs the following functionality: (15 points)

Write code that loops through a two-dimensional array of integers (grid) and counts all the pairs of adjacent numbers on a row that sum to 10.

For example, for the input
```
int[][] grid = {{1, 9, 2, 2, 8}, {10, -1, 3, 7, 1}};
```

The expected return value from your `countAdjacentTen` method would be 3

```
public _____ countAdjacentTen(int[][] grid){




}
```

Multiple choice (10 points)

6. Which of the following is true about the constructors for a class called **Person**?
    a. You can call the default constructor **Person()** without having written one.
    b. You can write multiple constructors for the **Person** class.
    c. A constructor can be called without the **new** keyword, or with it, for **Person**.
    d. A and B
    e. B and C
    f. A, B, and C

7. A private method can only access private attributes/fields in the same class.
    a. True
    b. False

8. A private method can only access other private methods in the same class.
    a. True
    b. False

9. A static method can only access static attributes/fields in the same class.
    a. True
    b. False

10. A static method can only access other static methods in the same class.
    a. True
    b. False

11. A public method can only access other public attributes/fields and methods in the same class.
    a. True
    b. False

12. If I have the statement **String animal = "tiger";** what does **animal.charAt(2)** return?
    a. The character 'i'
    b. The String "i"
    c. The character 'g'
    d. The String "g"

13. What gets stored in **num1** after the assignment **int num1 = (int) 1.3;**
    a. 0 (an integer)
    b. 0.0 (a floating point)
    c. 1 (an integer)
    d. 1.0 (a floating point)
    e. 1.3

14. What does the expression **"3" + 5** evaluate to in Java?
    a. 35 (an integer)
    b. 8 (an integer)
    c. "8"
    d. "35"
    e. It raises an exception

15. What gets printed for the code at the right:

    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

```
int x = 13;
int y = 1;
if(x > 5){
    y = 2;
}
if(x > 12){
        y = 3;
}else if (x > 5){
        y = 4;
}else{
        y = 5;
}
System.out.println(y);
```