CPS 101: Computer Programming I

Final Exam

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Instructions

Please answer all questions. The general questions and the problem set questions are worth 40 respectively 50 points, while the bonus question is worth 15 points.

– **We wish you good luck!**

General Questions (*40 points*)

1. What is the purpose of the *trim()* method of the String class? (**5 pts**)

2. When can you encounter an *ArrayIndexOutOfBoundsException* when you run a program? (**5 pts**)

3. Consider the code below. How many times will the variable *index* be incremented? (**5 pts**)

```
int index = 0;
for (int i = 1; i <= 10; i++);
   index++;
```

4. Consider the following array list defined to store a list of integer values. What is the error in the code and how can it be fixed? (**5 pts**)

```
ArrayList<int> values = new ArrayList<int>();
```

5. What is wrong with the following code: (**5 pts**)

```
int y = 0;
while (y < 20) {
   double i = b * r / 100;
   b = b + i;
}
```

   You can assume that the variables *b* and *r* have already been declared.

6. Rewrite the code above (question 5) to solve the problem that you have identified. (**5 pts**)

7. What is a multi-dimensional array? How can you declare a 4x4 array of String objects? (**5 pts**)

8. Identify the implicit and explicit parameter(s) of the following code snippet: (**5 pts**)

```
this.setAge(40);
```

Problem Set (*50 points*)

1. Consider the *doMystery* method described below: (**20 pts**)

```
public static void doMystry(int a[], int[] b, int n) {
   for (int i = 0; i <= n; i++) {
      a[i] = b[i];
   }
}
```

   (a) What is the doMystry(...) method doing exactly? Explain your answer. (**10 pts**)

(b) Consider the code below. What are the values of the array **foo** after the call to the doMystery(...) method on **line 4**. (**5 pts**)

```
1  public class MysteryTester {
2     int foo[] = new int[5];
3     int bar[] = {2,4,6,8,10};
4     doMystry(foo, bar, foo.length - 1);
5  }
```

(c) (**5 pts**) What is the problem when the *doMystry(...)* method is call with the actual length of the array, as shown in the code below. Motivate your answer.

```
1  int foo[] = new int[5];
2  int bar[] = {2,4,6,8,10};
3  doMystry(foo, bar, foo.length);
```

2. Consider the code below: (**30 pts**)

```
1  public static void doAnotherMystry(int[] a, boolean flag) {
2     int i = 0;
3     while (flag) {
4        a[i] = i * i;
5        i++;
6     }
7  }
```

(a) What is the *doAnotherMystry(...)* method doing exactly? Explain your answer.(**10 pts**)

(b) Consider the code below that calls the *doAnotherMystry(...)* method. What are the values of the array *foo* after the call to *doAnotherMystry(...)* method on **line 3**. (**5 pts**)

```
1  public static void main(String[] args) {
2     int foo[] = new int[5];
3     doAnotherMystry(foo, false);
4  }
```

(c) (**5 pts**) What is the problem when the *doAnotherMystry(...)* method is called with a *true* flag, as shown in the code below:

```
1  int foo[] = new int[5];
2  doAnotherMystry(foo, true);
```

(d) Change the implementation of the method so that the problem can be fixed. (**10 pts**)

Bonus Point (Optional Question) (*15 pts*)

1. Write a method call *reverse*(int[] a) that reverses all the elements in the array passed as a parameter.

Example: if the method is called as follows:

```
1  int[] a = {1,2,3,4,5,6}
2  reverse(a)
```

The new values of the array should be $\{6, 5, 4, 3, 2, 1\}$

Use the code below as starting point for your implementation:

```
1  public void reverse(int[] a) {
2
3  }
```

Note, just write the method reverse. We are only interested in how you implement the method. There is no need to write a class and the main method to test.