Lab 5
Powerball Simulation

What do you need to know in order to do this lab?

Variables, constants, modules, functions, decision structures, loops, arrays, and Input validation. A minimum amount of code should be in main. Use functions wherever reasonably possible! Use arrays to hold the lottery numbers. NOTE: Do not use Arraylists, or printf in this assignment.

What you will do:

You will create a simulation of the Powerball lottery. The player will start with $1000 and can purchase any number of $2 Powerball numbers until they either quit (purchase 0 Powerball tickets) or run out of money. The winning combinations are shown in the Sample Output.

Your program will randomly create the 5 winning lottery numbers, and a Powerball number. Lottery numbers are 1 to 69. The winning lottery numbers must be unique and cannot be repeated. The Powerball number can be any number from 1 to 26 and can be the same as one of the other 5 winning numbers. Compare each number on the player's ticket to every number on the winning ticket (in other words, sequence is not important). Then compare the Powerball number.

Before printing the lottery numbers, sort the numbers using a standard sorting routine from our textbook. Do not use array.sort. Show which numbers matched in red, and how much the ticket won. See the sample output for an example of how the output should look.

Print the winning Powerball number in red and print any matching numbers in red also. The list of lottery numbers must line up right-justified as shown in the sample output. Yes, you have to code for that using just print and println commands.

Use constants for the below numeric values that do not change during the execution of the program: The number of numbers; cost of ticket; initial amount of money; each winning amount.

Sample Expected Output:

```
************************************************
              Let's play Powerball!
************************************************
  5 numbers correct plus powerball = $100,000,000
  5 numbers correct,  no powerball = $1,000,000
  4 numbers correct plus powerball = $50,000
  4 numbers correct,  no powerball = $100
  3 numbers correct plus powerball = $100
  3 numbers correct,  no powerball = $7
  2 numbers correct plus powerball = $7
  1 number  correct plus powerball = $4
  0 numbers correct plus powerball = $4
************************************************
You have $1000
How many $2 lotto cards do you want to purchase?
5

The winning lottery numbers, followed by the Powerball Number, are:
8 22 42 46 55   25

Your lottery ticket numbers, followed by the Powerball Number, are:
  1   7 38 50 61    12
 22 46 47 51 53    25   You won $7
  6 34 57 60 63     8
  3   9 34 44 49    25   You won $4
 10 21 58 59 62     2

************************************************
              Let's play Powerball!
************************************************
  5 numbers correct plus powerball = $100,000,000
  5 numbers correct,  no powerball = $1,000,000
  4 numbers correct plus powerball = $50,000
  4 numbers correct,  no powerball = $100
  3 numbers correct plus powerball = $100
  3 numbers correct,  no powerball = $7
```

Notice the title is printed in red.

Do NOT hard-code the winning amounts. Use constants.

Show how much money the player has.

Notice the Powerball number is in **red**.

Notice the numbers are printed right justified.

Notice the matching numbers are printed in **red**.

```
  2 numbers correct plus powerball = $7
  1 number  correct plus powerball = $4
  0 numbers correct plus powerball = $4
************************************************
You have $1001
How many $2 lottery cards do you want to purchase?
0

You have $1001
Goodbye!
```

Show how much money the player still has.

What happens when the player has 0 dollars?

Lab Deliverables

This lab has 2 dates for deliverables:

First:

- A completed Test Plan with a list of constants to be used in the program

Second:

- A Java program (the .java file)

For examples of Java code, refer to the textbook *Java Programming to accompany Programming Logic and Design*.

Your Grading Decision

If you don't turn this in, or if you turn in the assignment and it doesn't work at an acceptable level, you will receive a zero on the assignment.

Verify your output looks almost EXACTLY like the sample output shown above. Blank lines matter, as does spelling.

This is essentially a take-home final exam that demonstrates your ability to solve a problem with code. This problem will be easier to solve if you break up the problem into small modules and functions.

Identify WHAT must be done before trying to code it. If you can't say what must be done, you can't code it. Try telling a friend what the program must do and have them make notes for you.