Lab #2: Guess the Combination

Overview: You have been asked to unlock a door that uses a 3-digit combination within the range of 900 through 999 inclusive. You will have 5 guesses/attempts **per round**, and a total of **3 rounds** to try and crack the combination. The loss of a round will reduce your "credibility", which is expressed as a percentage.

Assignment: Write a complete, well-documented Java program that will generate a new random combination that must be guessed at each round (if you don't correctly guess it in the last round). The random combination does not have to be unique, meaning that a random combination in round 2 or round 3 can be the same number from round 1. Design your program so that during each round it restricts the range of the next guess to be between their closest guessed numbers. For example, if a player's first guess of 955 is lower than the combination, then their next guess will have to be between 956 to 999. Conversely, if their first guess of 969 is higher than the combination, then their next guess will have to be between 900 to 968. Display an error message if the player attempts to guess a number outside the allowed range of guesses. The end of a round will have only two outcomes – a win or a loss:

- In the event of a **win** congratulate the user.
- In the event of a **loss:**
    - Display the 3-digit code
    - Reduce the user's credibility (use correct math based off the number of rounds)

Regardless of the outcome, your program must ask the user if they would like to play again – your program must end only if they would not like to play again.

Remember: A game consists of 3 rounds where each round will have 5 guesses.

Data: You will be expected to follow the proper format that we have covered in class that makes use of functions, modules, constants, and well-defined variable names – create generalized functions whenever possible. This assignment requires, for any credit, the use of at least **two functions** and at least **two loops** and **two decision structures**. Do not use any coding techniques we have not covered in class! The code for each round must be in a loop, as must be the code for the number of guesses. Use **global constants** for the number of **rounds**, the **number of guesses in each round**, the **credibility lost after each round**, and the **starting high and low values.**

Note: Code your program so you can change the value of the constants and your program will adjust accordingly.

> e.g. – 2 rounds of 9 guesses that are between 300 and 800.

A sub-problem for this lab is how to calculate the amount of credibility lost after every round when the number of rounds or guesses could be 1, 3, 5, or 99. This is the essence of computer science: you have a problem to solve and you find other smaller problems you have to solve before you can solve the bigger problem. Be prepared in class to explain how you solved this problem – we want to know!

Output: Here is the sample output from your program so that you can see the expected formatting:

Example Output #1

```
**********************************************************************
        Guess the Combination!
You are a great locksmith trying to open a door by guessing its combination.
If you can guess the number that opens the door, you will solve the case.
If you have not opened the door after 5 guesses, you will lose 33% of your credibility.
After 3 rounds, you will have lost all your credibility and will retire in defeat.
        Good luck - you'll need it!
**********************************************************************
What are you called in your city? Chris P. Bacon
OK, let's do this, Chris P. Bacon.


Guess #1:      What is your guess from 900 to 999? 99
You have entered a number out of range.
Guess #1:    What is your guess from 900 to 999? 900
Guess #2:      What is your guess from 901 to 999? 950
Guess #3:      What is your guess from 951 to 999? 10
You have entered a number out of range.
Guess #3:      What is your guess from 951 to 999? 140
You have entered a number out of range.
Guess #3:      What is your guess from 951 to 999? 990
Guess #4:      What is your guess from 951 to 989? 970
Last Guess:  What is your guess from 971 to 990? 980
Wrong, Chris P. Bacon! The 3-digit combination was 972
Your credibility as a locksmith is now at 66%


Let's try again with a new combination...
Guess #1: What is your guess between 900 and 999?  972
Guess #2: What is your guess between 900 and 971?  943
That's it! Well done, Chris P. Bacon!
Chris P. Bacon opens the door and solves the case!
Does a new locksmith want to try to open the lock? No
Goodbye, Chris P. Bacon. Until we meet again.
```

Remember: Numbers should not be hard-coded!

Note your program's feedback references the user's name.

Note the range changing after each guess!

User name, again!

Example Output #2

```
************************************************************************
        Guess the Combination!
You are a great locksmith trying to open a door by guessing its combination.

If you can guess the number that opens the door, you will solve the case.

If you have not opened the door after 5 guesses, you will lose 33% of your
credibility.

After 3 rounds, you will have lost all your credibility and will retire in defeat.
        Good luck - you'll need it!
************************************************************************
What are you called in your city?  Sam Sung
OK, let's do this, Sam Sung.


Guess #1:     What is your guess from 900 and 999? 925
Guess #2:     What is your guess from 926 and 999? 950
Guess #3:     What is your guess from 951 and 999? 990
Guess #4:     What is your guess from 951 and 989? 970
Last Guess:   What is your guess from 971 and 989? 980


Wrong, Sam Sung! The 3-digit combination was 972
Your credibility as a locksmith is now at 66%


Let's try again with a new combination.
Guess #1:     What is your guess from 900 and 999? 948
Guess #2:     What is your guess from 949 and 999? 912
You have entered a number out of range.
Guess #2:     What is your guess from 949 and 999? 968
Guess #3:     What is your guess from 949 and 967? 960
Guess #4:     What is your guess from 961 and 967? 965
Last Guess:   What is your guess from 966 and 967? 967


Wrong, Sam Sung! The 3-digit combination was 966
Your credibility as a locksmith is now at 33%
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//Example #2 continued

Last chance!! Let's try again with a new combination.

Guess #1:     What is your guess from 900 and 999? 950

Guess #2:     What is your guess from 900 and 949? 930

Guess #3:     What is your guess from 900 and 929? 920

Guess #4:     What is your guess from 900 and 919? 900

Last Guess:   What is your guess from 901 and 919? 910


Wrong, Sam Sung! The 3-digit combination was 902
Your credibility as a locksmith is now at 0%


     ***** Game Over *****
The light fades as you lower your head in defeat.

Goodbye, Sam Sung. Maybe you should brush up on your
lock-picking skills!


Does a new locksmith want to try to open the lock? No

Goodbye, Sam Sung. Until we meet again.
```

Hand In: You are required to submit your completed lab as a compressed .zip file which includes:

- Your completed Java source code file (*do not submit the .class file!*)
- Your test plan that contains an appropriate number of test cases and all possible types of input and output. (I expect that your test cases will document any possible invalid input that might be entered by the user – I WILL test your program!)