Homework 11 **ENGR 130, FA 23**

Submit the code for both problems as one .m file. Follow all course guidelines for submitting the homework.

Problem 1 (12 points)

Write MATLAB code following the specifications below to simulate a lottery in which each person playing the lottery purchases a unique ticket. Each ticket has a 5-digit number, ranging from 0 to 99999. The jackpot-winning ticket number is randomly generated. The program should allow users to buy multiple lottery tickets, check if any of their tickets match the winning number, and calculate the probability of winning the jackpot based on the number of tickets purchased.

The code is to be structured as three functions and a main script:

Functions:

- A function for "buying" a lottery ticket. It generates a random 5-digit number. If multiple tickets are being purchased, it checks to make sure that the number generated is not a duplicate before returning the ticket number to the main script.
- A function to generate a random 5-digit winning number for the jackpot. The winning number should be stored in a variable and returned to the main script.
- A function to check if the winning number is among the player's tickets, returning a 1 if the player has a winning ticket and a 0 if they do not

Main script:

- Ask the user to input the number of lottery tickets they want to purchase.
- Calculate the percentage chance of winning the jackpot based on the number of tickets purchased. Display this probability to the user.
- Call the function to generate the number for a purchased lottery ticket as many times as needed. Store the numbers for all purchased tickets in a vector.
- Call the function to generate the winning number
- Call the function to determine if any of the purchased tickets has won.
- Display the winning number and whether the user purchased a winning ticket or not.

Problem 2 (8 points)

Create MATLAB code for a virtual slot machine game. The game will simulate spinning the reels of a slot machine, check for winning combinations, give an option to spin the reels again, and keep track of winnings/losses. Here are the details for the slot machine:

- The game uses three characters as symbols on the reeks (A, B, and C).
- The winning combination is AAA

Gameplay

- The player starts with $10
- Prompt the user to enter the number of spins they want to play.

- Check to make sure that the player has enough money to spin the number of times selected. If they do not, reduce the number of spins to the maximum number they can spin and display a message informing the player of this.
- Simulate spinning the reels for the specified number of spins.
- For each spin:
  - Randomly select a symbol for each reel (A, B, or C).
  - Display the symbols on each reel.
  - Check if the spin is the winning combination (All three reels show A's)
  - If a spin results in the winning combination, the player wins $2; if not, they lose $2.
  - Display to the screen whether the player has a winning combination or not, whether they won or lost $2, and the total amount of money they have.
- If the player still has money when the requested number of spins is over, give them the option of continuing to play with whatever money they have.
- Show the amount of money the player has when ending the game.

You are encouraged to incorporate multiple user-written functions in your code to make it easier for you to build and test it in small pieces.