

Problem Solving & Coding – Level I

[Language Foundations]

(Simulation)

Solve the following problems using computer with help of Python/C++/Java/C# language as means of communication.

Problem 1: Random License Plate

In a particular jurisdiction, older license plates consist of three letters followed by three digits. When all of the license plates following that pattern had been used, the format was changed to four digits followed by three letters. Create a function named *randomLicencePlate* that generates a random license plate. Your function should have approximately equal odds of generating a sequence of characters for an old license plate or a new license plate. Write a main program that calls your function and displays the randomly generated license plate.

Problem 2: Rock Paper Scissors

Rock paper scissors is a hand game for two or more players. Participants say “rock, paper, scissors” and then simultaneously form their hands into the shape of a rock (a fist), a piece of paper (palm facing downward), or a pair of scissors (two fingers extended). The rules are straightforward:

- **Rock** smashes scissors
- **Paper** covers rock
- **Scissors** cut paper
- If both players say **same thing**, then it is a draw

Let us simulate the game between a player and computer as an opponent. Create a function named *getUserMove* which reads user move from command line and returns that move. Create a function named *getComputerMove* which returns the random move of computer. Create a function named *getResult* that takes both user and computer moves as input, then returns 1, 0 or -1 for win, loss and draw respectively.

Write a main function that simulates the game for about 10 times and displays the number of wins, losses and draws of a player.

Problem 3: Coin Flip

In this program, we are interested to explore the following: What’s the minimum number of times you have to flip a coin before you can have two consecutive flips that result in the same outcome (either both are heads or both are tails)? What’s the maximum number of flips that might be needed? How many flips are needed on average?

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Create a function named *getNumOfFlips* that returns the number of flips required to get two consecutive heads or two consecutive tails. Write a main program that simulates the process for 10 times and displays minimum, maximum and average number of flips required to get the desired outcome.