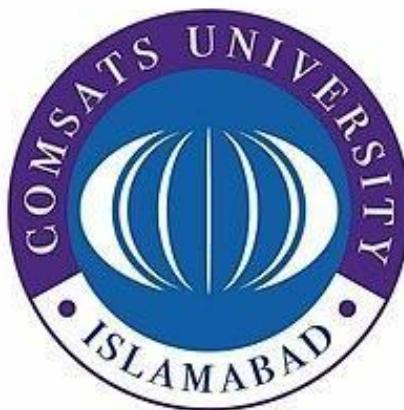# ASSIGNMENT # 2

PROGRAMMING FUNDAMENTALS

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MAIN MENU PROGRAM

```java
import java.util.Scanner;

import java.util.Random;


public class Assignment2 {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        int choice;


        do {

            System.out.println("----> Main Menu (Assignment-2) <----");

            System.out.println("1 – Question-1");

            System.out.println("2 – Question-2");

            System.out.println("3 – Question-3");

            System.out.println("4 – Question-4");

            System.out.println("5 – Question-5");

            System.out.println("Press option (1-5) to execute the program and Press 0 to Exit");

            System.out.print("Enter your option: ");

            while (!input.hasNextInt()) {

                System.out.print("Invalid input! Enter a number (0-5): ");

                input.next();

            }

            choice = input.nextInt();

            input.nextLine(); // consume newline
```

```java
        switch (choice) {

            case 1:

                question1(input);

                break;

            case 2:

                question2(input);

                break;

            case 3:

                question3();

                break;

            case 4:

                question4(input);

                break;

            case 5:

                question5(input);

                break;

            case 0:

                System.out.println("Exiting program...");

                break;

            default:

                System.out.println("Invalid choice! Try again.");

        }

    } while (choice != 0);

}
```

```java
// Question 1: Validate SSN

public static void question1(Scanner input) {

    String option;

    do {

        System.out.println("----> Executing Question – 1 <----");

        System.out.print("Enter a SSN: ");

        String ssn = input.nextLine();

        if (ssn.matches("\\d{3}-\\d{2}-\\d{4}")) {

            System.out.println(ssn + " is a valid social security number");

        } else {

            System.out.println(ssn + " is an invalid social security number");

        }

        System.out.print("Do you want to execute this question again? Press (y), or press (b) to go back to main menu: ");

        option = input.nextLine();

    } while (option.equalsIgnoreCase("y"));

}
```

```java
// Questio 2: Major and Year based on 2 characters
public static void question2(Scanner input) {
    String option;
    do {
        System.out.println("----> Executing Question – 2 <----");
        System.out.print("Enter two characters: ");
        String entry = input.nextLine().toUpperCase();

        if (entry.length() != 2 || !Character.isDigit(entry.charAt(1))) {
            System.out.println("Invalid input");
        } else {
            char major = entry.charAt(0);
            char year = entry.charAt(1);
            String majorStr = "";
            String yearStr = "";

            switch (major) {
                case 'M':
                    majorStr = "Mathematics";
                    break;
                case 'C':
                    majorStr = "Computer Science";
                    break;
                case 'I':
                    majorStr = "Information Technology";
```

```java
        break;
    default:
        majorStr = "Invalid";
}


switch (year) {
    case '1':
        yearStr = "Freshman";

        break;
    case '2':
        yearStr = "Sophomore";

        break;
    case '3':
        yearStr = "Junior";

        break;
    case '4':
        yearStr = "Senior";

        break;
    default:
        yearStr = "Invalid";
}


if (majorStr.equals("Invalid") || yearStr.equals("Invalid")) {

    System.out.println("Invalid input");

} else {
```

```java
            System.out.println(majorStr + " " + yearStr);

        }

    }


    System.out.print("Do you want to execute this question again? Press (y), or press (b) to
go back to main menu: ");

    option = input.nextLine();

} while (option.equalsIgnoreCase("y"));

}
```

// Question 3: Generate Plate Number

```
public static void question3() {

    System.out.println("----> Executing Question – 3 <----");

    Random rand = new Random();

    String plate = "";

    for (int i = 0; i < 3; i++) {

        plate += (char) (rand.nextInt(26) + 'A');

    }

    for (int i = 0; i < 4; i++) {

        plate += rand.nextInt(10);

    }

    System.out.println("Generated Plate Number: " + plate);

}
```

```java
// Question 4: Convert Decimal to Binary manually
public static void question4(Scanner input) {

    String option;
    do {

        System.out.println("----> Executing Question – 4 <----");

        System.out.print("Enter a decimal number: ");

        while (!input.hasNextInt()) {

            System.out.print("Invalid! Enter an integer: ");

            input.next();

        }

        int number = input.nextInt();

        input.nextLine(); // consume newline


        String binary = "";

        int num = number;

        if (num == 0) {

            binary = "0";

        } else {

            while (num > 0) {

                binary = (num % 2) + binary;

                num = num / 2;

            }

        }

        System.out.println("Binary value of " + number + " is: " + binary);
```

```java
        System.out.print("Do you want to execute this question again? Press (y), or press (b) to
go back to main menu: ");

        option = input.nextLine();

    } while (option.equalsIgnoreCase("y"));

  }
```

```java
// Question 5: Global Warming Quiz
public static void question5(Scanner input) {
    System.out.println("----> Executing Question – 5 <----");
    String[] questions = {
        "1. What is the main greenhouse gas responsible for global warming?\n1) Oxygen\n2) Carbon Dioxide\n3) Nitrogen\n4) Helium",
        "2. Which country emits the most CO2 currently?\n1) India\n2) USA\n3) China\n4) Russia",
        "3. What is one argument skeptics use?\n1) Earth is flat\n2) Climate change is natural\n3) CO2 is harmless\n4) No global temperature data",
        "4. What does the Paris Agreement aim to do?\n1) End all pollution\n2) Reduce carbon emissions\n3) Stop rainfall\n4) Remove all cars",
        "5. What is a common impact of global warming?\n1) More snowfall\n2) Ocean cooling\n3) Rising sea levels\n4) Lower humidity"
    };
    int[] answers = {2, 3, 2, 2, 3};

    int score = 0;
    for (int i = 0; i < questions.length; i++) {
        System.out.println(questions[i]);
        System.out.print("Your answer (1-4): ");
        int ans = 0;
        while (true) {
            if (input.hasNextInt()) {
                ans = input.nextInt();
                if (ans >= 1 && ans <= 4) break;
            }
            System.out.print("Invalid! Enter a number from 1 to 4: ");
```

```java
                input.next(); // discard invalid input

        }

        if (ans == answers[i]) score++;

    }

    input.nextLine(); // consume newline


    System.out.println("You got " + score + " correct answers.");

    if (score == 5)

        System.out.println("Excellent!");

    else if (score == 4)

        System.out.println("Very good!");

    else {

        System.out.println("Time to brush up on your knowledge of global warming.");

        System.out.println("Some helpful resources:");

        System.out.println("- https://climate.nasa.gov");

        System.out.println("- https://www.ipcc.ch");

        System.out.println("- https://skepticalscience.com");

    }

  }

}
```

OUTPUT WILL BE:

```
C:\Users\shaheen\Documents>java Assignment2
----> Main Menu (Assignment-2) <----
1 ? Question-1
2 ? Question-2
3 ? Question-3
4 ? Question-4
5 ? Question-5
Press option (1-5) to execute the program and Press 0 to Exit
Enter your option: 1
----> Executing Question ? 1 <----
Enter a SSN: 345-56-7890
345-56-7890 is a valid social security number
```

```
Do you want to execute this question again? Press (y), or press (b) to go back to main menu: b
----> Main Menu (Assignment-2) <----
1 ? Question-1
2 ? Question-2
3 ? Question-3
4 ? Question-4
5 ? Question-5
Press option (1-5) to execute the program and Press 0 to Exit
Enter your option: 2
----> Executing Question ? 2 <----
Enter two characters: M1
Mathematics Freshman
```

```
Do you want to execute this question again? Press (y), or press (b) to go back to main menu: B
----> Main Menu (Assignment-2) <----
1 ? Question-1
2 ? Question-2
3 ? Question-3
4 ? Question-4
5 ? Question-5
Press option (1-5) to execute the program and Press 0 to Exit
Enter your option: 3
----> Executing Question ? 3 <----
Generated Plate Number: NGF2353
```

```
3 ? Question-3
4 ? Question-4
5 ? Question-5
Press option (1-5) to execute the program and Press 0 to Exit
Enter your option: 5
----> Executing Question ? 5 <----
1. What is the main greenhouse gas responsible for global warming?
1) Oxygen
2) Carbon Dioxide
3) Nitrogen
4) Helium
Your answer (1-4): 2
2. Which country emits the most CO2 currently?
1) India
2) USA
3) China
4) Russia
Your answer (1-4): 2
3. What is one argument skeptics use?
1) Earth is flat
2) Climate change is natural
3) CO2 is harmless
4) No global temperature data
Your answer (1-4): 2
4. What does the Paris Agreement aim to do?
1) End all pollution
2) Reduce carbon emissions
3) Stop rainfall
4) Remove all cars
Your answer (1-4): 1
5. What is a common impact of global warming?
1) More snowfall
2) Ocean cooling
3) Rising sea levels
4) Lower humidity
Your answer (1-4): 3
You got 3 correct answers.
Time to brush up on your knowledge of global warming.
Some helpful resources:
- https://climate.nasa.gov
- https://www.ipcc.ch
- https://skepticalscience.com
----> Main Menu (Assignment-2) <----
1 ? Question-1
2 ? Question-2
3 ? Question-3
4 ? Question-4
5 ? Question-5
Press option (1-5) to execute the program and Press 0 to Exit
Enter your option: _
```