CAP680: PROGRAMMING IN JAVA-LABORATORY

Assignment's – I to V

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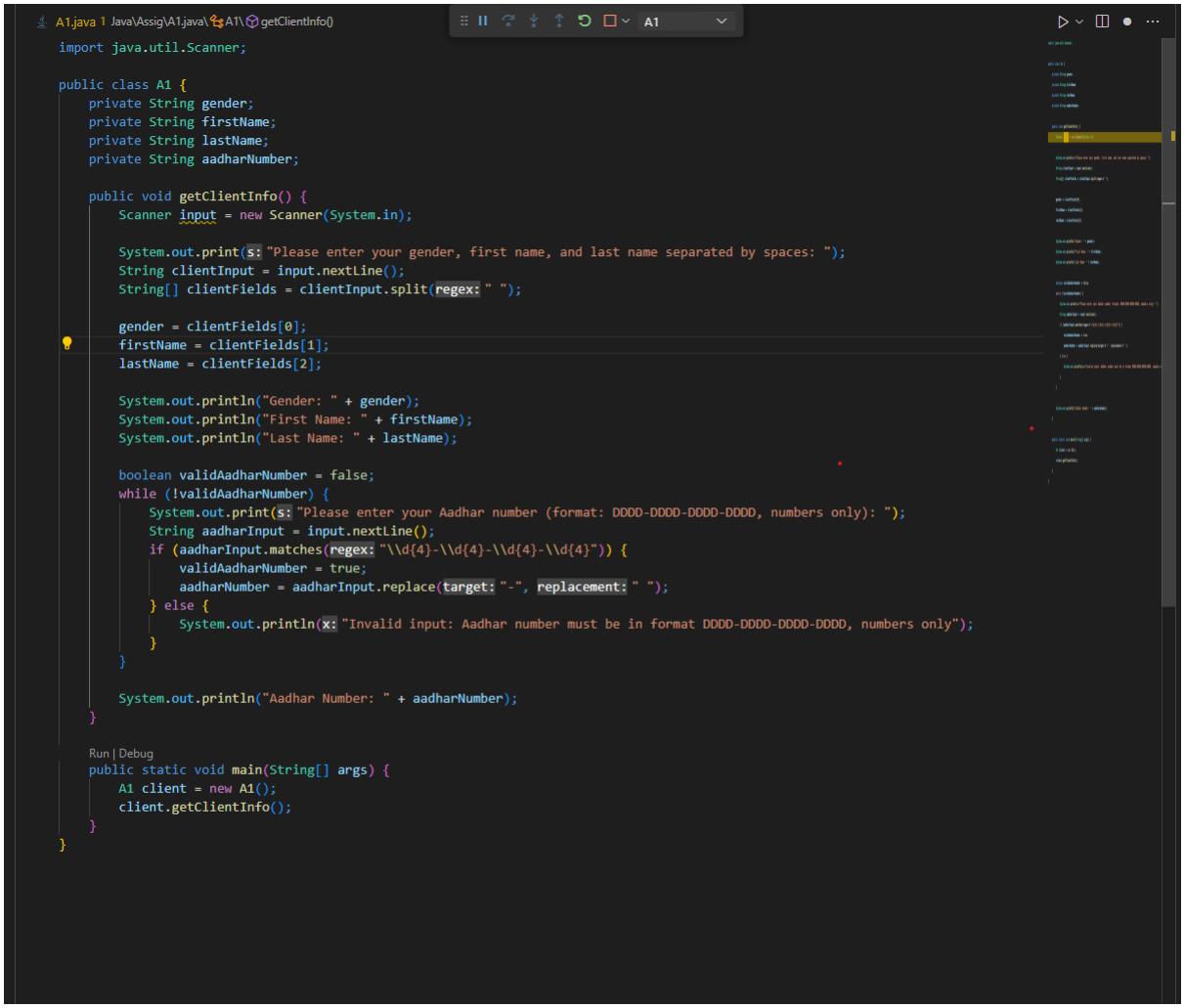
1. Create a customer class that asks users to enter gender, first name and last name in one string. The program should extract the gender, first and last name from the string and should print this. information. Then the program should prompt the user to enter a Social Security number in this format DDD-DD-DDDD, where D is a digit. Your program should check whether the input is valid. Take this number from the user in the form of a string. The program should keep on asking the user about the social security number until the user enters a valid social security number.
   Hint: Use length () function to check the total length of a social security number. Also check that you must have a "- "at index 3 and index 6 of string and digits at remaining indexes.

   Code:



```java
import java.util.Scanner;

public class A1 {
    private String gender;
    private String firstName;
    private String lastName;
    private String aadharNumber;

    public void getClientInfo() {
        Scanner input = new Scanner(System.in);

        System.out.print(s: "Please enter your gender, first name, and last name separated by spaces: ");
        String clientInput = input.nextLine();
        String[] clientFields = clientInput.split(regex: " ");

        gender = clientFields[0];
        firstName = clientFields[1];
        lastName = clientFields[2];

        System.out.println("Gender: " + gender);
        System.out.println("First Name: " + firstName);
        System.out.println("Last Name: " + lastName);

        boolean validAadharNumber = false;
        while (!validAadharNumber) {
            System.out.print(s: "Please enter your Aadhar number (format: DDDD-DDDD-DDDD-DDDD, numbers only): ");
            String aadharInput = input.nextLine();
            if (aadharInput.matches(regex: "\\d{4}-\\d{4}-\\d{4}-\\d{4}")) {
                validAadharNumber = true;
                aadharNumber = aadharInput.replace(target: "-", replacement: " ");
            } else {
                System.out.println(x: "Invalid input: Aadhar number must be in format DDDD-DDDD-DDDD-DDDD, numbers only");
            }
        }

        System.out.println("Aadhar Number: " + aadharNumber);
    }

    Run | Debug
    public static void main(String[] args) {
        A1 client = new A1();
        client.getClientInfo();
    }
}
```

Output:

---

2. RIL JIO is planning to setup a secure password for his customer account. For a password to be secure the following conditions should be satisfied:
    a. Password must contain at least one lower case letter [a-z] [a–z]
    b. Password must contain at least one upper case letter [A-Z] [A–Z] strictly inside, i.e., not as the first or the last character.
    c. Password must contain at least one digit [0-9][0–9] strictly inside
    d. Password must contain at least one special character from the set {{‘@', '#', '%', '&', ‘?’}} strictly inside.
    e. Password must be at least 1010 characters in length, but it can be longer.
    f. RIL JIO has generated several strings and now wants you to check whether the
    g. passwords are secure based on the above criteria. Please help RIL JIO in doing so.

    Input

    First line will contain TT, number of test cases. Then the test cases follow. Each test case contains of a single line of input, string SS.

    Output

    For each test case, output in a single line "YES" if the password is secure and "NO" if it is not.

    Constraints

    1≤|S|≤20 All the characters in S are one of the following: lower case letters [a-z] [a–z], upper case letters [A-Z][A–Z], digits [0-9][0–9], special characters from the set { '@', '#', '%', '&', '?' }

Code:

```java
import java.util.Scanner;

public class A2 {
    Run | Debug
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.println(x: "Enter the number of test cases: ");
        int numTestCases = input.nextInt();

        input.nextLine(); // consume the remaining newline character

        for (int i = 0; i < numTestCases; i++) {
            System.out.println("Enter password for test case " + (i + 1) + ":");
            String password = input.nextLine();

            boolean condition1 = false;
            boolean condition2 = false;
            boolean condition3 = false;
            boolean condition4 = false;
            boolean condition5 = false;

            if (password.length() >= 10) {
                condition5 = true;
                for (char ch : password.toCharArray()) {
                    if (Character.isLowerCase(ch)) {
                        condition1 = true;
                    } else if (Character.isUpperCase(ch)) {
                        condition2 = true;
                    } else if (Character.isDigit(ch)) {
                        condition3 = true;
                    } else if (ch == '@' || ch == '#' || ch == '%' || ch == '&' || ch == '?') {
                        condition4 = true;
                    }
                }
            }

            if (condition1 && condition2 && condition3 && condition4 && condition5) {
                System.out.println(x: "YES");
            } else {
                System.out.println(x: "NO");
            }
        }
    }
}
```

Output:

```
PROBLEMS 8  OUTPUT  DEBUG CONSOLE  TERMINAL  SQL CONSOLE  COMMENTS

Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\rohit\Documents\ds> & 'C:\Program Files\Java\jdk-19\bin\java.exe' '--enable-preview' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\rohit\AppData\Roaming\Code\User\workspaceStorage\2c50ae6071b96585c0f639ba461ec1ba\redhat.java\jdt_ws\ds_56f32de\
bin' 'A2'
Enter the number of test cases:
2
Enter password for test case 1:
Password456@
YES
Enter password for test case 2:
```
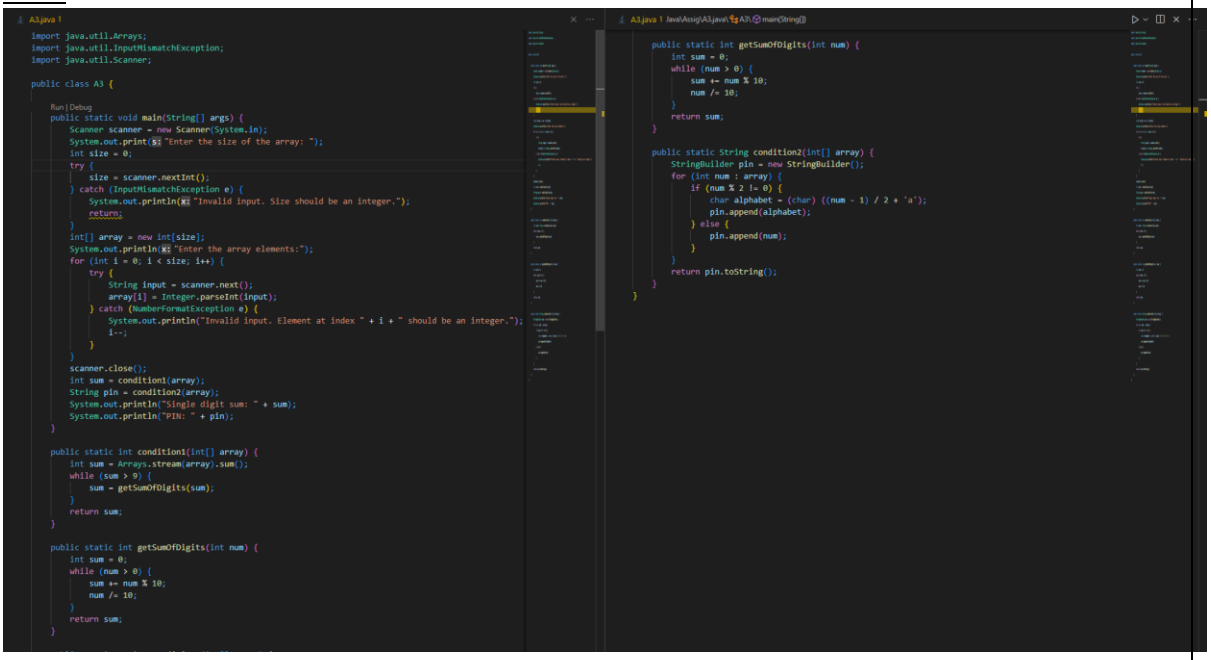

3. Decode the array and generate the six-digit PIN number based on the following rules:
    a. Find the cumulative sum of all the digits until you get a single digit.
    Replace all the odd numbers with their respective alphabets in lowercase i.e., 1=a, 2=b…….,9=i……
    Hint: numArray= {1,22,123,4242,45,46} the cumulative sums are={1,4,6,3,9,2}=14639. After replacing all the odd numbers with alphabets Output=a46ci2

Code:



```java
import java.util.Arrays;
import java.util.InputMismatchException;
import java.util.Scanner;

public class A3 {

    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the size of the array: ");
        int size = 0;
        try {
            size = scanner.nextInt();
        } catch (InputMismatchException e) {
            System.out.println("Invalid input. Size should be an integer.");
            return;
        }
        int[] array = new int[size];
        System.out.println("Enter the array elements:");
        for (int i = 0; i < size; i++) {
            try {
                String input = scanner.next();
                array[i] = Integer.parseInt(input);
            } catch (NumberFormatException e) {
                System.out.println("Invalid input. Element at index " + i + " should be an integer.");
                i--;
            }
        }
        scanner.close();
        int sum = condition1(array);
        String pin = condition2(array);
        System.out.println("Single digit sum: " + sum);
        System.out.println("PIN: " + pin);
    }

    public static int condition1(int[] array) {
        int sum = Arrays.stream(array).sum();
        while (sum > 9) {
            sum = getSumOfDigits(sum);
        }
        return sum;
    }

    public static int getSumOfDigits(int num) {
        int sum = 0;
        while (num > 0) {
            sum += num % 10;
            num /= 10;
        }
        return sum;
    }
```

```java
    public static int getSumOfDigits(int num) {
        int sum = 0;
        while (num > 0) {
            sum += num % 10;
            num /= 10;
        }
        return sum;
    }

    public static String condition2(int[] array) {
        StringBuilder pin = new StringBuilder();
        for (int num : array) {
            if (num % 2 != 0) {
                char alphabet = (char) ((num - 1) / 2 + 'a');
                pin.append(alphabet);
            } else {
                pin.append(num);
            }
        }
        return pin.toString();
    }
}
```

Output:

```
PROBLEMS 9  OUTPUT  DEBUG CONSOLE  TERMINAL  SQL CONSOLE  COMMENTS

Enter the size of the array: 2
Enter the array elements:
16
15
Single digit sum: 4
PIN: 16h
PS C:\Users\rohit\Documents\ds>
```

---

4. Suppose you are working as a dietitian, and you want to calculate and displays a person's body mass index (BMI). The BMI is often used to determine whether a person lifestyle is overweight or underweight. A person's BMI is calculated with the following formula:

   BMI = weight * 711/height^2

   Where weight is measured in pounds and height is measured in inches. Display a message indicating whether the person has optimal weight, is underweight, or is overweight. A sedentary person's weight is optimal if his or her BMI is between 19.5 and 26. If the BMI is less than 19.5, the person is underweight. If the BMI value is greater than 26, the person is considered to be overweight

Code:

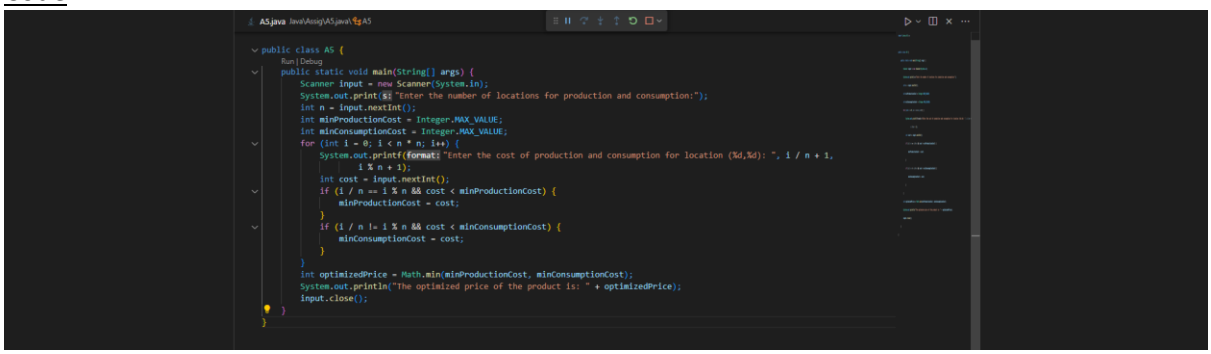
```java
import java.util.Scanner;

public class A4 {
    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s: "Please choose between imperial and metric (i/m): ");
        String choice = scanner.nextLine().toLowerCase();

        double weight, height;

        if (choice.equals(anObject: "m")) {
            System.out.print(s: "Please enter your weight in kilograms: ");
            weight = scanner.nextDouble();
            System.out.print(s: "Please enter your height in centimeters: ");
            height = scanner.nextDouble() / 100;
        } else {
            System.out.print(s: "Please enter your weight in pounds: ");
            weight = scanner.nextDouble();
            System.out.print(s: "Please enter your height in inches: ");
            height = scanner.nextDouble();
        }

        double bmi = (weight * 711) / Math.pow(height, b: 2);

        System.out.printf(format: "Your BMI is %.2f\n", bmi);
    }
}
```

Output:

```
Your BMI is 16975.21
PS C:\Users\rohit\Documents\ds> c:; cd 'c:\Users\rohit\Documents\ds'; & 'C:\Program Files\Java\jdk-19\bin\java.exe' '--enable-preview' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\rohit\AppData\Roaming\Code\User\workspaceStorage\2c58ae60
Please choose between imperial and metric (i/m): i
Please enter your weight in pounds: 120
Please enter your height in inches: 5 8
Your BMI is 3412.80
PS C:\Users\rohit\Documents\ds>
```

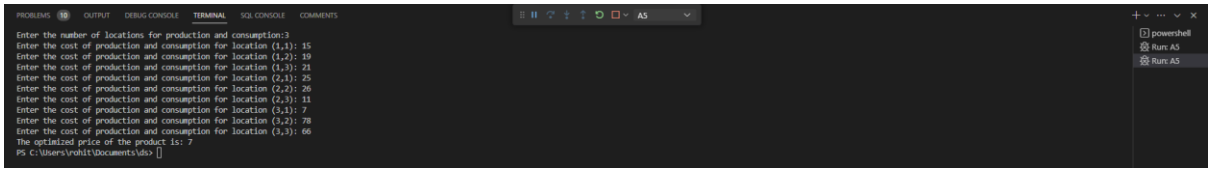
5. In a star company there are products being produced at ‘M’ and that are consumed at ‘N’ locations. The cost varies when they are produced and consumed at same location. Due to increase in competition in the similar product market it has become important now to find an optimized price of the product. Help the start company by providing the general solution for market price amount to be optimized. Keeping in mind the benefits of cost effectiveness of location of production and location of consumption of the product by the customers

Code:



```java
public class A5 {
    Run | Debug
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print(s: "Enter the number of locations for production and consumption:");
        int n = input.nextInt();
        int minProductionCost = Integer.MAX_VALUE;
        int minConsumptionCost = Integer.MAX_VALUE;
        for (int i = 0; i < n * n; i++) {
            System.out.printf(format: "Enter the cost of production and consumption for location (%d,%d): ", i / n + 1,
                    i % n + 1);
            int cost = input.nextInt();
            if (i / n == i % n && cost < minProductionCost) {
                minProductionCost = cost;
            }
            if (i / n != i % n && cost < minConsumptionCost) {
                minConsumptionCost = cost;
            }
        }
        int optimizedPrice = Math.min(minProductionCost, minConsumptionCost);
        System.out.println("The optimized price of the product is: " + optimizedPrice);
        input.close();
    }
}
```

Output:


PROBLEMS 10
OUTPUT
DEBUG CONSOLE
TERMINAL
SQL CONSOLE
COMMENTS
A5
Enter the number of locations for production and consumption:3
Enter the cost of production and consumption for location (1,1): 15
Enter the cost of production and consumption for location (1,2): 19
Enter the cost of production and consumption for location (1,3): 21
Enter the cost of production and consumption for location (2,1): 25
Enter the cost of production and consumption for location (2,2): 26
Enter the cost of production and consumption for location (2,3): 11
Enter the cost of production and consumption for location (3,1): 7
Enter the cost of production and consumption for location (3,2): 78
Enter the cost of production and consumption for location (3,3): 66
The optimized price of the product is: 7
PS C:\Users\rohit\Documents\ds>
powershell
Run: A5
Run: A5