Assignment 3

1) Implement transpose of a given matrix

```java
import java.util.Scanner;

public class TransposeMatrix {
    public static void main(String[] args) {
        System.out.println("Enter the number of rows and columns of the matrix");
        Scanner sc = new Scanner(System.in);
        int row = sc.nextInt();
        int col = sc.nextInt();
        int[][] matrix = new int[row][col];
        System.out.println("Enter the elements of the matrix");
        for (int i = 0; i < row; i++) {
            for (int j = 0; j < col; j++) {
                matrix[i][j] = sc.nextInt();
            }
        }

        int [][] transpose = transpose(matrix);
        System.out.println("The transposed matrix is");
        for (int i = 0; i < row; i++) {
            for (int j = 0; j < col; j++) {
                System.out.print(transpose[i][j] + " ");
            }
            System.out.println();
        }
    }

    public static int[][] transpose(int[][] matrix) {
        int[][] transpose = new int[matrix[0].length][matrix.length];
        for (int i = 0; i < matrix.length; i++) {
            for (int j = 0; j < matrix[0].length; j++) {
                transpose[j][i] = matrix[i][j];
            }
        }
        return transpose;
    }

}
```

2) Implement multiplication of two Matrix.

```java
import java.util.Scanner;

public class MultiplyMatrix {
    public static void main(String[] args) {
        int row1, col1, row2, col2;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number of rows and columns of the first matrix");
        row1 = sc.nextInt();
        col1 = sc.nextInt();
```

```
        int[][] matrix1 = new int[row1][col1];
        System.out.println("Enter the elements of the first matrix");
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col1; j++) {
                matrix1[i][j] = sc.nextInt();
            }
        }

        System.out.println("Enter the number of rows and columns of the second matrix");
        row2 = sc.nextInt();
        col2 = sc.nextInt();
        int[][] matrix2 = new int[row2][col2];

        System.out.println("Enter the elements of the second matrix");
        for (int i = 0; i < row2; i++) {
            for (int j = 0; j < col2; j++) {
                matrix2[i][j] = sc.nextInt();
            }
        }

        if (col1 != row2) {
            System.out.println("The matrices cannot be multiplied");
        } else {
            int[][] result = multiply(matrix1, matrix2);
            System.out.println("The result of the multiplication is");
            for (int i = 0; i < row1; i++) {
                for (int j = 0; j < col2; j++) {
                    System.out.print(result[i][j] + " ");
                }
                System.out.println();
            }
        }

    }

    public static int[][] multiply(int[][] a, int[][] b) {
        int[][] mul = new int[a.length][b[0].length];
        for (int i = 0; i < a.length; i++) {
            for (int j = 0; j < b[0].length; j++) {
                for (int k = 0; k < a[0].length; k++) {
                    mul[i][j] += a[i][k] * b[k][j];
                }
            }
        }
        return mul;
    }
}
```

3) **Implement a program to generate random password based on customer name, age and id for banking applications.**

```java
import java.util.Scanner;
import java.util.Random;
public class RandomPasswordGenerator {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter customer name:");
        String name=sc.nextLine();
        System.out.println("Enter customer age:");
        String age=sc.nextLine();
        System.out.println("Enter customer id:");
        String id=sc.nextLine();
        System.out.println("The random passoword generated is : " + String.valueOf(
generateRandomPassword(name,age,id)));
        sc.close();

    }

    public static char[] generateRandomPassword(String name, String age, String id) {
        name = name.replaceAll(" ", "");

        String mixedCombinedDataString = name + age + id ;

        Random random = new Random();
        char[] password = new char[8];
        password[1] = age.charAt(random.nextInt(age.length()));
        password[0] = name.charAt(random.nextInt(name.length()));
        password[2] = id.charAt(random.nextInt(id.length()));


        for (int i = 3; i < 8; i++) {
            password[i] =
mixedCombinedDataString.charAt(random.nextInt(mixedCombinedDataString.length()));
        }
        return password;

    }

}
```