Practical 5

<u>Aim</u>: Write a program that generates 6*6 two-dimensional matrix, filled with 1s and 0s, displays the matrix, checks every row and column has an odd number of 1s.

```
<u>Input:</u> not Require <u>Code:</u>
import java.util.Random;
public class Exp5_1 {
   public static void main(String args[]) {
     // declare matrix
                           int a[][] = new
int[6][6];
               int i, j;
     Random n = new Random();
                                         for (i = 0; i <
                 for (j = 0; j < 6; j++) {
6; i++) {
a[i][j] = n.nextInt(2);
        }
     System.out.println("\nDisplay of matrix");
System.out.println("");
                             displayMat(a);
     System.out.println("\n\nRow Processing");
System.out.println("");
                             rowProcess(a);
     System.out.println("\n\nColumn Processing");
                             columnProcess(a);
System.out.println("");
  }
  // display matrix
  public static void displayMat(int a[][]) {
     // this is mathod in java to print 2d array in matrix form
                                                                     for (int[] x : a) {
for (int y : x) {
          System.out.print(y + " ");
       System.out.println();
     }
  }
  // row process
  public static void rowProcess(int a[][]) {
                                                  int cn, i, j;
for (i = 0; i < 6; i++) {
                               cn = 0;
                                               for (j = 0; j < 6;
j++) {
                 if (a[i][j] == 1) {
                                                cn++;
        }
       if (cn \% 2 == 1) {
          System.out.println("Row" + (i + 1) + "has odd number of 1");
        } else {
```

```
System.out.println("Row" + (i + 1) + "has even number of 1");
        }
     }
       public static void columnProcess(int a[][]) {
                                                          int cn, i,
       for (i = 0; i < 6; i++) {
j;
       for (j = 0; j < 6; j++) {
                                         if (a[i][j] ==
1) {
                 cn++;
        }
       if (cn \% 2 == 1) {
          System.out.println("Column" + (i + 1) + "has odd number of 1");
          System.out.println("Column" + (i + 1) + "has even number of 1");
       }
     }
   }
```

Output:

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```
Display of matrix
101101
101100
110011
00000
110010
011010
Row Processing
Row1has even number of 1
Row2has odd number of 1
Row3has even number of 1
Row4has even number of 1
Row5has odd number of 1
Row6has odd number of 1
Column Processing
Column1has even number of 1
Column2has odd number of 1
Column3has even number of 1
Column4has even number of 1
Column5has odd number of 1
Column6has odd number of 1
PS E:\4th sem\oops\programs>
```

Aim:

Write a program that creates a Random object with seed 1000 and displays the first 100 random integers between 1 and 49 using the NextInt (49) method.

<u>Input:</u> not require <u>Code:</u>

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Output:

```
the first 100 random integer between 1 to 49

40 1 17 0 46 46 4 33 9 40

25 13 17 29 30 31 42 35 48 40

11 13 10 0 38 9 0 10 35 10

14 26 34 35 31 43 47 35 2 33

16 48 45 43 5 29 1 35 0 25

28 42 25 2 33 30 18 27 4 28

31 35 9 13 33 12 18 36 39 7

17 31 21 26 47 39 11 40 11 26

48 26 27 32 19 30 26 4 7 40

9 41 8 37 3 34 10 36 4 21

PS E:\4th sem\oops\programs>
```

<u>Aim:</u> Write a program for calculator to accept an expression as a string in which the operands and operator are separated by zero or more spaces.

For ex: 3+4 and 3 + 4 are acceptable expressions.

<u>Input:</u> Enter two operator and one oprand

Code:

```
import java.util.Scanner;
   class Exp5_3 {
              public static void main(String[] args) {
                                                                                                                                                                                                                                                             Scanner input = new
 Scanner(System.in);
                          System.out.print("Enter Equation : ");
                          String string = input.nextLine();
                          String a = string.replaceAll(" ", "");
                          if (a.length() < 3) {
                                       System.out.println(
                                                                   "Minimum 2 Opearator and 1 Opearand Required");
                                       System.exit(0);
                                                                  int result = 0;
                           }
int i = 0;
                           while (a.charAt(i) != '+' && a.charAt(i) != '-' && a.charAt(i) != '*' && a.charAt(i) != '/') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             i++;
                          switch (a.charAt(i)) {
                                                                                                                                                                                          case '+':
                                                     result = Integer.parseInt(a.substring(0, i)) + Integer.parseInt(a.substring(i)) + In
 + 1, a.length()));
                                                                                                                                                  break;
                                                                                                                                                                                                                               case '-':
                                                    result = Integer.parseInt(a.substring(0, i)) - Integer.parseInt(a.substring(i)) - In
 + 1, a.length()));
                                                                                                                                                 break;
                                                                                                                                                                                                                                case '*':
                                                    result = Integer.parseInt(a.substring(0, i)) * Integer.parseInt(a.substring(i
 + 1, a.length()));
                                                                                                                                                  break;
                                                                                                                                                                                                                               case '/':
                                                    result = Integer.parseInt(a.substring(0, i)) / Integer.parseInt(a.substring(i
 + 1, a.length()));
                                                                                                                                                 break;
```

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```
System.out.println(a.substring(0, i) + ' + a.charAt(i) + ' + a.substring(i + 1, a.length())
       + " = " + result);
}
```

```
<u>Outout:</u>
Enter Equation : 5+4
5 + 4 = 9
PS E:\4th sem\oops\programs>
spot\bin\java.exe' '-cp' 'C:\Use
rams_a5d79df5\bin' 'Exp5_3'
Enter Equation : 5*8
5 * 8 = 40
PS E:\4th sem\oops\programs>
```

Aim: Write a program that prompts the user to enter a decimal number and displays the number in a fraction. Hint: Read the decimal number as a string, extract the integer part and fractional part from the string.

Input: Enter decimal number

Code:

```
import java.util.Scanner;
class Fraction { private int real;
private int imaginary;
  Fraction(int r, int img) {
                                real = r;
imaginary = img;
       public long gcm(long a, long b) {
                                              return b
== 0 ? a : gcm(b, a % b);
       public String toString() {
                                     long gcm = gcm(real,
                 return real / gcm + "/" + imaginary / gcm;
imaginary);
  }
public class Exp5_4 {
  public static void main(String[] args) {
                                              Scanner sc = new
Scanner(System.in);
    System.out.print("Enter a Decimal Number: ");
    String decimal = sc.nextLine();
```

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```
int indexOfDecimal = decimal.indexOf(".");
                                              int len =
decimal.substring(indexOfDecimal).length();
                                          int imag_part = (int)
Math.pow(10, len - 1);
    int real_part = (int) (Double.parseDouble(decimal) * imag_part);
   Fraction fr = new Fraction(real_part, imag_part);
    System.out.println("The Fraction Number is " + fr);
                                                   System.out.print("Enter a
Decimal Number: ");
                                               indexOfDecimal = \\
                      decimal = sc.nextLine();
decimal.indexOf(".");
                      len = decimal.substring(indexOfDecimal).length();
imag_part = (int) Math.pow(10, len - 1);
                                      real_part = (int)
(Double.parseDouble(decimal) * imag_part);
                                          fr = new Fraction(real_part, imag_part);
    System.out.println("The Fraction Number is " + fr);
}
```

Output:

```
PS E:\4th sem\oops\programs> & 'C:\Us\
Admin\AppData\Roaming\Code\User\worksp\
Enter a Decimal Number: 123.234
The Fraction Number is 61617/500
Enter a Decimal Number: 2312.2121
The Fraction Number is 23122121/10000
PS E:\4th sem\oops\programs>
```