ASSIGNMENT-2 DATE-9/7/24

1. Write a program for matrix multiplication?
   Sample Input:
   Mat1 = 1 2
   5 3
   Mat2 = 2 3
   4 1
   Sample Output:
   Mat Sum = 10 5

   22 18

CODE:

```
public class main {

   public static void main(String[] args) {

      int[][] mat1 = {{1, 2}, {5, 3}};

      int[][] mat2 = {{2, 3}, {4, 1}};

      int[][] result = new int[2][2];


      for (int i = 0; i < 2; i++) {

         for (int j = 0; j < 2; j++) {

            for (int k = 0; k < 2; k++) {

               result[i][j] += mat1[i][k] * mat2[k][j];

            }

         }

      }


      System.out.println("Mat Sum = ");

      for (int i = 0; i < 2; i++) {

         for (int j = 0; j < 2; j++) {

            System.out.print(result[i][j] + " ");
```

```
        }

        System.out.println();

      }

   }

}
```

OUTPUT:

2.Write a program for matrix addition?

Sample Input:

Mat1 = 1 2
5 3

Mat2 = 2 3
4 1

Sample Output:

Mat Sum = 3 5
9 4

CODE:

```
public class main {
   public static void main(String[] args) {
      int[][] mat1 = {{1, 2}, {5, 3}};
      int[][] mat2 = {{2, 3}, {4, 1}};
      int[][] result = new int[2][2];

      for (int i = 0; i < 2; i++) {
         for (int j = 0; j < 2; j++) {
            for (int k = 0; k < 2; k++) {
               result[i][j]=mat1[i][j]
               +mat2[i][j];
            }
         }
      }

      System.out.println("Mat Sum = ");
      for (int i = 0; i < 2; i++) {
         for (int j = 0; j < 2; j++) {
```

```
            System.out.print(result[i][j] + " ");
        }
        System.out.println();
    }
  }
}
```

OUTPUT:

3.Write a program for Merge two sorted arrays using Array list

Input: arr1[] = { 1, 3, 4, 5}, arr2[] = {2, 4, 6, 8}

Output: arr3[] = {1, 2, 3, 4, 4, 5, 6, 8}

CODE:

```
import java.util.ArrayList;
import java.util.Collections;
public class main {
  public static void main(String[] args) {
    int[] arr1 = {1, 3, 4, 5};
    int[] arr2 = {2, 4, 6, 8};
    ArrayList<Integer> mergedList = new ArrayList<>();
    for (int num : arr1) {
      mergedList.add(num);
    }
    for (int num : arr2) {
      mergedList.add(num);
    }
    Collections.sort(mergedList);
    System.out.println("Merged Sorted Array: " + mergedList);
  }
}
```

OUTPUT:

4.Find the Mean, Median, Mode of the array of numbers?
Sample Input;:
Array of elements = {16, 18, 27, 16, 23, 21, 19}
Sample Output:
Mean = 20
Median = 19
Mode = 16

CODE:

```
import java.util.Arrays;
import java.util.HashMap;
import java.util.Map;
public class main {
   public static void main(String[] args) {
      int[] numbers = {16, 18, 27, 16, 23, 21, 19};
      // Mean
      int sum = 0;
      for (int num : numbers) {
         sum += num;
      }
      double mean = (double) sum / numbers.length;
      System.out.println("Mean = " + mean);
      // Median
      Arrays.sort(numbers);
      double median;
      if (numbers.length % 2 == 0) {
       median = (double) (numbers[numbers.length / 2 - 1] + numbers[numbers.length / 2]) /2;
      } else {
         median = (double) numbers[numbers.length / 2];
      }
      System.out.println("Median = " + median);
      // Mode
      Map<Integer, Integer> frequencyMap = new HashMap<>();
      int maxFrequency = 0;
      int mode = 0;
      for (int num : numbers) {
         int frequency = frequencyMap.getOrDefault(num, 0) + 1;
         frequencyMap.put(num, frequency);
         if (frequency > maxFrequency) {
            maxFrequency = frequency;
            mode = num;
         }
      }
      System.out.println("Mode = " + mode);
```

```
    }
}
```

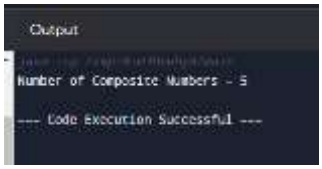
OUTPUT:

5.Write a program to find the number of composite numbers in an array of elements
Sample Input;:
Array of elements = {16, 18, 27, 16, 23, 21, 19}
Sample Output:
Number of Composite Numbers = 5

CODE:

```
public class main {
    public static void main(String[] args) {
        int[] elements = {16, 18, 27, 16, 23, 21, 19};
        int count = 0;
        for (int num : elements) {
            if (isComposite(num)) {
                count++;
            }
        }
        System.out.println("Number of Composite Numbers = " + count);
    }
    public static boolean isComposite(int num) {
        if (num < 2) {
            return false;
        }
        for (int i = 2; i <= num / 2; i++) {
            if (num % i == 0) {
                return true;
            }
        }
        return false;
    }
}
```

OUTPUT:



6.Write a program to print Right Triangle Star Pattern

Sample Input:: n = 5

Output:

```
    *
   * *
  * * *
 * * * *
* * * * *
```

CODE:

```
public class main {
    public static void main(String[] args) {
        int n = 5;
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n - i - 1; j++) {
                System.out.print("  ");
            }
            for (int k = 0; k <= i; k++) {
                System.out.print("* ");
            }
            System.out.println();
        }
    }
}
```

OUTPUT:

7. write a program to print the below pattern?

```
        1
    1       1
1       2       1
```

1 3 3 1

1 4 6 4 1

CODE:

```
public class main {
    public static void main(String[] args) {
        int rows = 5;
        for (int i = 0; i < rows; i++) {
            int number = 1;
            for (int j = rows; j > i; j--) {
                System.out.print(" ");
            }
            for (int k = 0; k <= i; k++) {
                System.out.print(number + " ");
                number = number * (i - k) / (k + 1);
            }
            System.out.println();
        }
    }
}
```

OUTPUT:

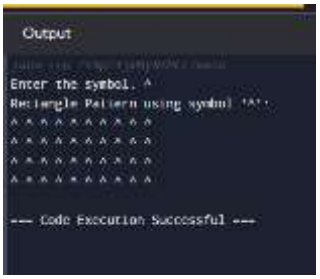
8. Write a program to print rectangle symbol pattern.
   Get the symbol as input from user

   CODE:

```
import java.util.Scanner;
public class main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the symbol: ");
        char symbol = scanner.next().charAt(0);
        System.out.println("Rectangle Pattern using symbol '" + symbol + "':");
        for (int i = 1; i <= 4; i++) {
```

```
            for (int j = 1; j <= 10; j++) {
                System.out.print(symbol + " ");
            }
            System.out.println();
        }
    }
}
```

OUTPUT:



9.Write a program to print the following pattern
Sample Input:

Enter the number to be printed: 1
Max Number of time printed: 3
1
11
111
11
1

CODE:

```
public class PatternPrinting {
    public static void main(String[] args) {
        int num = 1;
        int max = 3;

        for (int i = 1; i <= max; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(num);
            }
            System.out.println();
        }

        for (int i = max - 1; i >= 1; i--) {
            for (int j = 1; j <= i; j++) {
                System.out.print(num);
            }
```

```
            System.out.println();
        }
    }
}
```

OUTPUT:

10.Write a program to print the Inverted Full Pyramid pattern?

CODE:

```
public class main {
    public static void main(String[] args) {
        int rows = 5;
        for (int i = rows; i >= 1; --i) {
            for (int space = 0; space < rows - i; ++space) {
                System.out.print("  ");
            }
            for (int j = i; j <= 2 * i - 1; ++j) {
                System.out.print("* ");
            }
            for (int j = 0; j < i - 1; ++j) {
                System.out.print("* ");
            }
            System.out.println();
        }
    }
}
```

OUTPUT: