Practical No-5

Title – Write a program to calculate harmonic mean (F-measure) and E-measure for above example.

Program :

```
import java.util.ArrayList;
import java.util.List;


public class EvaluationMetrics {


   public static List<Integer> commonMember(int[] a, int[] b) {
      List<Integer> result = new ArrayList<>();
      for (int valueA : a) {
         for (int valueB : b) {
            if (valueA == valueB) {
               result.add(valueA);
            }
         }
      }
      return result;
   }


   public static void main(String[] args) {
      int[] Q = { 3, 7, 8, 11, 14, 19, 23, 25 }; // total retrieved documents
      int[] A = { 1, 2, 3, 7, 9, 10, 14, 20, 23, 24, 25 }; // total relevant documents


      List<Integer> relevantRetriveA = commonMember(Q, A);
      System.out.println("\n\nRelevant Retrieved Documents: " + relevantRetriveA);
      System.out.println();
```

```
for (int x = 0; x < relevantRetriveA.size(); x++) {
    int aValue = indexOf(Q, relevantRetriveA.get(x)) + 1;
    int aPlusC = indexOf(A, relevantRetriveA.get(x)) + 1;
    int b = 1; // Assuming the value of b as 1 for the E-measure



    double precision = (double) aValue / aPlusC * 100;
    double recall = (double) aValue / Q.length * 100;
    double f1Score = 2 * ((precision * recall) / (precision + recall));
    double harmonicMean = 2 / ((1 / recall) + (1 / precision));
    double eMeasure = 1 - ((1 + b * b) / (((b * b) / recall) + (1 / precision)));

    String precisionAnswer = "Precision: " + String.format("%.2f", precision);
    String recallAnswer = "Recall: " + String.format("%.2f", recall);
    String f1MeasureAnswer = "F1 Measure: " + String.format("%.2f", f1Score);
    String harmonicMeanAnswer = "Harmonic Mean: " + String.format("%.2f", harmonicMean);
    String eMeasureAnswer = "E-Measure: " + String.format("%.2f", eMeasure);

    System.out.println("Document: " + relevantRetriveA.get(x));
    System.out.println(precisionAnswer);
    System.out.println(recallAnswer);
    System.out.println(f1MeasureAnswer);
    System.out.println(harmonicMeanAnswer);
    System.out.println(eMeasureAnswer);
    System.out.println();
}



double totalRecall = (double) relevantRetriveA.size() / Q.length * 100;
```

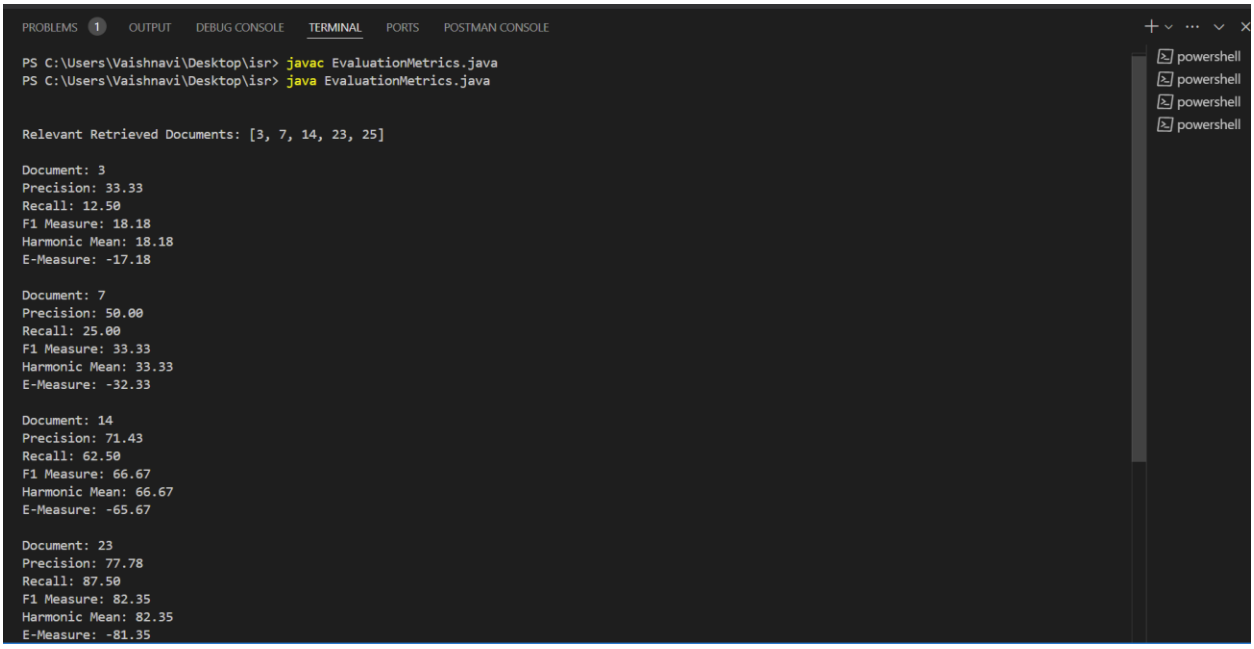
```
        double totalPrecision = (double) relevantRetriveA.size() / A.length * 100;


        System.out.println("Total Recall: " + String.format("%.2f", totalRecall));
        System.out.println("Total Precision: " + String.format("%.2f", totalPrecision));
    }



    public static int indexOf(int[] array, int value) {
        for (int i = 0; i < array.length; i++) {
            if (array[i] == value) {
                return i;
            }
        }
        return -1; // Element not found
    }
}
```

OUTPUT :


PROBLEMS 1
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
POSTMAN CONSOLE
powershell
powershell
powershell
powershell
PS C:\Users\Vaishnavi\Desktop\isr> javac EvaluationMetrics.java
PS C:\Users\Vaishnavi\Desktop\isr> java EvaluationMetrics.java
Relevant Retrieved Documents: [3, 7, 14, 23, 25]
Document: 3
Precision: 33.33
Recall: 12.50
F1 Measure: 18.18
Harmonic Mean: 18.18
E-Measure: -17.18
Document: 7
Precision: 50.00
Recall: 25.00
F1 Measure: 33.33
Harmonic Mean: 33.33
E-Measure: -32.33
Document: 14
Precision: 71.43
Recall: 62.50
F1 Measure: 66.67
Harmonic Mean: 66.67
E-Measure: -65.67
Document: 23
Precision: 77.78
Recall: 87.50
F1 Measure: 82.35
Harmonic Mean: 82.35
E-Measure: -81.35


Document: 25
Precision: 72.73
Recall: 100.00
F1 Measure: 84.21
Harmonic Mean: 84.21
E-Measure: -83.21
Total Recall: 62.50
Total Precision: 45.45
PS C:\Users\Vaishnavi\Desktop\isr>