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## Practical 4 harmonic mean (F-measure) and E-measure

### CODE:

```
import java.util.*;  
public class FandEMeasure {  
  
    public static void main(String[] args) {  
  
        // Sample input  
  
        Set<String> answerSet = new HashSet<>(Arrays.asList("doc1", "doc2", "doc4", "doc5"));  
  
        Set<String> relevantSet = new HashSet<>(Arrays.asList("doc2", "doc3", "doc4"));  
  
        // Intersection = retrieved relevant documents  
  
        Set<String> intersection = new HashSet<>(answerSet);  
  
        intersection.retainAll(relevantSet);  
  
        // Precision  
  
        double precision = (double) intersection.size() / answerSet.size();  
  
        // Recall  
  
        double recall = (double) intersection.size() / relevantSet.size();  
  
        // F-Measure (Harmonic mean)  
  
        double fMeasure = (precision + recall == 0) ? 0 : (2 * precision * recall) / (precision + recall);  
  
        // E-Measure  
  
        double eMeasure = 1 - fMeasure;  
  
        // Print results  
  
        System.out.println("Answer set A: " + answerSet);  
  
        System.out.println("Relevant set Rq1: " + relevantSet);
```

```

        System.out.println("Retrieved relevant documents (A ∩ Rq1): " + intersection);

        System.out.printf("Precision: %.2f\n", precision);

        System.out.printf("Recall: %.2f\n", recall);

        System.out.printf("F-Measure (Harmonic Mean): %.2f\n", fMeasure);

        System.out.printf("E-Measure: %.2f\n", eMeasure);

    }

}

```

Output:

```

// Sample input

Set<String> answerSet = new HashSet<>(Arrays.asList("doc1", "doc2", "doc4", "doc5"));

Set<String> relevantSet = new HashSet<>(Arrays.asList("doc2", "doc3", "doc4"));

```

```

Microsoft Windows [Version 10.0.19045.6216]
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C:\Users\Parth\Desktop\7thsem practical\ir practical>javac FandEMeasure.java

C:\Users\Parth\Desktop\7thsem practical\ir practical>java FandEMeasure
Answer set A: [doc5, doc4, doc2, doc1]
Relevant set R1: [doc4, doc3, doc2]
Retrieved relevant documents (A ∩ R1): [doc4, doc2]
Precision: 0.50
Recall: 0.67
F-Measure (Harmonic Mean): 0.57
E-Measure: 0.43

C:\Users\Parth\Desktop\7thsem practical\ir practical>

```