CS1003 Week 4 Exercise 2: Precision, Recall and F1-Measure

As with all lab exercises, this exercise is not assessed. It is intended solely to help you understand the module material. There is probably more here than you will have time for during the lab hour; you are encouraged to complete it in your own time if you don't finish it.

The aim of this exercise is to practice some information retrieval principles. You can use Eclipse, IntelliJ IDEA or any other Java development tools.

Consider the photograph from the lectures:

This example illustrates an image query looking for oranges. The query has recovered the ticked items: three oranges and one juggling ball. In this practical you are required to calculate the precision, recall and F1-measure for queries similar to this.

You are given two files, the first called ground_truth.csv contains the ground truth about the items in a photograph. It is encoded as a list of tab separated pairs consisting of the name of an item in the photograph e.g. an orange and an integer representing the number of items of that type. This file might look something like this:

Apple	1
Ball	2
Orange	5
…	…

The second file, called results.csv is also tab separated and contains one query per row. The first row of the file is a header row and contains the name of items recovered in a query. The first item in each row is what was searched for in the query. This file might look like this:

Query	Apple	Ball	Orange	Fish	Peas	Chips
Orange	0	2	3	0	0	0
Ball	1	1	1	0	0	0

You are required to write a program that will read these two files and output tables of the precision, recall and F1-measure for each query.

Suggested Approach

Use a map to hold the ground truth data. Ensure that you test that your map is properly created before moving onto the next part. Next write a method that reads in the results file line by line and is capable of passing the data to an *analysis* method. Think carefully about how you are going to encode the information for processing by the analysis method. Test that the analysis method gets passed the correct information before writing the next part. Next write the analysis method body which takes a line from the results file and calls three other

methods that calculate the precision, recall and F1-measure. Finally write out the query input and the precision, recall and F1-measure in some sensible format.

Once you have achieved this, if time permits, you could try reusing some of your code to interactively ask a user to input the query result and produce the precision, recall and F1-measure. This will allow you to interactively adjust the queries and see how the query results effect precision, recall and F1 measures.