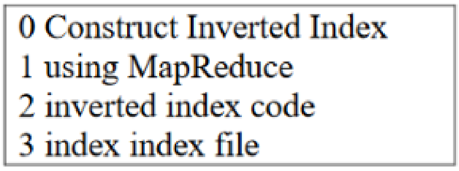
Problem statement:

Guild the inverted index for a given set of documents (compute the term weights by TF-IDF as shown in slide 5 of Chapter 4, using base 10 logarithm). Ignore the letter case, i.e., consider all words as lower case.

Input files:

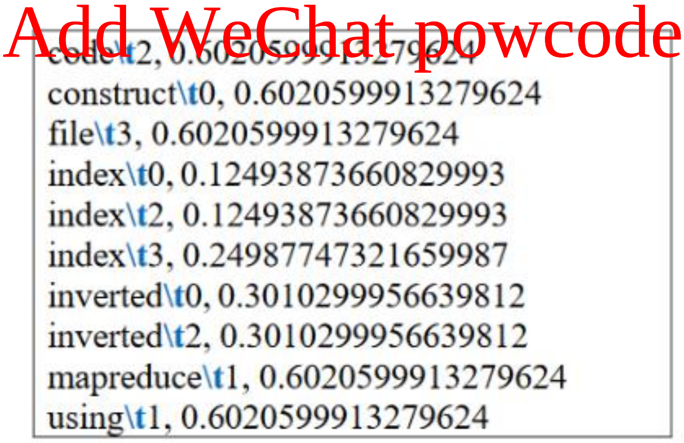
Each line is in format of “DocID DOC”, where DocID is the ID of the document, and DOC is the document content (a list of terms). For example:



```
0 Construct Inverted Index
1 using MapReduce
2 inverted index code
3 index index file
```

Output:

If a term W is contained in N documents, the corresponding output for this term contains N lines, in format of: “W\tDocID$_1$, weight$_1$”, “W\tDocID$_2$, weight$_2$”, …, and “W\tDocID$_n$, weight$_n$”. The DocIDs are sorted in ascending order, and the term weights are of double precision (stored in double/DoubleWritable). Given the example graph, the output file is like (assumed in one file):



```
code\t2, 0.6020599913279624
construct\t0, 0.6020599913279624
file\t3, 0.6020599913279624
index\t0, 0.12493873660829993
index\t2, 0.12493873660829993
index\t3, 0.24987747321659987
inverted\t0, 0.3010299956639812
inverted\t2, 0.3010299956639812
mapreduce\t1, 0.6020599913279624
using\t1, 0.6020599913279624
```

Code format:

Name your package as "comp9313.proj1" and name your driver class as "Project1.java". Your program should receive 3 parameters: the input folder, the output folder and the number of reducers. Finally, package all your java files as a zip file with name "InvertedIndex.zip".

Compile:

Your java code will be compiled and packaged as a jar file, and we will use the following commands to check the correctness of your solution:

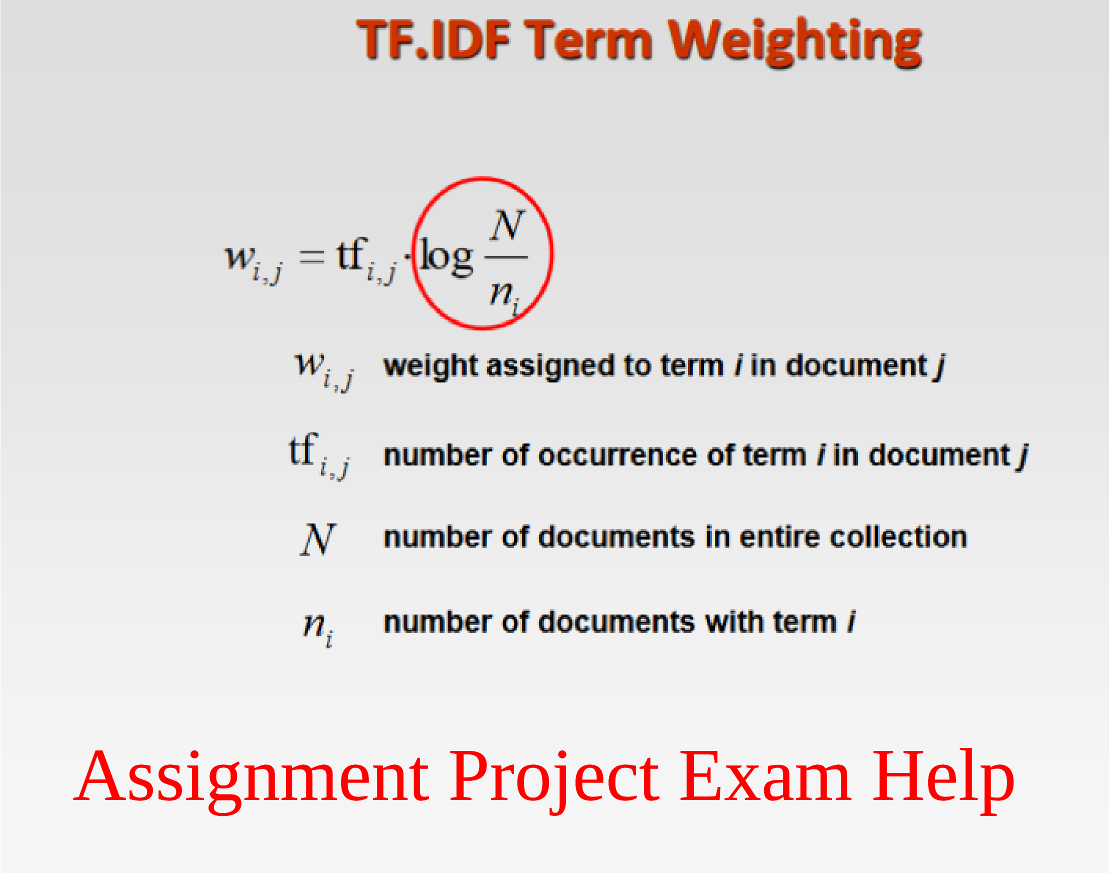
```
$ $HADOOP_HOME/bin/hadoop jar YOURJAR.jar YOURCLASS input output 1

$ $HADOOP_HOME/bin/hdfs dfs -cat output/*
```

Please ensure that the code you submit can be compiled and packaged. Any solution that has compilation errors will receive no more than 5 points for the entire assignment.

Documentation and code readability

Your source code will be inspected and marked based on readability and ease of understanding. The documentation (comments of the codes) in your source code is also important. Below is an indicative marking scheme:

Result correctness: 18
Efficiency: 5
Code structure, Readability, and Documentation: 2



TF.IDF Term Weighting

$$w_{i,j} = \mathrm{tf}_{i,j} \cdot \boxed{\log \frac{N}{n_i}}$$

$w_{i,j}$	weight assigned to term *i* in document *j*
$\mathrm{tf}_{i,j}$	number of occurrence of term *i* in document *j*
N	number of documents in entire collection
n_i	number of documents with term *i*