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# PRACTICAL 9

# To implement Word Count problem using Pig

## Apache Pig

- **Apache Pig** is a platform for analyzing large data sets that consists of a high-level language for expressing data analysis programs, coupled with infrastructure for evaluating these programs. The salient property of Pig programs is that their structure is amenable to substantial parallelization, which in turns enables them to handle very large data sets.
- The language used for Pig is Pig Latin. The Pig scripts get internally converted to Map Reduce jobs and get executed on data stored in HDFS.
- Apart from that, Pig can also execute its job in Apache Tez or Apache Spark.
- Pig can handle any type of data, i.e., structured, semi-structured or unstructured and stores the corresponding results into Hadoop Data File System.
- Every task which can be achieved using PIG can also be achieved using java used in MapReduce.

- Pig's language layer currently consists of a textual language called Pig Latin, which has the following key properties:
  - **Ease of programming.** It is trivial to achieve parallel execution of simple, "embarrassingly parallel" data analysis tasks. Complex tasks comprised of multiple interrelated data transformations are explicitly encoded as data flow sequences, making them easy to write, understand, and maintain.
  - **Optimization opportunities.** The way in which tasks are encoded permits the system to optimize their execution automatically, allowing the user to focus on semantics rather than efficiency.
  - **Extensibility.** Users can create their own functions to do special-purpose processing.

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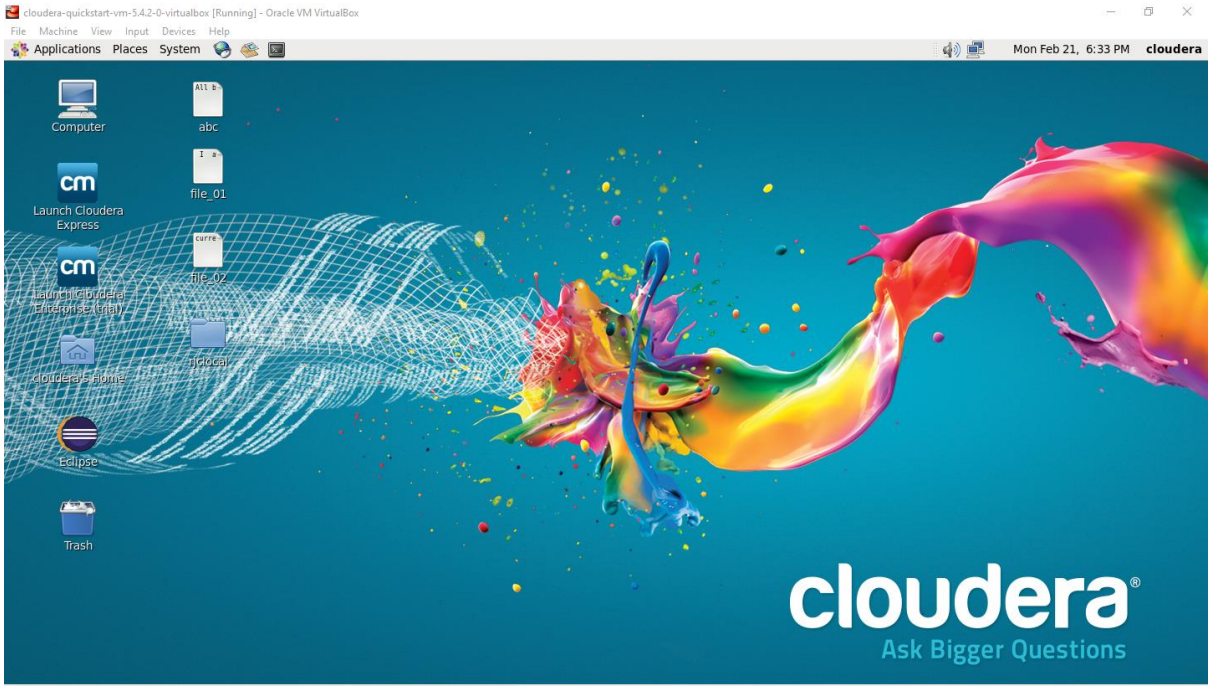
## To implement Word Count problem using Pig

## Steps:

1) Start the cloudera.




2) Open the browser. And then open Hue and login.

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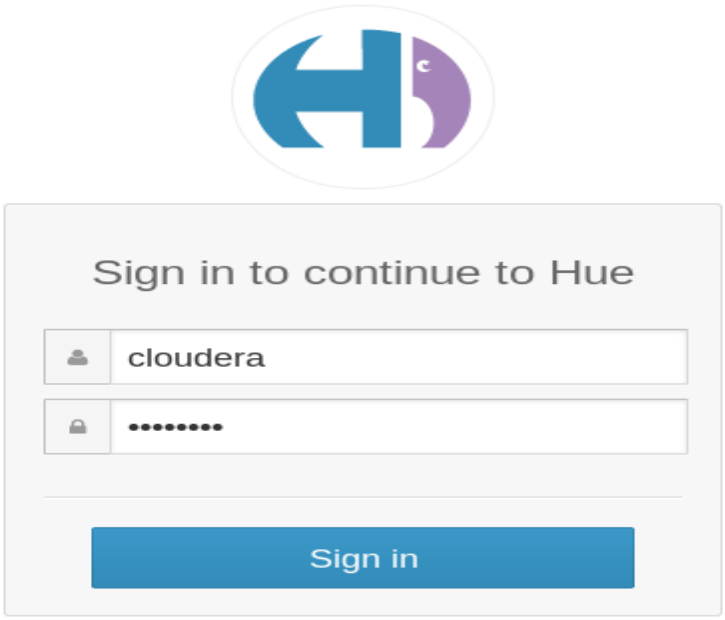
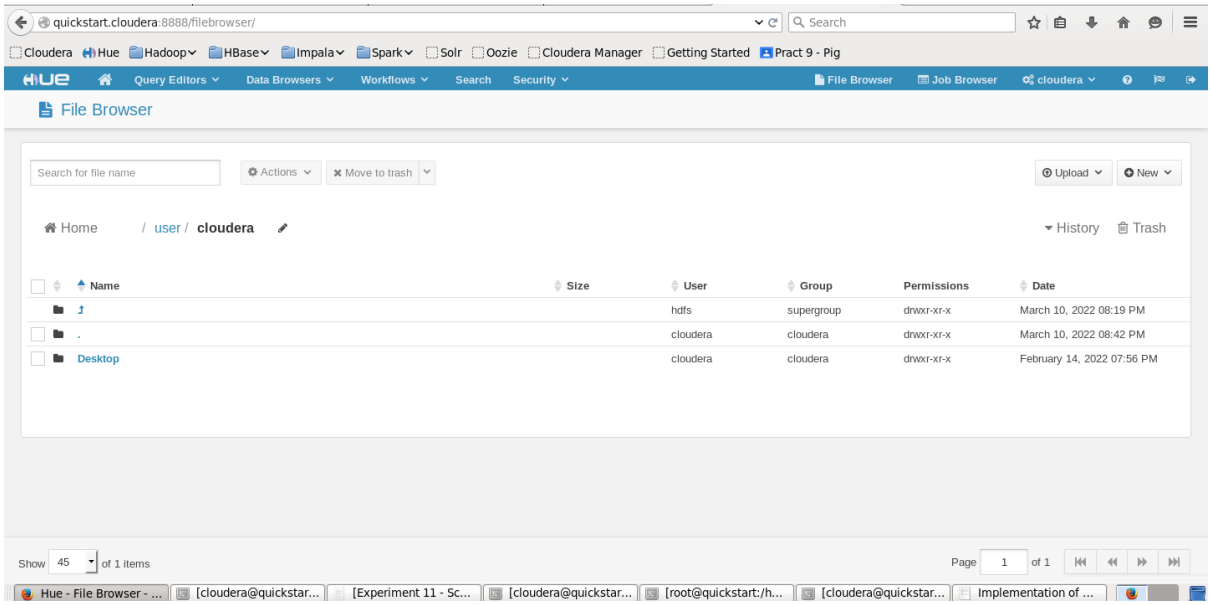



3) In Hue Go to file browser and Now open the directory /user/cloudera




4) Now we are creating the directory as Training inside /user/cloudera

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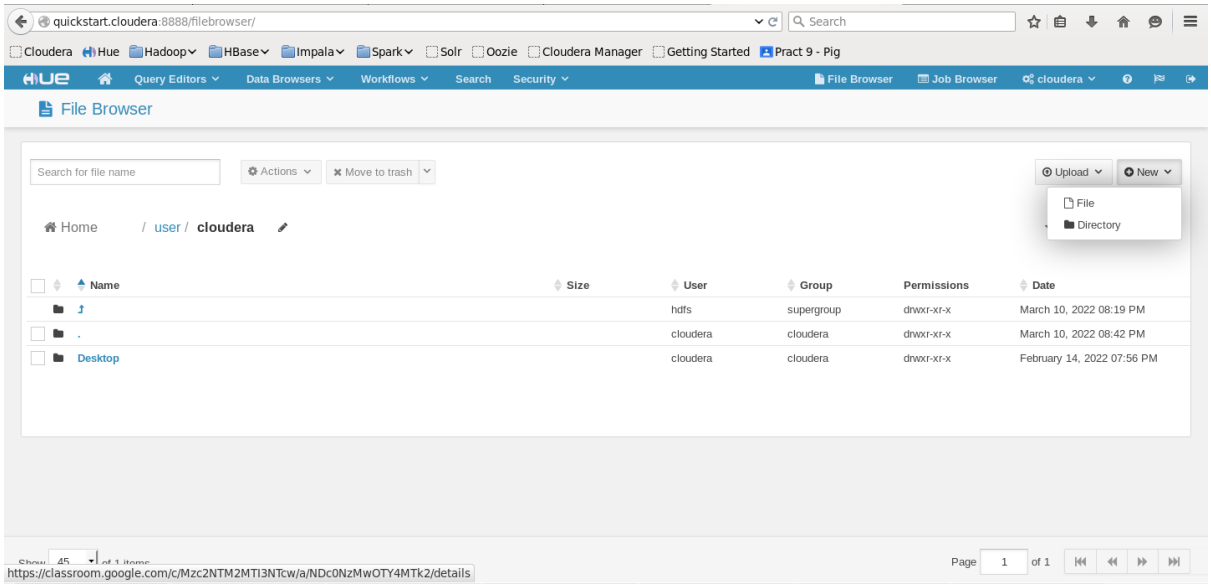
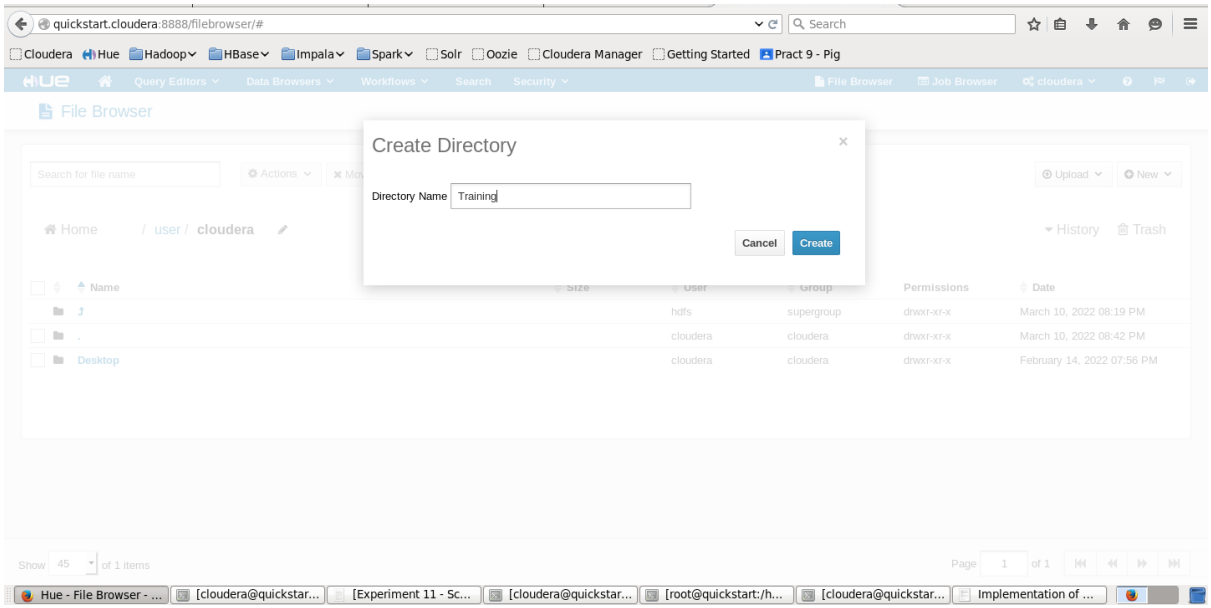



In File Browser we have New option in right corner

Click on New →Directory

Give the directory name And click on Create



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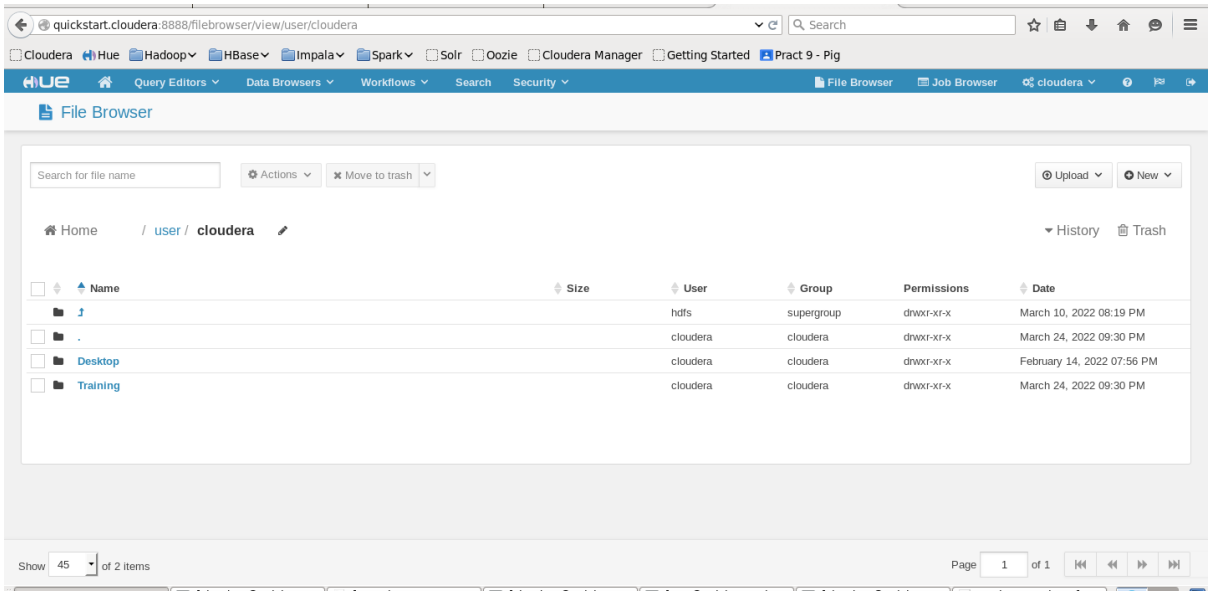
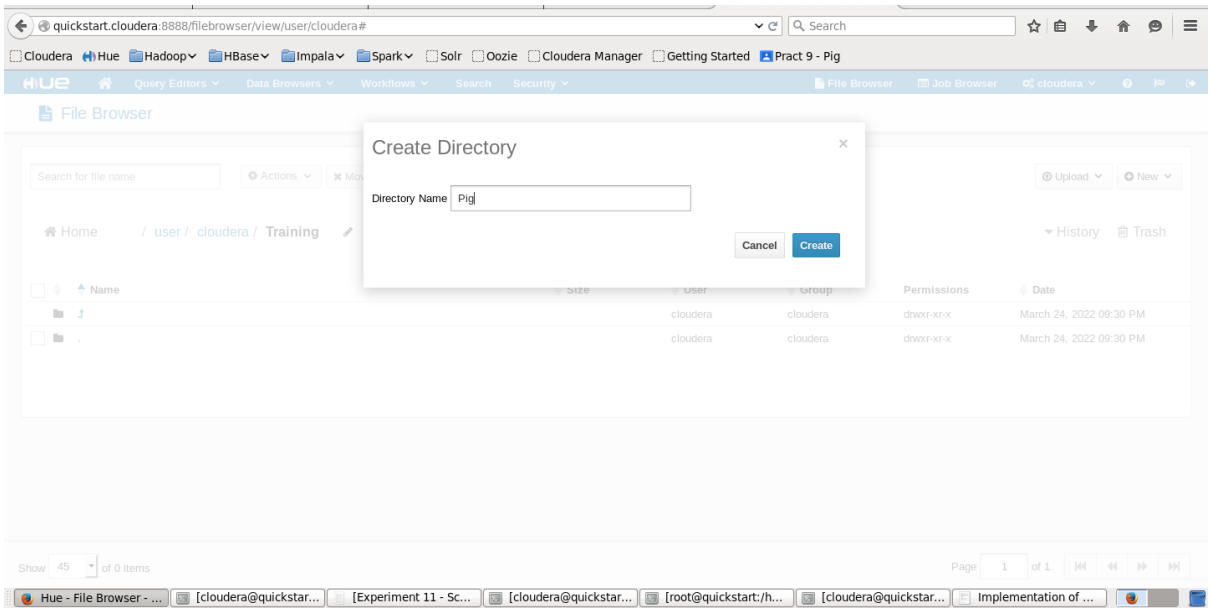



5) After creating Training directory now creating the Pig directory inside Training.




6) Pig directory has been created inside /user/cloudera/Training

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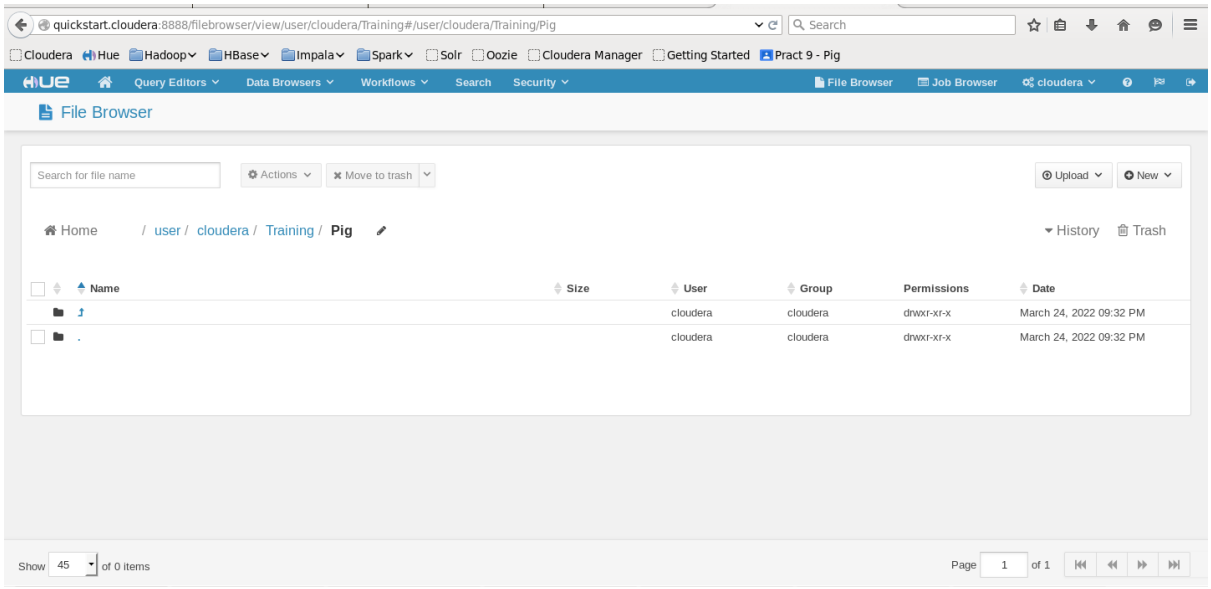
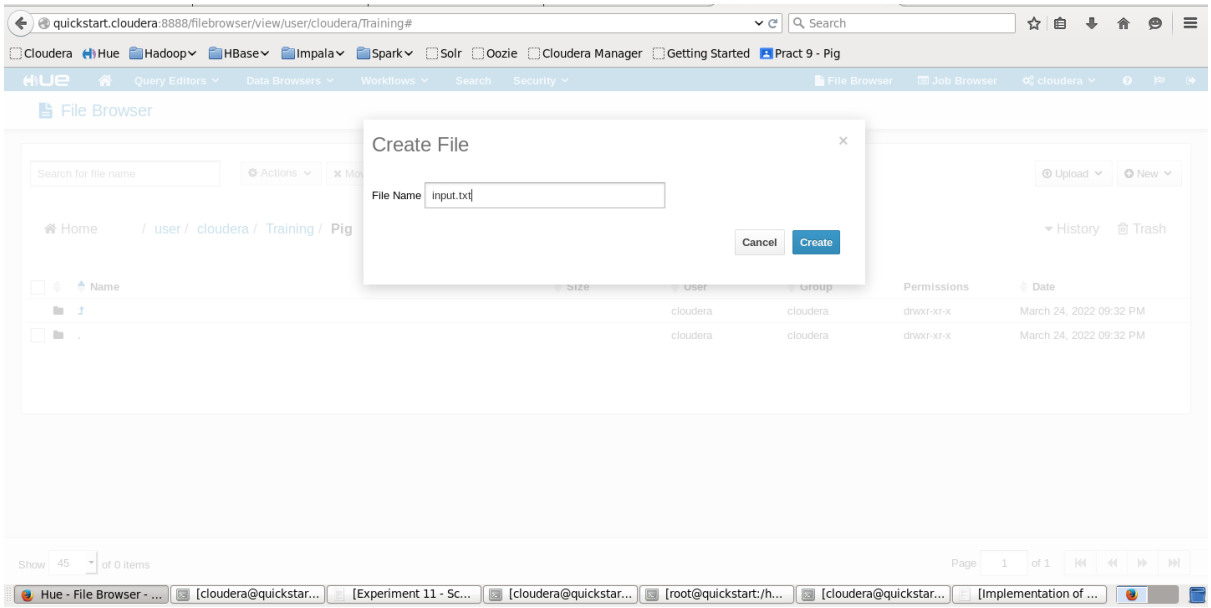



7) Creating input.txt file inside /usr/cloudera/Training/Pig directory

Again inside the Pig directory click on New and create file as'input.txt'




Once the file has been created click on 'input.txt' to add the content in it

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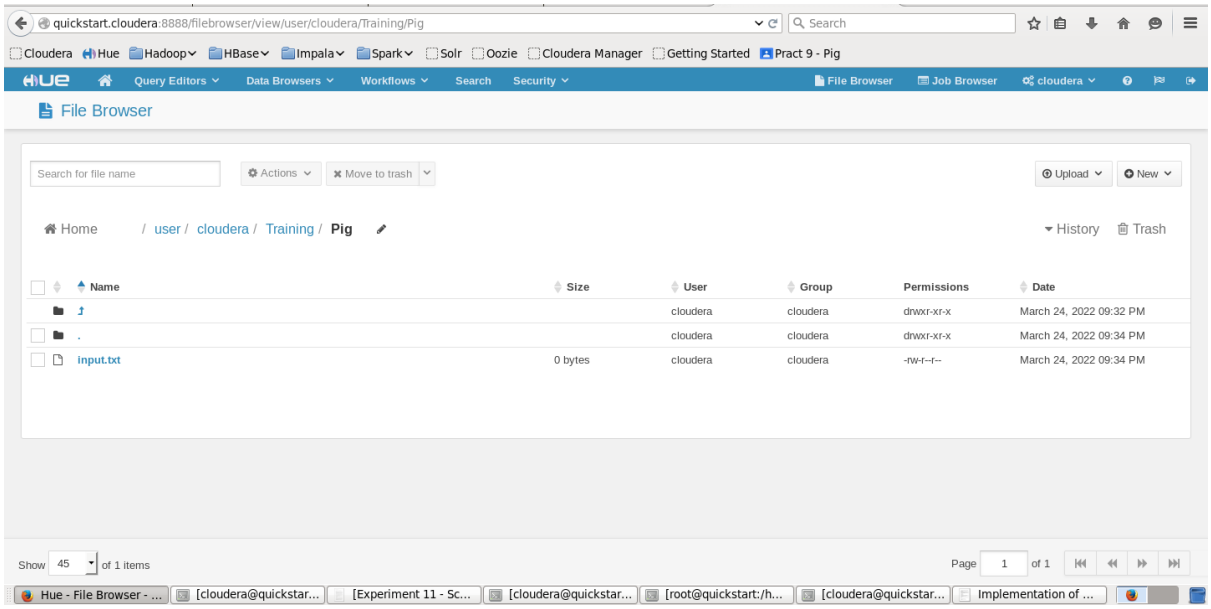
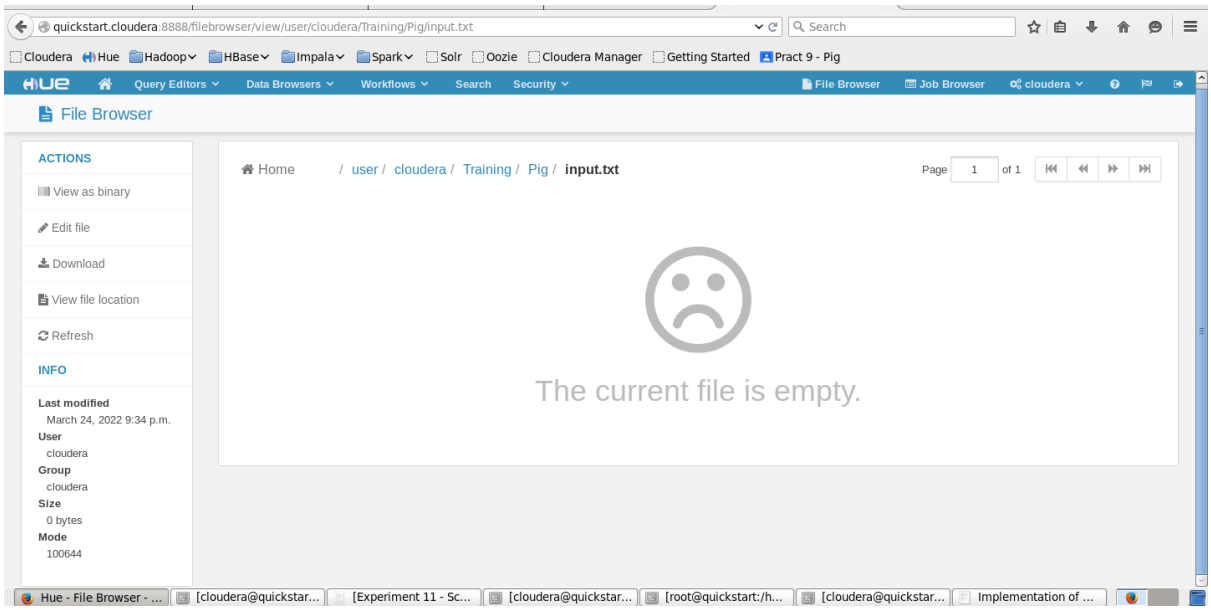



8) Adding some contents to this input.txt file.




For adding content in the input file, Click on ‘Edit file’ option then add the content.

Save the input.txt file

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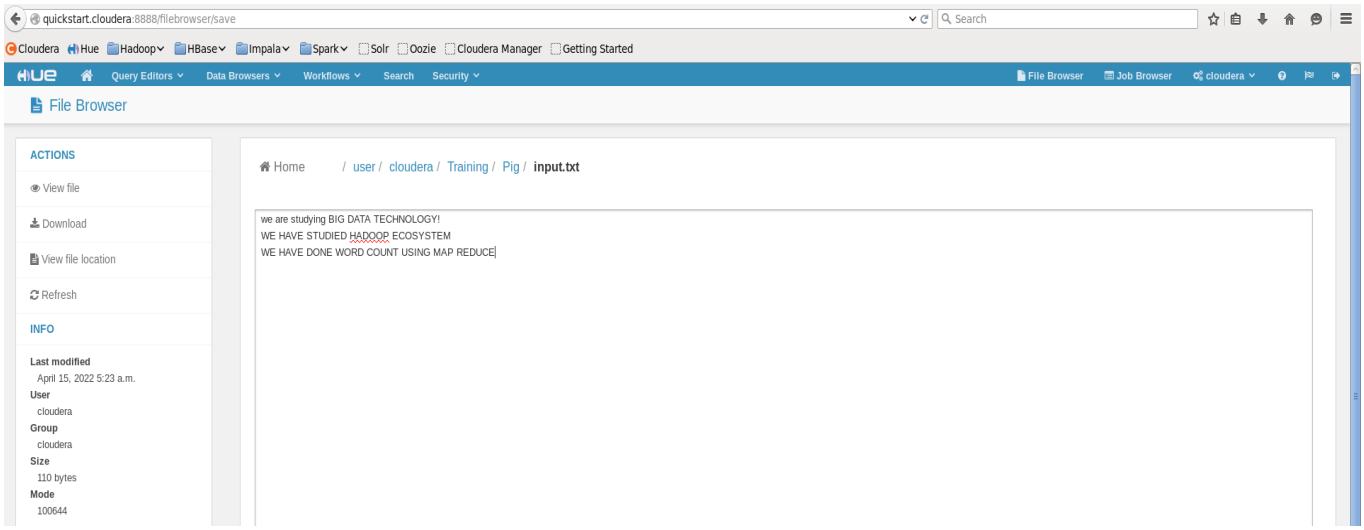


9) Now Open the terminal. And start Pig by typing pig on terminal.

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```
[cloudera@quickstart ~]$ pig
log4j:WARN No appenders could be found for logger (org.apache.hadoop.util.Shell)
.
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more in
fo.
2022-03-24 21:27:30,534 [main] INFO  org.apache.pig.Main - Apache Pig version 0.
12.0-cdh5.4.2 (rexported) compiled May 19 2015, 17:03:41
2022-03-24 21:27:30,534 [main] INFO  org.apache.pig.Main - Logging error message
s to: /home/cloudera/pig_1648182450505.log
2022-03-24 21:27:30,564 [main] INFO  org.apache.pig.impl.util.Utils - Default bo
otup file /home/cloudera/.pigbootup not found
2022-03-24 21:27:31,410 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:31,411 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:31,411 [main] INFO  org.apache.pig.backend.hadoop.executionengi
ne.HExecutionEngine - Connecting to hadoop file system at: hdfs://quickstart.clo
udera:8020
2022-03-24 21:27:33,409 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,409 [main] INFO  org.apache.pig.backend.hadoop.executionengi
ne.HExecutionEngine - Connecting to map-reduce job tracker at: localhost:8021
2022-03-24 21:27:33,415 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,466 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,468 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,517 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,517 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,571 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,571 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,670 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
```

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```
2022-03-24 21:27:33,755 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,761 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,832 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,839 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,911 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,911 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
2022-03-24 21:27:33,956 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:27:33,957 [main] INFO  org.apache.hadoop.conf.Configuration.deprec
ation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.addr
ess
grunt>
```

10) Now we have to load that input file where ever it is stored. By typing the command

Input1 = LOAD '/usr/cloudera/Training/pig/input.txt' AS (f1:chararray);

```
grunt> Input1 = LOAD '/usr/cloudera/Training/pig/input.txt' AS (f1:chararray);
grunt>
```

11) Now we are dumping the data. It will do the MapReduce task. The Dump operator is used to run the Pig Latin statements and display the results on the screen. It is generally used for debugging Purpose.

DUMP input1;

```
grunt> Input1 = LOAD '/user/cloudera/Training/pig/input.txt' AS (f1:chararray);
grunt> DUMP Input1;
2022-03-24 21:34:49,873 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: UNKNOWN
2022-03-24 21:34:49,874 [main] INFO  org.apache.pig.newplan.logical.optimizer.LogicalPlanOptimizer - {RULES_ENABLED=[AddForEach, ColumnMapKeyPrune, DuplicateForEachColumnRewrite, GroupByConstParallelSetter, ImplicitSplitInserter, Limit
timizer, LoadTypeCastInserter, MergeFilter, MergeForEach, NewPartitionFilterOptimizer, PushDownForEachFlatten, PushUpFilter, SplitFilter, StreamTypeCastInserter], RULES_DISABLED=[FilterLogicExpressionSimplifier, PartitionFilterOptimize
]}
2022-03-24 21:34:49,875 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MRCompiler - File concatenation threshold: 100 optimistic? false
2022-03-24 21:34:49,876 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size before optimization: 1
2022-03-24 21:34:49,876 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size after optimization: 1
2022-03-24 21:34:49,900 [main] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-24 21:34:49,903 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig script settings are added to the job
2022-03-24 21:34:49,905 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - mapred.job.reduce.markreset.buffer.percent is not set, set to default 0.3
2022-03-24 21:34:50,158 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - creating jar file Job3515554818749659l125.jar
2022-03-24 21:34:53,053 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - jar file Job3515554818749659l125.jar created
2022-03-24 21:34:53,060 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting up single store job
2022-03-24 21:34:53,060 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Key [pig.schematuple] is false, will not generate code.
2022-03-24 21:34:53,060 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Starting process to move generated code to distributed cache
2022-03-24 21:34:53,060 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Setting key [pig.schematuple.classes] with classes to deserialize []
2022-03-24 21:34:53,067 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 1 map-reduce job(s) waiting for submission.
2022-03-24 21:34:53,067 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-24 21:34:53,068 [JobControl] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-24 21:34:53,074 [JobControl] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:34:53,270 [JobControl] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-24 21:34:53,270 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
2022-03-24 21:34:53,291 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths (combined) to process : 1
2022-03-24 21:34:53,331 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - number of splits:1
2022-03-24 21:34:53,799 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - Submitting tokens for job: job_1644548343526_0028
2022-03-24 21:34:53,981 [JobControl] INFO  org.apache.hadoop.yarn.client.api.impl.YarnClientImpl - Submitted application application_1644548343526_0028
```

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```
2022-03-24 21:34:53,331 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - number of splits:1
2022-03-24 21:34:53,799 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - Submitting tokens for job: job_1644548343526_0028
2022-03-24 21:34:53,981 [JobControl] INFO  org.apache.hadoop.yarn.client.api.impl.YarnClientImpl - Submitted application application_1644548343526_0028
2022-03-24 21:34:54,049 [JobControl] INFO  org.apache.hadoop.mapreduce.Job - The url to track the job: http://quickstart.cloudera:8088/proxy/application_1644548343526_0028/
2022-03-24 21:34:54,049 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - HadoopJobId: job_1644548343526_0028
2022-03-24 21:34:54,049 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Processing aliases Input1
2022-03-24 21:34:54,049 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - detailed locations: M: Input1[3,9],Input1[-1,-1] C:  R:
2022-03-24 21:34:54,049 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - More information at: http://localhost:50030/jobdetails.jsp?jobid=job_1644548343526_0028
2022-03-24 21:34:54,098 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 0% complete
2022-03-24 21:35:12,995 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 50% complete
2022-03-24 21:35:19,500 [main] INFO  org.apache.hadoop.mapred.ClientServiceDelegate - Application state is completed. FinalApplicationStatus=SUCCEEDED. Redirecting to job history server
2022-03-24 21:35:20,906 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.reduce.tasks is deprecated. Instead, use mapreduce.job.reduces
2022-03-24 21:35:20,963 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 100% complete
2022-03-24 21:35:20,964 [main] INFO  org.apache.pig.tools.pigstats.SimplePigStats - Script Statistics:

HadoopVersion   PigVersion      UserId  StartedAt       FinishedAt      Features
2.6.0-cdh5.4.2  0.12.0-cdh5.4.2 cloudera        2022-03-24 21:34:49     2022-03-24 21:35:20     UNKNOWN

Success!

Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTIme      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   MedianReducetime        Alias   Feature Outputs
job_1644548343526_0028  1       0       6       6       6       n/a     n/a     n/a     n/a     Input1  MAP_ONLY        hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp-413572416,

Input(s):
Successfully read 3 records (497 bytes) from: "/user/cloudera/Training/pig/input.txt"

Output(s):
Successfully stored 3 records (129 bytes) in: "hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp-413572416"

Counters:
Total records written : 3
Total bytes written : 129
Spillable Memory Manager spill count : 0
Total bags proactively spilled: 0
Total records proactively spilled: 0

Job DAG:
job_1644548343526_0028


2022-03-24 21:35:21,051 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Success!
2022-03-24 21:35:21,052 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-24 21:35:21,052 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-24 21:35:21,052 [main] INFO  org.apache.pig.data.SchemaTupleBackend - Key [pig.schematuple] was not set... will not generate code.
2022-03-24 21:35:21,065 [main] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-24 21:35:21,065 [main] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
(we are studying BIG DATA TWECHNOLOGY!)
(WE HAVE STUDED HADOOP ECOSYSTEM)
(WE HAVE DONE WORD COUNT USING MAP REDUCE)
grunt>
```

12) Here we are counting the words in each line for that we are using the following command

wordsInEachLine = FOREACH input1 GENERATE flatten(TOKENIZE(f1)) as word;

```
grunt> wordsInEachLine = FOREACH Input1 GENERATE flatten(TOKENIZE(f1)) as word;
2022-03-25 22:09:29,072 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:09:29,072 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
grunt>
```

13) Again, we are dumping the data. It will do the MapReduce task.
dump wordsInEachLine;

```
grunt> wordsInEachLine = FOREACH Input1 GENERATE flatten(TOKENIZE(f1)) as word;
2022-03-25 22:09:29,072 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:09:29,072 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
grunt> dump wordsInEachLine;
2022-03-25 22:10:40,971 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: UNKNOWN
2022-03-25 22:10:40,986 [main] INFO  org.apache.pig.newplan.logical.optimizer.LogicalPlanOptimizer - {RULES_ENABLED=[AddForEach, ColumnMapKeyPrune, DuplicateForEachColumnRewrite, GroupByConstParallelSetter, ImplicitSplitInserter, LimitOp
timizer, LoadTypeCastInserter, MergeFilter, MergeForEach, NewPartitionFilterOptimizer, PushDownForEachFlatten, PushUpFilter, SplitFilter, StreamTypeCastInserter], RULES_DISABLED=[FilterLogicExpressionSimplifier, PartitionFilterOptimizer]
}
2022-03-25 22:10:41,014 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MRCompiler - File concatenation threshold: 100 optimistic? false
2022-03-25 22:10:41,016 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size before optimization: 1
2022-03-25 22:10:41,016 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size after optimization: 1
2022-03-25 22:10:41,062 [main] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:10:41,067 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig script settings are added to the job
2022-03-25 22:10:41,084 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - mapred.job.reduce.markreset.buffer.percent is not set, set to default 0.3
2022-03-25 22:10:42,118 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - creating jar file Job6058087589058459951.jar
2022-03-25 22:10:45,525 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - jar file Job6058087589058459951.jar created
2022-03-25 22:10:45,536 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting up single store job
2022-03-25 22:10:45,537 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Key [pig.schematuple] is false, will not generate code.
2022-03-25 22:10:45,537 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Starting process to move generated code to distributed cache
2022-03-25 22:10:45,537 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Setting key [pig.schematuple.classes] with classes to deserialize []
2022-03-25 22:10:45,546 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 1 map-reduce job(s) waiting for submission.
2022-03-25 22:10:45,546 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-25 22:10:45,550 [JobControl] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:10:45,566 [JobControl] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:10:45,776 [JobControl] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-25 22:10:45,776 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
2022-03-25 22:10:45,778 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths (combined) to process : 1
2022-03-25 22:10:45,803 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - number of splits:1
2022-03-25 22:10:45,887 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - Submitting tokens for job: job_1644548343526_0029
2022-03-25 22:10:45,928 [JobControl] INFO  org.apache.hadoop.yarn.client.api.impl.YarnClientImpl - Submitted application application_1644548343526_0029
2022-03-25 22:10:45,930 [JobControl] INFO  org.apache.hadoop.mapreduce.Job - The url to track the job: http://quickstart.cloudera:8088/proxy/application_1644548343526_0029/
2022-03-25 22:10:46,046 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - HadoopJobId: job_1644548343526_0029
2022-03-25 22:10:46,046 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Processing aliases Input1,wordsInEachLine
2022-03-25 22:10:46,046 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - detailed locations: M: Input1[3,9],wordsInEachLine[-1,-1] C:  R:
2022-03-25 22:10:46,046 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - More information at: http://localhost:50030/jobdetails.jsp?jobid=job_1644548343526_0029
2022-03-25 22:10:46,100 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 0% complete
2022-03-25 22:11:05,626 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 50% complete
2022-03-25 22:11:11,459 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 100% complete
2022-03-25 22:11:11,459 [main] INFO  org.apache.pig.tools.pigstats.SimplePigStats - Script Statistics:

HadoopVersion   PigVersion      UserId  StartedAt       FinishedAt      Features
2.6.0-cdh5.4.2  0.12.0-cdh5.4.2 cloudera        2022-03-25 22:10:41     2022-03-25 22:11:11     UNKNOWN

Success!
```

Name:

Roll No:

```
Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTIme      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   MedianReducetime        Alias   Feature Outputs
job_1644548343526_0029  1       0       5       5       5       n/a     n/a     n/a     n/a     Input1,wordsInEachLine  MAP_ONLY        hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp-341911088,

Input(s):
Successfully read 3 records (497 bytes) from: "/user/cloudera/Training/pig/input.txt"

Output(s):
Successfully stored 19 records (225 bytes) in: "hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp-341911088"

Counters:
Total records written : 19
Total bytes written : 225
Spillable Memory Manager spill count : 0
Total bags proactively spilled: 0
Total records proactively spilled: 0

Job DAG:
job_1644548343526_0029


2022-03-25 22:11:11,537 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Success!
2022-03-25 22:11:11,537 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:11:11,537 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-25 22:11:11,538 [main] INFO  org.apache.pig.data.SchemaTupleBackend - Key [pig.schematuple] was not set... will not generate code.
2022-03-25 22:11:11,543 [main] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-25 22:11:11,543 [main] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
(we)
(are)
(studying)
(BIG)
(DATA)
(TWECHNOLOGY!)
(WE)
(HAVE)
(STUDED)
(HADOOP)
(ECOSYSTEM)
(WE)
(HAVE)
(DONE)
(WORD)
(COUNT)
(USING)
(MAP)
(REDUCE)
grunt>
```

14) Now grouping the words present in each line.
groupedWords = group wordsInEachLine by word;

```
grunt> groupedWords = group wordsInEachLine by word;
grunt>
```

And then dumping the data by the following command.

dump groupedWords;

```
grunt> dump groupedWords;
2022-03-25 22:12:59,694 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: GROUP_BY
2022-03-25 22:12:59,695 [main] INFO  org.apache.pig.newplan.logical.optimizer.LogicalPlanOptimizer - {RULES_ENABLED=[AddForEach, ColumnMapKeyPrune, DuplicateForEachColumnRewrite, GroupByConstParallelSetter, ImplicitSplitInserter, LimitO
timizer, LoadTypeCastInserter, MergeFilter, MergeForEach, NewPartitionFilterOptimizer, PushDownForEachFlatten, PushUpFilter, SplitFilter, StreamTypeCastInserter], RULES_DISABLED=[FilterLogicExpressionSimplifier, PartitionFilterOptimizer
]
2022-03-25 22:12:59,702 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MRCompiler - File concatenation threshold: 100 optimistic? false
2022-03-25 22:12:59,706 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size before optimization: 1
2022-03-25 22:12:59,706 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size after optimization: 1
2022-03-25 22:12:59,736 [main] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:12:59,738 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig script settings are added to the job
2022-03-25 22:12:59,750 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - mapred.job.reduce.markreset.buffer.percent is not set, set to default 0.3
2022-03-25 22:12:59,750 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Reduce phase detected, estimating # of required reducers.
2022-03-25 22:12:59,752 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Using reducer estimator: org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.InputSizeReducerEstimator
2022-03-25 22:12:59,757 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.InputSizeReducerEstimator - BytesPerReducer=1000000000 maxReducers=999 totalInputFileSize=110
2022-03-25 22:12:59,757 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting Parallelism to 1
2022-03-25 22:13:00,128 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - creating jar file Job8164396865159780146.jar
2022-03-25 22:13:03,567 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - jar file Job8164396865159780146.jar created
2022-03-25 22:13:03,573 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting up single store job
2022-03-25 22:13:03,574 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Key [pig.schematuple] is false, will not generate code.
2022-03-25 22:13:03,574 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Starting process to move generated code to distributed cache
2022-03-25 22:13:03,574 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Setting key [pig.schematuple.classes] with classes to deserialize []
2022-03-25 22:13:03,676 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 1 map-reduce job(s) waiting for submission.
2022-03-25 22:13:03,676 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-25 22:13:03,677 [JobControl] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:13:03,687 [JobControl] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:13:03,825 [JobControl] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-25 22:13:03,825 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
2022-03-25 22:13:03,829 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths (combined) to process : 1
2022-03-25 22:13:03,858 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - number of splits:1
2022-03-25 22:13:03,905 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - Submitting tokens for job: job_1644548343526_0030
2022-03-25 22:13:03,951 [JobControl] INFO  org.apache.hadoop.yarn.client.api.impl.YarnClientImpl - Submitted application application_1644548343526_0030
2022-03-25 22:13:03,953 [JobControl] INFO  org.apache.hadoop.mapreduce.Job - The url to track the job: http://quickstart.cloudera:8088/proxy/application_1644548343526_0030/
2022-03-25 22:13:04,176 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - HadoopJobId: job_1644548343526_0030
2022-03-25 22:13:04,176 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Processing aliases Input1,groupedWords,wordsInEachLine
2022-03-25 22:13:04,176 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - detailed locations: M: Input1[3,9],wordsInEachLine[-1,-1],groupedWords[5,15] C:  R:
2022-03-25 22:13:04,176 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - More information at: http://localhost:50030/jobdetails.jsp?jobid=job_1644548343526_0030
2022-03-25 22:13:04,246 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 0% complete
2022-03-25 22:13:20,489 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 50% complete
2022-03-25 22:13:34,143 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 100% complete
2022-03-25 22:13:34,144 [main] INFO  org.apache.pig.tools.pigstats.SimplePigStats - Script Statistics:

HadoopVersion   PigVersion      UserId  StartedAt       FinishedAt      Features
2.6.0-cdh5.4.2  0.12.0-cdh5.4.2 cloudera        2022-03-25 22:12:59     2022-03-25 22:13:34     GROUP_BY

Success!

Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTIme      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   MedianReducetime        Alias   Feature Outputs
job_1644548343526_0030  1       1       5       5       5       5       6       6       6       6       Input1,groupedWords,wordsInEachLine     GROUP_BY        hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp325198341,
```

Name:

Roll No:

```
Success!

Job Stats (time in seconds):
JobId   Maps    Reduces MaxMapTime      MinMapTime      AvgMapTime      MedianMapTime   MaxReduceTime   MinReduceTime   AvgReduceTime   MedianReducetime        Alias   Feature Outputs
job_1644548343526_0030  1       1       5       5       5       6       6       6       Input1,groupedWords,wordsInEachLine     GROUP_BY        hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp325198341,

Input(s):
Successfully read 3 records (497 bytes) from: "/user/cloudera/Training/pig/input.txt"

Output(s):
Successfully stored 17 records (407 bytes) in: "hdfs://quickstart.cloudera:8020/tmp/temp-669075149/tmp325198341"

Counters:
Total records written : 17
Total bytes written : 407
Spillable Memory Manager spill count : 0
Total bags proactively spilled: 0
Total records proactively spilled: 0

Job DAG:
job_1644548343526_0030


2022-03-25 22:13:34,226 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Success!
2022-03-25 22:13:34,226 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:13:34,226 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-25 22:13:34,227 [main] INFO  org.apache.pig.data.SchemaTupleBackend - Key [pig.schematuple] was not set... will not generate code.
2022-03-25 22:13:34,235 [main] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-25 22:13:34,235 [main] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
(WE,{(WE),(WE)})
(we,{(we)})
(BIG,{(BIG)})
(MAP,{(MAP)})
(are,{(are)})
(DATA,{(DATA)})
(DONE,{(DONE)})
(HAVE,{(HAVE),(HAVE)})
(WORD,{(WORD)})
(COUNT,{(COUNT)})
(USING,{(USING)})
(HADOOP,{(HADOOP)})
(REDUCE,{(REDUCE)})
(STUDED,{(STUDED)})
(studying,{(studying)})
(ECOSYSTEM,{(ECOSYSTEM)})
(TWECHNOLOGY!,{(TWECHNOLOGY!)})
grunt>
```

15) Now we count those words. For each group we count words in each line.

countedWords = foreach groupedWords generate group, COUNT(wordsInEachLine);

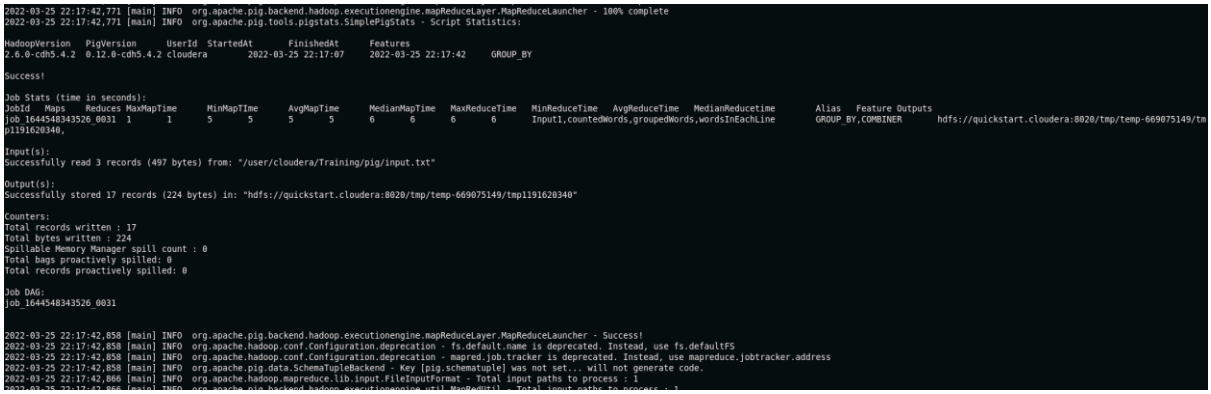
```
grunt> countedWords = foreach groupedWords generate group, COUNT(wordsInEachLine);
grunt>
```

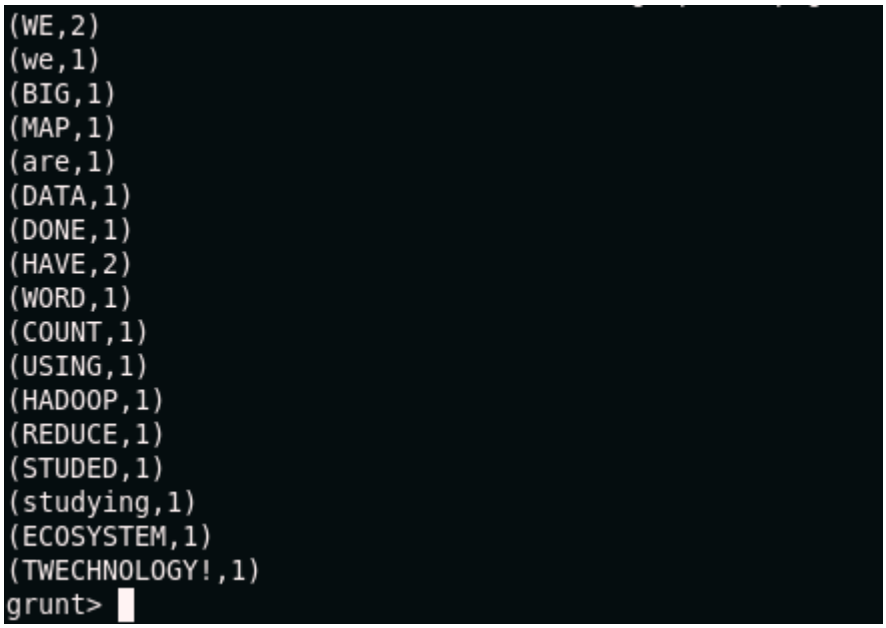
16) After every counting of words commands, we are dumping the data
dump countedWords;
Now the Final Output we are getting as word count for every word.

```
grunt>  countedWords = foreach groupedWords generate group, COUNT(wordsInEachLine);
grunt> dump countedWords;
2022-03-25 22:17:07,065 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig features used in the script: GROUP_BY
2022-03-25 22:17:07,066 [main] INFO  org.apache.pig.newplan.logical.optimizer.LogicalPlanOptimizer - {RULES_ENABLED=[AddForEach, ColumnMapKeyPrune, DuplicateForEachColumnRewrite, GroupByConstParallelSetter, ImplicitSplitInserter, LimitOptimizer, LoadTypeCastInserter, MergeFilter, MergeForEach, NewPartitionFilterOptimizer, PushDownForEachFlatten, PushUpFilter, SplitFilter, StreamTypeCastInserter], RULES_DISABLED=[FilterLogicExpressionSimplifier, PartitionFilterOptimizer]}
2022-03-25 22:17:07,074 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MRCompiler - File concatenation threshold: 100 optimistic? false
2022-03-25 22:17:07,075 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.CombinerOptimizer - Choosing to move algebraic foreach to combiner
2022-03-25 22:17:07,080 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size before optimization: 1
2022-03-25 22:17:07,080 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MultiQueryOptimizer - MR plan size after optimization: 1
2022-03-25 22:17:07,110 [main] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:17:07,113 [main] INFO  org.apache.pig.tools.pigstats.ScriptState - Pig script settings are added to the job
2022-03-25 22:17:07,132 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - mapred.job.reduce.markreset.buffer.percent is not set, set to default 0.3
2022-03-25 22:17:07,133 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Reduce phase detected, estimating # of required reducers.
2022-03-25 22:17:07,133 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Using reducer estimator: org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.InputSizeReducerEstimator
2022-03-25 22:17:07,136 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.InputSizeReducerEstimator - BytesPerReducer=1000000000 maxReducers=999 totalInputFileSize=110
2022-03-25 22:17:07,136 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting Parallelism to 1
2022-03-25 22:17:07,716 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - creating jar file Job7925097203331980059.jar
2022-03-25 22:17:11,021 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - jar file Job7925097203331980059.jar created
2022-03-25 22:17:11,036 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.JobControlCompiler - Setting up single store job
2022-03-25 22:17:11,037 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Key [pig.schematuple] is false, will not generate code.
2022-03-25 22:17:11,037 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Starting process to move generated code to distributed cache
2022-03-25 22:17:11,037 [main] INFO  org.apache.pig.data.SchemaTupleFrontend - Setting key [pig.schematuple.classes] with classes to deserialize []
2022-03-25 22:17:11,077 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 1 map-reduce job(s) waiting for submission.
2022-03-25 22:17:11,077 [main] INFO  org.apache.hadoop.conf.Configuration.deprecation - mapred.job.tracker is deprecated. Instead, use mapreduce.jobtracker.address
2022-03-25 22:17:11,078 [JobControl] INFO  org.apache.hadoop.yarn.client.RMProxy - Connecting to ResourceManager at /0.0.0.0:8032
2022-03-25 22:17:11,087 [JobControl] INFO  org.apache.hadoop.conf.Configuration.deprecation - fs.default.name is deprecated. Instead, use fs.defaultFS
2022-03-25 22:17:11,215 [JobControl] INFO  org.apache.hadoop.mapreduce.lib.input.FileInputFormat - Total input paths to process : 1
2022-03-25 22:17:11,215 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths to process : 1
2022-03-25 22:17:11,222 [JobControl] INFO  org.apache.pig.backend.hadoop.executionengine.util.MapRedUtil - Total input paths (combined) to process : 1
2022-03-25 22:17:11,998 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - number of splits:1
2022-03-25 22:17:12,055 [JobControl] INFO  org.apache.hadoop.mapreduce.JobSubmitter - Submitting tokens for job: job_1644548343526_0031
2022-03-25 22:17:12,099 [JobControl] INFO  org.apache.hadoop.yarn.client.api.impl.YarnClientImpl - Submitted application application_1644548343526_0031
2022-03-25 22:17:12,104 [JobControl] INFO  org.apache.hadoop.mapreduce.Job - The url to track the job: http://quickstart.cloudera:8088/proxy/application_1644548343526_0031/
2022-03-25 22:17:12,106 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - HadoopJobId: job_1644548343526_0031
2022-03-25 22:17:12,106 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - Processing aliases Input1,countedWords,groupedWords,wordsInEachLine
2022-03-25 22:17:12,106 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - detailed locations: M: Input1[3,9],wordsInEachLine[-1,-1],countedWords[6,15],groupedWords[5,15] C: countedWords[6,15],groupedWords[5,15] R: countedWords[6,15]
2022-03-25 22:17:12,106 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - More information at: http://localhost:50030/jobdetails.jsp?jobid=job_1644548343526_0031
2022-03-25 22:17:12,141 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 0% complete
2022-03-25 22:17:28,842 [main] INFO  org.apache.pig.backend.hadoop.executionengine.mapReduceLayer.MapReduceLauncher - 50% complete
```

Name:

Roll No:




As we can see from above image the Word “a” occurred twice, word “for, data” start with small w occurred twice, word “I” occurred once, and so on.

17) Now Exit from the grunt shell using quit command.