G Pulla Reddy Engineering College (Autonomous): Kurnool

Department of Computer Science & Engineering

Lab Manual

Class	**B.Tech CSE VII Semester**
Course	**Big Data Analytics (BDA (P))**
Course Code	**CS404**
Scheme	**2017**
Academic Year	**2022-23**
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List of Experiments

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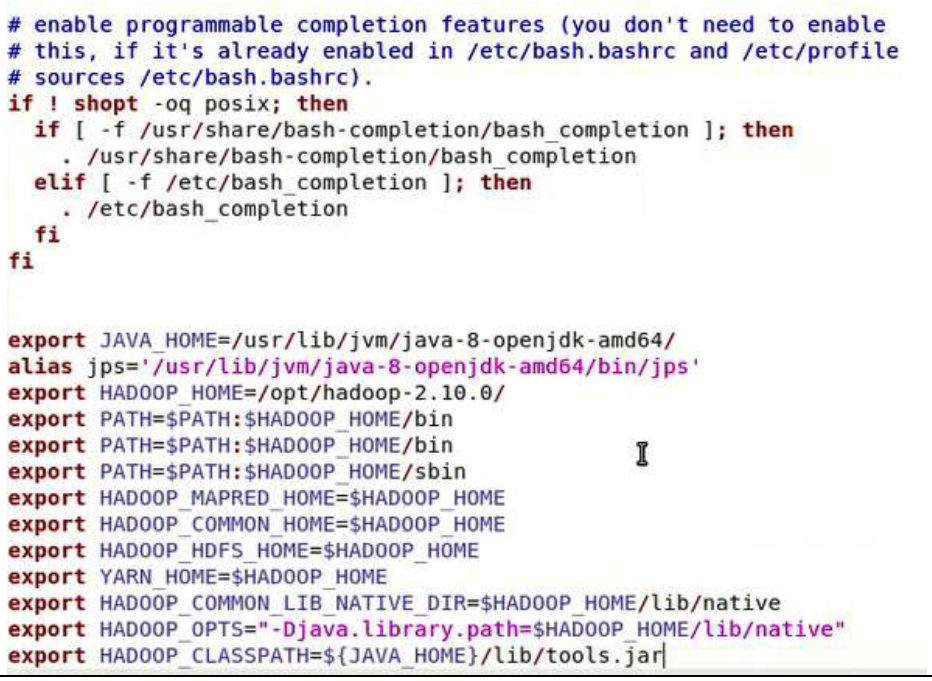
Video Tutorials	
https://www.youtube.com/channel/UC_6mhzMATOtsC1UXO0sHpwA	
Topic	**Youtube link**
Install Ubuntu in Virtualbox	https://www.youtube.com/watch?v=2QVz7715n5g
run Wordcount MapReduce	https://www.youtube.com/watch?v=G0xyw1ODi5A
MapReduce on Gutenberg	https://www.youtube.com/watch?v=q8INOCrU9HE
Pig Latin Operators	https://www.youtube.com/watch?v=2N9gP1l9_F4

01.	**Perform Hadoop setup in Local and Pseudo mode and monitor through web based UI.**

Local (Standalone) mode:

Step	Details
1.	Prerequisites: a) VMWare b) Ubuntu 18.04 c) Jdk 8 d) Hadoop 2.10.0
2.	*Open Terminal and type in the following command* sudo apt-get install openjdk-8-jdk
3.	*Check whether java is installed or not using the command* java –version
4.	*Download Hadoop 2.10.0*
5.	cd /Downloads
6.	sudo tar xvf hadoop-2.10.0.tar.gz
7.	sudo mv hadoop-2.10.0 /opt
8.	cd /
9.	cd opt
10.	sudo chmod 777 hadoop-2.10.0
11.	cd /home/Sreedhar
12.	sudo gedit .bashrc *At the end of the file (after fi) add the following (export JAVA_HOME…)* 
13.	source .bashrc
14.	hadoop version

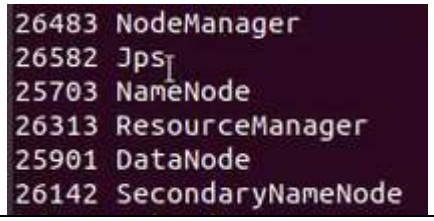
```
# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
  if [ -f /usr/share/bash-completion/bash_completion ]; then
    . /usr/share/bash-completion/bash_completion
  elif [ -f /etc/bash_completion ]; then
    . /etc/bash_completion
  fi
fi


export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64/
alias jps='/usr/lib/jvm/java-8-openjdk-amd64/bin/jps'
export HADOOP_HOME=/opt/hadoop-2.10.0/
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/sbin
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib/native"
export HADOOP_CLASSPATH=${JAVA_HOME}/lib/tools.jar
```

Pseudo mode

Step	Details
1.	Prerequisites: a) VMWare b) Ubuntu 18.04 c) Jdk 8 d) Hadoop 2.10.0
2.	*Open Terminal and type in the following command* sudo apt-get install openjdk-8-jdk
3.	*Check whether java is installed or not using the command* java –version
4.	sudo su
5.	adduser hduser *(Give password)*
6.	usermod –aG sudo hduser
7.	sudo su hduser
8.	sudo apt-get purge openssh-server
9.	sudo apt-get install openssh-server
10.	ssh-keygen –t rsa
11.	cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
12.	ssh localhost
13.	cd /home/hduser
14.	*Download Hadoop 2.10.0*
15.	sudo tar xvf hadoop-2.10.0.tar.gz
16.	sudo mv /home/hduser/hadoop-2.10.0 /opt
17.	cd /
18.	cd opt
19.	sudo chmod 777 hadoop-2.10.0
20.	cd /home/hduser
21.	sudo gedit .bashrc *At the end of the file add export JAVA_HOME...(Same as local mode)*
22.	source .bashrc
23.	cd /
24.	cd opt
25.	cd hadoop-2.10.0
26.	cd etc
27.	cd hadoop
28.	sudo gedit hadoop-env.sh *replace the following export JAVA_HOME=${JAVA_HOME}* `# The java implementation to use.` `#export JAVA_HOME=${JAVA_HOME}` `export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64`

29.	sudo gedit core-site.xml *add the following between* *<configuration> </configuration>* `<configuration>` `<property>` `<name>fs.default.name</name>` `<value>hdfs://localhost:9000</value>` `</property>` `<property>` `<name>hadoop.tmp.dir</name>` `<value>/opt/hadoop-2.10.0/tmp</value>` `</property>` `</configuration>`
30.	sudo gedit hdfs-site.xml *add the following between <configuration> </configuration>* `<configuration>` `<property>` `<name>dfs.replication</name>` `<value>1</value>` `</property>` `<property>` `<name>dfs.namenode.name.dir</name>` `<value>/home/hduser/hadoop_tmp/hdfs/namenode</value>` `</property>` `<property>` `<name>dfs.datanode.data.dir</name>` `<value>/home/hduser/hadoop_tmp/hdfs/datanode</value>` `</property>` `</configuration>`
31.	sudo gedit yarn-site.xml *add the following between <configuration> </configuration>* `<configuration>` `<property>` `<name>yarn.nodemanager.aux-services</name>` `<value>mapreduce_shuffle</value>` `</property>` `<property>` `<name>yarn.nodemanager.aux-services.mapreduce.shuffle.class</name>` `<value>org.apache.hadoop.mapred.ShuffleHandler</value>` `</property>` `<!-- Site specific YARN configuration properties -->` `</configuration>`
32.	sudo cp mapred-site.xml.template mapred-site.xml
33.	sudo gedit yarn-site.xml *add the following between <configuration> </configuration>* `<configuration>` `<property>` `<name>mapreduce.framework.name</name>` `<value>yarn</value>` `</property>` `</configuration>`
34.	cd /home/hduser
35.	sudo mkdir –p hadoop_tmp/hdfs/namenode
36.	sudo mkdir –p hadoop_tmp/hdfs/datanode
37.	sudo chmod 777 –R hadoop_tmp/hdfs/namenode
38.	sudo chmod 777 –R hadoop_tmp/hdfs/datanode
39.	sudo chown –R hduser hadoop_tmp/hdfs/datanode
40.	hdfs namenode -format

41.	start-dfs.sh
42.	start-yarn.sh
43.	jps jps command shows the following output 
44.	To stop all hadoop daemon services, use the following command stop-dfs.sh stop-yarn.sh

Monitor through Web based UI	
Namenode information	localhost:50070
Secondarynamenode information	localhost:50090
Datanode information	localhost:50075
YARN Resource Manager	localhost:8088
YARN Node Manager	localhost:8042

02. Implementation of Hadoop shell commands on files

Syntax and Description	Example (Usage)
hadoop **version** displays the version of hadoop installed in the system	hadoop version
hadoop fs -**ls** / *Displays List of Files and Directories in HDFS file Path*	hadoop fs -ls /
hadoop fs –**mkdir** *create a directory on an HDFS environment.*	hadoop fs -mkdir /user/hadoop/
hadoop fs –**put** *used to copy files from the local file system to the HDFS filesystem*	hadoop fs -put sample.txt /user/data/
hadoop fs –**get** *used to copy files from HDFS file system to the local file system, just the opposite to put command.*	hadoop fs -get /user/data/sample.txt workspace/
hadoop fs -**cat** URI [URI …] *used for displaying the contents of a file on the console.*	hadoop fs -cat /user/data/sampletext.txt
hadoop fs -**cp** URI [URI …] <dest> *Copy files from source to destination. This command allows multiple sources as well in which case the destination must be a directory.*	hadoop fs -cp /user/hadoop/file1 /user/hadoop/file2
hadoop fs -**appendToFile** <localsrc> … <dst> *Append single src, or multiple srcs from local file system to the destination file system. Also reads input from stdin and appends to destination file system.*	hadoop fs -appendToFile localfile /user/hadoop/hadoopfile

hadoop fs -**df** URI [URI …] *Displays free space*	hadoop dfs -df /user/hadoop/dir1
hadoop fs –**help**	hadoop fs –help
hadoop fs -**touchz** URI [URI …] *Create a file of zero length. An error is returned if the file exists with non-zero length*	hadoop -touchz pathname
hadoop fs -**rmdir** URI [URI …] *Delete a directory*	hadoop fs -rmdir /user/hadoop/emptydir
hadoop fs -**mv** URI [URI …] <dest> *Moves files from source to destination. This command allows multiple sources as well in which case the destination needs to be a directory.*	hadoop fs -mv /user/hadoop/file1 /user/hadoop/file2

03.	**Implementation of word count example using Hadoop MapReduce**

Step	Details
1.	Prerequisites: a) VMWare or Virtualbox b) Cloudera (CDH5)
2.	File → New → Java Project → Project Name as WordCount → Libraries → Add External Jars
3.	Open Terminal cat > /home/cloudera/inputFile.txt --Enter words
4.	hdfs dfs -mkdir /inputnew hdfs dfs -put /home/cloudera/inputFile.txt /inputnew/
5.	hdfs dfs -cat /inputnew/inputFile.txt
6.	hadoop jar /home/cloudera/wordcount.jar WordCount /inputnew/inputFile.txt /output_new
7.	hdfs dfs -cat /output_new/part-r-00000

```
import java.io.IOException;

import java.util.StringTokenizer;

import org.apache.hadoop.conf.Configuration;

import org.apache.hadoop.fs.Path;

import org.apache.hadoop.io.IntWritable;

import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Job;

import org.apache.hadoop.mapreduce.Mapper;

import org.apache.hadoop.mapreduce.Reducer;

import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;

import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class WordCount {

  public static class TokenizerMapper
```

```
      extends Mapper<Object, Text, Text, IntWritable>{
   private final static IntWritable one = new IntWritable(1);
   private Text word = new Text();
   public void map(Object key, Text value, Context context
                   ) throws IOException, InterruptedException {
     StringTokenizer itr = new StringTokenizer(value.toString());
     while (itr.hasMoreTokens()) {
       word.set(itr.nextToken());
       context.write(word, one);
     }
   }
 }
  public static class IntSumReducer
       extends Reducer<Text,IntWritable,Text,IntWritable> {
   private IntWritable result = new IntWritable();
   public void reduce(Text key, Iterable<IntWritable> values, Context context)
throws
                      IOException, InterruptedException {
     int sum = 0;
     for (IntWritable val : values) {
       sum += val.get();
     }
     result.set(sum);
     context.write(key, result);
   }
```

```
  }
  public static void main(String[] args) throws Exception {
    Configuration conf = new Configuration();
    Job job = Job.getInstance(conf, "word count");
    job.setJarByClass(WordCount.class);
    job.setMapperClass(TokenizerMapper.class);
    job.setCombinerClass(IntSumReducer.class);
    job.setReducerClass(IntSumReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);
    FileInputFormat.addInputPath(job, new Path(args[0]));
    FileOutputFormat.setOutputPath(job, new Path(args[1]));
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

04.	**Write a MapReduce program that works on Gutenberg data.**

Step	Details
1.	Prerequisites: a) VMWare or Virtualbox b) Cloudera (CDH5)
2.	Download gutenberg dataset and paste into gutenbergdata folder http://www.gutenberg.org/cache/epub/4300/pg4300.txt
3.	Follow the similar steps as Wordcount MapReduce program
4.	Open Terminal
5.	Type the command: hdfs dfs -mkdir /guteninput
6.	hdfs dfs -put /home/cloudera/gutenbergdata/pg4300.txt /guteninput/
7.	hadoop jar /home/cloudera/Wordcount.jar WordCount /guteninput/pg4300.txt /gutenoutput
8.	hdfs dfs -cat /gutenoutput/part-r-00000
9.	You can also use hdfs dfs -cat /gutenoutput/* command instead of step 19

Source code:

Same as Wordcount MapReduce program

05.	**Write a MapReduce program that mines weather data.**

Step	Details
1.	Prerequisites: a) VMWare or Virtualbox b) Cloudera (CDH5)
2.	Download the dataset (save in weatherdata folder) and jar file: https://drive.google.com/file/d/0B-ur4R5mlgGLcVRZMTZGekRpZWM/view https://drive.google.com/file/d/0B-ur4R5mlgGLMzVyTmdITTVmbjA/view
3.	Select File --> New --> Class --> Give name as CalculateMaxAndMinTemeratureWithTime
4.	Click on Finish
5.	Save the source code and name it as CalculateMaxAndMinTemeratureWithTime.java into workspace
6.	Open Terminal
7.	Type the command: hdfs dfs -mkdir /weatherinput
8.	hdfs dfs -put /home/cloudera/weatherdata/input_temp.txt /weatherinput/
9.	hadoop jar /home/cloudera/WeatherReportPOC.jar CalculateMaxAndMinTemeratureWithTime /weatherinput/input_temp.txt /weatheroutput
10.	hdfs dfs -cat /gutenoutput/Austin-r-00000

Source code:

```
import java.io.IOException;

import java.util.StringTokenizer;

import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Mapper;

import org.apache.hadoop.mapreduce.Reducer;

import org.apache.hadoop.mapreduce.lib.output.MultipleOutputs;

import org.apache.hadoop.conf.Configuration;

import org.apache.hadoop.fs.Path;
```

```
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;

public class CalculateMaxAndMinTemeratureWithTime {
public static String calOutputName = "California";
public static String nyOutputName = "Newyork";
public static String njOutputName = "Newjersy";
public static String ausOutputName = "Austin";
public static String bosOutputName = "Boston";
public static String balOutputName = "Baltimore";

public static class WhetherForcastMapper extends
  Mapper<Object, Text, Text, Text> {

 public void map(Object keyOffset, Text dayReport, Context con)
   throws IOException, InterruptedException {
  StringTokenizer strTokens = new StringTokenizer(
    dayReport.toString(), "\t");
  int counter = 0;
  Float currnetTemp = null;
  Float minTemp = Float.MAX_VALUE;
  Float maxTemp = Float.MIN_VALUE;
  String date = null;
```

```
String currentTime = null;
String minTempANDTime = null;
String maxTempANDTime = null;

while (strTokens.hasMoreElements()) {
 if (counter == 0) {
  date = strTokens.nextToken();
 } else {
  if (counter % 2 == 1) {
   currentTime = strTokens.nextToken();
  } else {
   currnetTemp = Float.parseFloat(strTokens.nextToken());
   if (minTemp > currnetTemp) {
    minTemp = currnetTemp;
    minTempANDTime = minTemp + "AND" + currentTime;
   }
   if (maxTemp < currnetTemp) {
    maxTemp = currnetTemp;
    maxTempANDTime = maxTemp + "AND" + currentTime;
   }
  }
 }
 counter++;
}
// Write to context - MinTemp, MaxTemp and corresponding time
```

```
  Text temp = new Text();
  temp.set(maxTempANDTime);
  Text dateText = new Text();
  dateText.set(date);
  try {
   con.write(dateText, temp);
  } catch (Exception e) {
   e.printStackTrace();
  }

  temp.set(minTempANDTime);
  dateText.set(date);
  con.write(dateText, temp);

 }
}

public static class WhetherForcastReducer extends
  Reducer<Text, Text, Text, Text> {
 MultipleOutputs<Text, Text> mos;

 public void setup(Context context) {
  mos = new MultipleOutputs<Text, Text>(context);
 }
```

```
public void reduce(Text key, Iterable<Text> values, Context context)
  throws IOException, InterruptedException {
 int counter = 0;
 String reducerInputStr[] = null;
 String f1Time = "";
 String f2Time = "";
 String f1 = "", f2 = "";
 Text result = new Text();
 for (Text value : values) {

  if (counter == 0) {
   reducerInputStr = value.toString().split("AND");
   f1 = reducerInputStr[0];
   f1Time = reducerInputStr[1];
  }

  else {
   reducerInputStr = value.toString().split("AND");
   f2 = reducerInputStr[0];
   f2Time = reducerInputStr[1];
  }

  counter = counter + 1;
 }
 if (Float.parseFloat(f1) > Float.parseFloat(f2)) {
```

```
 result = new Text("Time: " + f2Time + " MinTemp: " + f2 + "\t"
   + "Time: " + f1Time + " MaxTemp: " + f1);
} else {

 result = new Text("Time: " + f1Time + " MinTemp: " + f1 + "\t"
   + "Time: " + f2Time + " MaxTemp: " + f2);
}
String fileName = "";
if (key.toString().substring(0, 2).equals("CA")) {
 fileName = CalculateMaxAndMinTemeratureTime.calOutputName;
} else if (key.toString().substring(0, 2).equals("NY")) {
 fileName = CalculateMaxAndMinTemeratureTime.nyOutputName;
} else if (key.toString().substring(0, 2).equals("NJ")) {
 fileName = CalculateMaxAndMinTemeratureTime.njOutputName;
} else if (key.toString().substring(0, 3).equals("AUS")) {
 fileName = CalculateMaxAndMinTemeratureTime.ausOutputName;
} else if (key.toString().substring(0, 3).equals("BOS")) {
 fileName = CalculateMaxAndMinTemeratureTime.bosOutputName;
} else if (key.toString().substring(0, 3).equals("BAL")) {
 fileName = CalculateMaxAndMinTemeratureTime.balOutputName;
}
String strArr[] = key.toString().split("_");
key.set(strArr[1]); //Key is date value
mos.write(fileName, key, result);
```

```
 }


 @Override
 public void cleanup(Context context) throws IOException,
   InterruptedException {
  mos.close();
 }
}
public static void main(String[] args) throws IOException,
  ClassNotFoundException, InterruptedException {
 Configuration conf = new Configuration();
 Job job = Job.getInstance(conf, "Wheather Statistics of USA");
 job.setJarByClass(CalculateMaxAndMinTemeratureWithTime.class);
job.setMapperClass(WhetherForcastMapper.class);
 job.setReducerClass(WhetherForcastReducer.class);
job.setMapOutputKeyClass(Text.class);
 job.setMapOutputValueClass(Text.class);
job.setOutputKeyClass(Text.class);
 job.setOutputValueClass(Text.class);
MultipleOutputs.addNamedOutput(job, calOutputName,
   TextOutputFormat.class, Text.class, Text.class);
 MultipleOutputs.addNamedOutput(job, nyOutputName,
   TextOutputFormat.class, Text.class, Text.class);
 MultipleOutputs.addNamedOutput(job, njOutputName,
   TextOutputFormat.class, Text.class, Text.class);
```

```
 MultipleOutputs.addNamedOutput(job, bosOutputName,
   TextOutputFormat.class, Text.class, Text.class);
 MultipleOutputs.addNamedOutput(job, ausOutputName,
   TextOutputFormat.class, Text.class, Text.class);
 MultipleOutputs.addNamedOutput(job, balOutputName,
   TextOutputFormat.class, Text.class, Text.class);

 // FileInputFormat.addInputPath(job, new Path(args[0]));
 // FileOutputFormat.setOutputPath(job, new Path(args[1]));
 Path pathInput = new Path(
   "hdfs://192.168.213.133:54310/weatherInputData/input_temp.txt");
 Path pathOutputDir = new Path(
   "hdfs://192.168.213.133:54310/user/hduser1/testfs/output_mapred3");
 FileInputFormat.addInputPath(job, pathInput);
 FileOutputFormat.setOutputPath(job, pathOutputDir);

 try {
  System.exit(job.waitForCompletion(true) ? 0 : 1);
 } catch (Exception e) {
  // TODO Auto-generated catch block
  e.printStackTrace();
 }
}
}
```

06.	Write pig latin scripts on Describe, for each and order by operator

Operator	Description
DESCRIBE	**describe** operator is used to view the schema of a relation. Usage: DESCRIBE relationname;
FOREACH	**FOREACH** operator is used to generate specified data transformations based on the column data. Usage: relationname2 = FOREACH relationname1 GENERATE (required columndata);
ORDER BY	**ORDER BY** operator is used to display the contents of a relation in a sorted order based on one or more fields. Usage: relationname2 = ORDER relationname1 BY (ASC|DESC);

Step	Details
1.	Prerequisites: a) VMWare or Virtualbox b) Cloudera (CDH5)
2.	Open Terminal and type the command: pig
3.	gprec_data = LOAD 'gprec.txt' using PigStorage(',') as (branchid:int, branch:chararray,strength:int) *Assuming gprec.txt contains data*
4.	DUMP gprec_data;
5.	DESCRIBE gprec_data;
6.	foreach_opr = FOREACH gprec_data GENERATE branch,strength;
7.	DUMP foreach_opr;
8.	foreach_opr2 = FOREACH gprec_data GENERATE lower(branch); DUMP foreach_opr2;
9.	orderby_opr = ORDER gprec_data BY strength DESC;
10.	DUMP orderby_opr;

07.	Write pig latin scripts to perform set and sort operation

Set Operation: UNION

UNION operator of Pig Latin is used to merge the content of two relations.

To perform UNION operation on two relations, their columns and domains must be identical.

Syntax:
grunt> relationname3 = UNION relationname1, relationname2;

```
student1 = LOAD 'student1_data.txt' using PigStorage(',') as (studentid:int,
studentname:chararray,percentage:int)

student2 = LOAD 'student2_data.txt' using PigStorage(',') as (studentid:int,
studentname:chararray,percentage:int)

grunt> student = UNION student1, student2;

grunt> DUMP student
```

Set Operation: Join

Used to combine two or more relations

Assuming the files (customers.txt)	Order.txt
1,Ramesh,32,Ahmedabad,2000.00 2,Suresh,25,Delhi,1500.00 3,kuresh,23,Kota,2000.00 4,Kalesh,25,Mumbai,6500.00 5,Sailesh,27,Bhopal,8500.00 6,Komal,22,MP,4500.00 7,Dinesh,24,Indore,10000.00	102,2009-10-08 00:00:00,3,3000 100,2009-10-08 00:00:00,3,1500 101,2009-11-20 00:00:00,2,1560 103,2008-05-20 00:00:00,4,2060

```
grunt>customers = load '/home/cloudera/customers.txt' using PigStorage(',')as
(id:int, name:chararray, age:int, address:chararray, salary:int);
 grunt>orders = load 'home/cloudera/orders.txt' using PigStorage(',')as (oid:int,
date:chararray, customer_id:int, amount:int);
```

Self-join is used to join a table with itself as if the table were two relations.
Syntax: Relation3_name = join Relation1_name BY key, Relation2_name BY key

```
grunt> cust_realation1 = load '/home/cloudera/customers.txt' using
PigStorage(',')as (id:int, name:chararray, age:int, address:chararray, salary:int);
grunt> cust_realation2 = load '/home/cloudera/customers.txt' using
PigStorage(',')as (id:int, name:chararray, age:int, address:chararray, salary:int);
grunt> customers3 = JOIN cust_relation1 BY id, cust_relation2 BY id;
```

Inner Join

Inner join returns rows when there is a match in both tables.

Syntax: Relation3_name = join Relation1_name BY key, Relation2_name BY key

grunt> cust_realation1 = load '/home/cloudera/customers.txt' using PigStorage(',')as (id:int, name:chararray, age:int, address:chararray, salary:int);

grunt> cust_realation2 = load '/home/cloudera/customers.txt' using PigStorage(',')as (id:int, name:chararray, age:int, address:chararray, salary:

grunt> customers3 = JOIN cust_relation1 BY id, cust_relation2 BY id;

SORT Operation

Assume the file (raw_sales.txt) with the following contents

```
CatZ,Prod22-cZ,30,60
CatA,Prod88-cA,15,50
CatY,Prod07-cY,20,40
CatB,Prod18-cB,10,50
CatX,Prod29-cZ,40,60
CatC,Prod09-cC,80,140
CatZ,Prod83-cZ,20,60
CatA,Prod17-cA,25,50
CatY,Prod98-cY,10,40
CatB,Prod99-cB,30,50
CatX,Prod19-cZ,10,60
CatC,Prod73-cC,50,140
CatZ,Prod52-cZ,10,60
CatA,Prod58-cA,15,50
CatY,Prod57-cY,10,40
CatB,Prod58-cB,10,50
CatX,Prod59-cZ,10,60
CatC,Prod59-cC,10,140
```

```
grunt> rawSales = LOAD 'raw_sales.txt' USING PigStorage(',') AS (category: chararray, product: chararray, sales: long, total_sales_category: long);
grunt> DUMP rawSales;
```

```
grpByCatTotals = GROUP rawSales BY (total_sales_category, category);
grunt> DUMP grpByCatTotals
```

```
sortGrpByCatTotals = ORDER grpByCatTotals BY group DESC;
grunt> sortGrpByCatTotals
```

```
topSalesCats = LIMIT sortGrpByCatTotals 2;
grunt> topSalesCats
```

08.	Perform DDL operations on Hive

DDL: Data Definition Language

1. CREATE
2. ALTER
3. DROP

CREATE TABLE

Creates a new table and specifies its characteristics.

```
hive> CREATE TABLE Employee (empid INT, empname STRING, empcity STRING);

hive> describe Employee;

hive> insert into Employee values (200,'Sreedhar','Kurnool');

hive> select * from Employee;
```

ALTER TABLE

Alter Table statement is used to alter a table in Hive.

```
hive> ALTER TABLE Employee RENAME to GPREmployee

hive> desc GPREmployee;

hive> ALTER TABLE GPREmployee ADD COLUMNS (Sal BIGINT);
```

DROP TABLE

DROP TABLE removes the table in Hive

```
hive> DROP TABLE GPREmployee;

hive> desc GPREmployee
```

08.	Implementation of data management using NOSQL databases.

HBASE:

HBase is a column oriented database management system derived from Google's NoSQL database BigTable that runs on top of HDFS.

Create table: Creates a table

```
hbase> create 'st_percentage', 'Rollno', 'Percentage'
```

Describe (or) **desc**: command returns the description of the table

```
hbase> desc 'st_percentage'
```

Insert: command used to insert the values into the table

```
hbase> Insert values into table: put 'st_percentage', '1001', 'Percentage:upto7thsem','98'
```

scan: command is used to view the data in table

```
hbase> scan 'st_percentage'
```

Alter: command used to make changes to an existing table

```
hbase> alter 'st_percentage','delete'=>'percentage'
```

disable: To delete a table, the table has to be disabled first using the disable command

```
hbase> disable 'st_percentage'
```

enable: command used to enable the table

```
hbase> enable 'st_percentage'
```

drop: command used to delete a table. Before dropping a table, it must be disabled.

```
hbase> drop 'st_percentage'
```

exists: command used to verify, whether the table is present in the database or not.

```
hbase> exists 'st_percentage'
```