NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY

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Yelahanka, Bengaluru-560064

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

BIGDATA LABORATORY

Report on,

Learning Activity II - Programming Assignment

Submitted by,

Chavi Singh

1NT18IS043

Github link:

https://github.com/1nt18is043/1NT18IS043_chavi_A_bdLab/blob/main/1NT18IS043_BD_LA2.pdf

Hadoop Map-reduce Programming:

Hadoop MapReduce is a software framework for easily writing applications which process vast amounts of data (multi-terabyte data-sets) in-parallel on large clusters (thousands of nodes) of commodity hardware in a reliable, fault-tolerant manner.

A MapReduce *job* usually splits the input data-set into independent chunks which are processed by the *map tasks* in a completely parallel manner. The framework sorts the outputs of the maps, which are then input to the *reduce tasks*. Typically both the input and the output of the job are stored in a file-system. The framework takes care of scheduling tasks, monitoring them and re-executes the failed tasks.

Typically the compute nodes and the storage nodes are the same, that is, the MapReduce framework and the Hadoop Distributed File System are running on the same set of nodes. This configuration allows the framework to effectively schedule tasks on the nodes where data is already present, resulting in very high aggregate bandwidth across the cluster.

The MapReduce framework consists of a single master JobTracker and one slave TaskTracker per cluster-node. The master is responsible for scheduling the jobs' component tasks on the slaves, monitoring them and re-executing the failed tasks. The slaves execute the tasks as directed by the master.

Minimally, applications specify the input/output locations and supply *map* and *reduce* functions via implementations of appropriate interfaces and/or abstract-classes. These, and other job parameters, comprise the *job configuration*. The Hadoop *job client* then submits the job (jar/executable etc.) and configuration to the JobTracker which then assumes the responsibility of distributing the software/configuration to the slaves, scheduling tasks and monitoring them, providing status and diagnostic information to the job-client.

Hive:

Hive is a data warehouse infrastructure tool to process structured data in Hadoop. It resides on top of Hadoop to summarize Big Data, and makes querying and analyzing easy.

Initially Hive was developed by Facebook, later the Apache Software Foundation took it up and developed it further as an open source under the name Apache Hive. It is used by different companies. For example, Amazon uses it in Amazon Elastic MapReduce.

Hive is not:

- A relational database
- A design for OnLine Transaction Processing (OLTP)
- A language for real-time queries and row-level updates

Features of Hive:

- It stores schema in a database and processed data into HDFS.
- It is designed for OLAP.
- It provides SQL type language for querying called HiveQL or HQL.
- It is familiar, fast, scalable, and extensible

Exercise-I

Create a dataset in excel as .csv file and it should contain the following fields with at least 20 sample datasets in it.

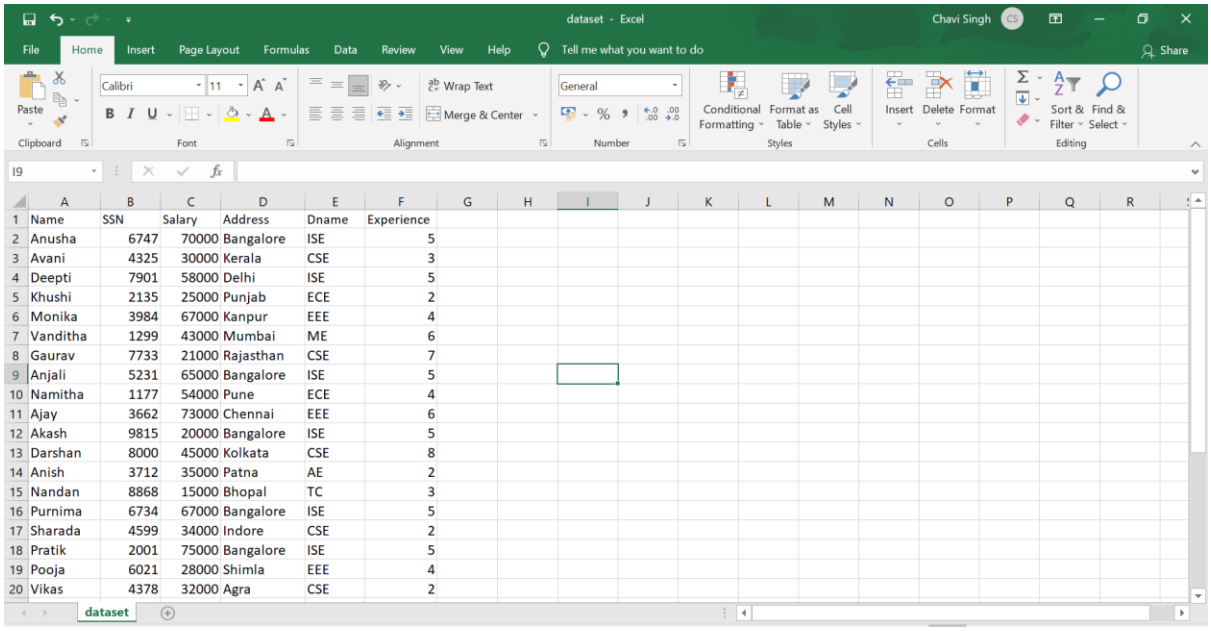
Use the Hadoop MapReduce programming framework to come up with a Program which will take the data from this .csv file and computes the following.

1. Total number of employees who work in ISE department

2. Total number of employees with experience=5 years

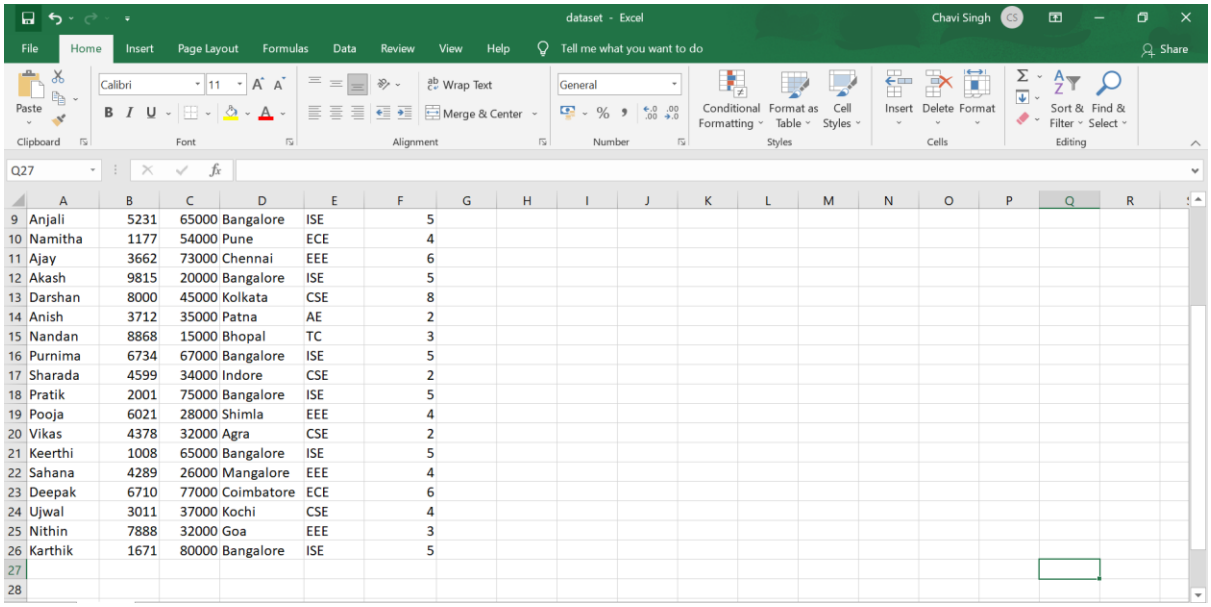
3. Count the number of employees who lives in Bangalore

Dataset Snapshot:



dataset - Excel

	A	B	C	D	E	F
1	Name	SSN	Salary	Address	Dname	Experience
2	Anusha	6747	70000	Bangalore	ISE	5
3	Avani	4325	30000	Kerala	CSE	3
4	Deepti	7901	58000	Delhi	ISE	5
5	Khushi	2135	25000	Punjab	ECE	2
6	Monika	3984	67000	Kanpur	EEE	4
7	Vanditha	1299	43000	Mumbai	ME	6
8	Gaurav	7733	21000	Rajasthan	CSE	7
9	Anjali	5231	65000	Bangalore	ISE	5
10	Namitha	1177	54000	Pune	ECE	4
11	Ajay	3662	73000	Chennai	EEE	6
12	Akash	9815	20000	Bangalore	ISE	5
13	Darshan	8000	45000	Kolkata	CSE	8
14	Anish	3712	35000	Patna	AE	2
15	Nandan	8868	15000	Bhopal	TC	3
16	Purnima	6734	67000	Bangalore	ISE	5
17	Sharada	4599	34000	Indore	CSE	2
18	Pratik	2001	75000	Bangalore	ISE	5
19	Pooja	6021	28000	Shimla	EEE	4
20	Vikas	4378	32000	Agra	CSE	2



dataset - Excel

	A	B	C	D	E	F
9	Anjali	5231	65000	Bangalore	ISE	5
10	Namitha	1177	54000	Pune	ECE	4
11	Ajay	3662	73000	Chennai	EEE	6
12	Akash	9815	20000	Bangalore	ISE	5
13	Darshan	8000	45000	Kolkata	CSE	8
14	Anish	3712	35000	Patna	AE	2
15	Nandan	8868	15000	Bhopal	TC	3
16	Purnima	6734	67000	Bangalore	ISE	5
17	Sharada	4599	34000	Indore	CSE	2
18	Pratik	2001	75000	Bangalore	ISE	5
19	Pooja	6021	28000	Shimla	EEE	4
20	Vikas	4378	32000	Agra	CSE	2
21	Keerthi	1008	65000	Bangalore	ISE	5
22	Sahana	4289	26000	Mangalore	EEE	4
23	Deepak	6710	77000	Coimbatore	ECE	6
24	Ujwal	3011	37000	Kochi	CSE	4
25	Nithin	7888	32000	Goa	EEE	3
26	Karthik	1671	80000	Bangalore	ISE	5

JAVA program screenshots :-

1. ## Employee Project -> EmpISE class

```
import java.io.IOException;

import java.util.*;

import org.apache.hadoop.fs.Path;

import org.apache.hadoop.io.*;

import org.apache.hadoop.mapred.*;



public class EmpISE {

//MAPPER CODE


public static class Map extends MapReduceBase implements Mapper<LongWritable, Text, Text, IntWritable> {

private final static IntWritable one = new IntWritable(1);

private Text word = new Text();


public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable> output, Reporter reporter) throws IOException {
```

```
String data = value.toString();
String[] Ecount= data.split(",");

if (Ecount[4].equals("ISE")) {
output.collect(new Text("Total no.of employees working in ISE Department : "), one);
}

}
}
```

```
//REDUCER CODE
public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritable> {
public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text, IntWritable> output, Reporter reporter) throws IOException { //{little: {1,1}}
int val = 0 ;
while(values.hasNext()) {
val += values.next().get();
}
output.collect(key, new IntWritable(val));
}
}
```

```
//DRIVER CODE
public static void main(String[] args) throws Exception {
JobConf conf = new JobConf(EmpISE.class);
conf.setJobName("Total no.of employees working in ISE Department");
conf.setOutputKeyClass(Text.class);
conf.setOutputValueClass(IntWritable.class);
conf.setMapperClass(Map.class);
conf.setCombinerClass(Reduce.class);
conf.setReducerClass(Reduce.class);
```

conf.setInputFormat(TextInputFormat.class);

conf.setOutputFormat(TextOutputFormat.class);

FileInputFormat.setInputPaths(conf, new Path(args[0]));

FileOutputFormat.setOutputPath(conf, new Path(args[1]));

JobClient.runJob(conf);

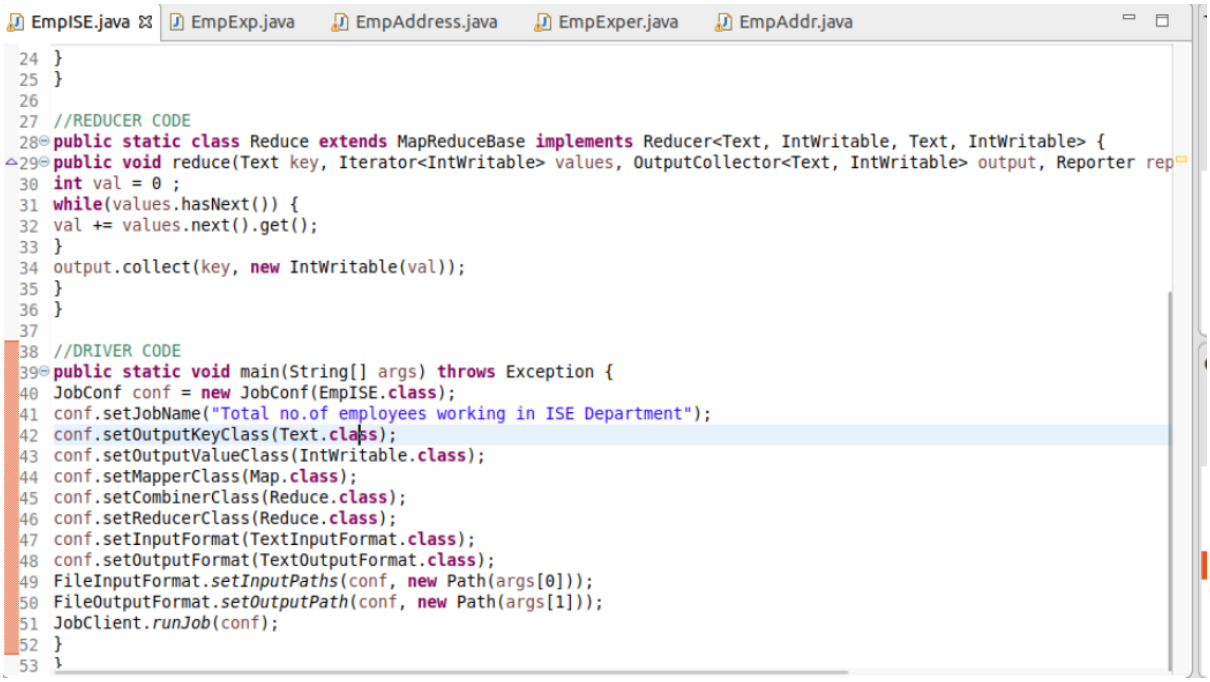
}

}

Program:

EmpISE.java | EmpExp.java | EmpAddress.java | EmpExper.java | EmpAddr.java

```
1
2  import java.io.IOException;
7
8
9  public class EmpISE {
10 //MAPPER CODE
11
12 public static class Map extends MapReduceBase implements Mapper<LongWritable, Text, Text, IntWritable> {
13 private final static IntWritable one = new IntWritable(1);
14 private Text word = new Text();
15
16 public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable> output, Reporter reporter) throw
17 String data = value.toString();
18 String[] Ecount= data.split(",");
19
20 if (Ecount[4].equals("ISE")) {
21 output.collect(new Text("Total no.of employees working in ISE Department : "), one);
22 }
23
24 }
25 }
26
27 //REDUCER CODE
28 public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritable> {
29 public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text, IntWritable> output, Reporter re
30 int val = 0 ;
31 while(values.hasNext()) {
32 val += values.next().get();
33 }
34 output.collect(key, new IntWritable(val));
```



Number of employees working in ISE: 8

Execution:

hdoop@ubuntu:~$ cd hadoop-3.2.1/sbin

hdoop@ubuntu:~/hadoop-3.2.1/sbin$ ./start-all.sh

WARNING: Attempting to start all Apache Hadoop daemons as hdoop in 10 seconds.

WARNING: This is not a recommended production deployment configuration.

WARNING: Use CTRL-C to abort.

Starting namenodes on [localhost]

Starting datanodes

Starting secondary namenodes [ubuntu]

Starting resourcemanager

Starting nodemanagers

hdoop@ubuntu:~/hadoop-3.2.1/sbin$ jps

5202 SecondaryNameNode

6612 Jps

5700 NodeManager

5525 ResourceManager

4982 DataNode

3386 org.eclipse.equinox.launcher_1.5.600.v20191014-2022.jar

4831 NameNode

hdoop@ubuntu:~/hadoop-3.2.1/sbin$ cd ~

hdoop@ubuntu:~$ cd Desktop

hdoop@ubuntu:~/Desktop$ ls

Banking Banking.zip dataset.csv

Banking2 EmpISE.jar sales.csv

Banking2.zip IIGNISER1 sales_withoutHeader.csv

BankingTransaction2.jar IIGNISER1.zip WR.jar

BankingTransaction.jar input1.txt

hdoop@ubuntu:~/Desktop$ hadoop fs -copyFromLocal dataset.csv

2021-07-04 09:03:22,579 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

hdoop@ubuntu:~/Desktop$ hadoop fs -ls

Found 13 items

-rw-r--r-- 1 hdoop supergroup 638 2021-07-04 09:03 dataset.csv

drwxr-xr-x - hdoop supergroup 0 2021-05-11 07:25 adarsh

drwxr-xr-x - hdoop supergroup 0 2021-06-07 09:29 banking1.txt

drwxr-xr-x - hdoop supergroup 0 2021-06-07 09:52 banking2.txt

-rw-r--r-- 1 hdoop supergroup 116 2021-05-18 09:51 input1.txt

drwxr-xr-x - hdoop supergroup 0 2021-05-18 03:18 op

drwxr-xr-x - hdoop supergroup 0 2021-05-18 03:32 opt

drwxr-xr-x - hdoop supergroup 0 2021-05-18 09:57 output1.txt

drwxr-xr-x - hdoop supergroup 0 2021-05-11 08:33 prog1

drwxr-xr-x - hdoop supergroup 0 2021-05-11 08:24 prog2

-rw-r--r-- 1 hdoop supergroup 138 2021-06-07 09:24 sales_withoutHeader.csv

hdoop@ubuntu:~/Desktop$ hadoop jar EmpISE.jar EmpISE.EmpISE dataset.csv EmpISE.txt

2021-07-04 09:11:06,280 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 09:11:18,054 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 09:11:20,020 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.

2021-07-04 09:11:20,616 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625413465806_0001

2021-07-04 09:11:21,316 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:11:22,438 INFO mapred.FileInputFormat: Total input files to process : 1

2021-07-04 09:11:23,361 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:11:23,545 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:11:23,566 INFO mapreduce.JobSubmitter: number of splits:2

2021-07-04 09:11:26,831 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:11:28,217 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625413465806_0001

2021-07-04 09:11:28,218 INFO mapreduce.JobSubmitter: Executing with tokens: []

2021-07-04 09:11:32,114 INFO conf.Configuration: resource-types.xml not found

2021-07-04 09:11:32,114 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.

2021-07-04 09:11:38,975 INFO impl.YarnClientImpl: Submitted application application_1625413465806_0001

2021-07-04 09:11:40,184 INFO mapreduce.Job: The url to track the job: http://ubuntu:8088/proxy/application_1625413465806_0001/

2021-07-04 09:11:40,361 INFO mapreduce.Job: Running job: job_1625413465806_0001

2021-07-04 09:13:46,673 INFO mapreduce.Job: Job job_1625413465806_0001 running in uber mode : false

2021-07-04 09:13:46,674 INFO mapreduce.Job: map 0% reduce 0%

2021-07-04 09:18:31,564 INFO mapreduce.Job: map 33% reduce 0%

2021-07-04 09:18:32,587 INFO mapreduce.Job: map 67% reduce 0%

2021-07-04 09:18:34,657 INFO mapreduce.Job: map 100% reduce 0%

2021-07-04 09:19:23,241 INFO mapreduce.Job: map 100% reduce 100%

2021-07-04 09:19:25,278 INFO mapreduce.Job: Job job_1625413465806_0001 completed successfully

2021-07-04 09:19:26,524 INFO mapreduce.Job: Counters: 54

File System Counters

FILE: Number of bytes read=120

FILE: Number of bytes written=677717

FILE: Number of read operations=0

FILE: Number of large read operations=0

FILE: Number of write operations=0

HDFS: Number of bytes read=1141

HDFS: Number of bytes written=54

HDFS: Number of read operations=11

HDFS: Number of large read operations=0

HDFS: Number of write operations=2

HDFS: Number of bytes read erasure-coded=0

Job Counters

Launched map tasks=2

Launched reduce tasks=1

Data-local map tasks=2

Total time spent by all maps in occupied slots (ms)=568879

Total time spent by all reduces in occupied slots (ms)=45707

Total time spent by all map tasks (ms)=568879

Total time spent by all reduce tasks (ms)=45707

Total vcore-milliseconds taken by all map tasks=568879

Total vcore-milliseconds taken by all reduce tasks=45707

Total megabyte-milliseconds taken by all map tasks=582532096

Total megabyte-milliseconds taken by all reduce tasks=46803968

Map-Reduce Framework

Map input records=20

Map output records=13

Map output bytes=715

Map output materialized bytes=126

Input split bytes=184

Combine input records=13

Combine output records=2

Reduce input groups=1

Reduce shuffle bytes=126

Reduce input records=2

Reduce output records=1

Spilled Records=4

Shuffled Maps =2

Failed Shuffles=0

Merged Map outputs=2

GC time elapsed (ms)=28715

CPU time spent (ms)=360840

Physical memory (bytes) snapshot=790487040

Virtual memory (bytes) snapshot=7789518848

Total committed heap usage (bytes)=644874240

Peak Map Physical memory (bytes)=304123904

Peak Map Virtual memory (bytes)=2595966976

Peak Reduce Physical memory (bytes)=183201792

Peak Reduce Virtual memory (bytes)=2604199936

Shuffle Errors

BAD_ID=0

CONNECTION=0

IO_ERROR=0

WRONG_LENGTH=0

WRONG_MAP=0

WRONG_REDUCE=0

File Input Format Counters

Bytes Read=957

File Output Format Counters

Bytes Written=54

hdoop@ubuntu:~/Desktop$ hadoop fs -ls EmpISE.txt

Found 2 items

-rw-r--r-- 1 hdoop supergroup 0 2021-07-04 09:19 EmpISE.txt/_SUCCESS

-rw-r--r-- 1 hdoop supergroup 54 2021-07-04 09:19 EmpISE.txt/part-00000

hdoop@ubuntu:~/Desktop$ hadoop fs -cat EmpISE.txt/part-00000

2021-07-04 09:20:31,372 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

Total no.of employees working in ISE Department : 8

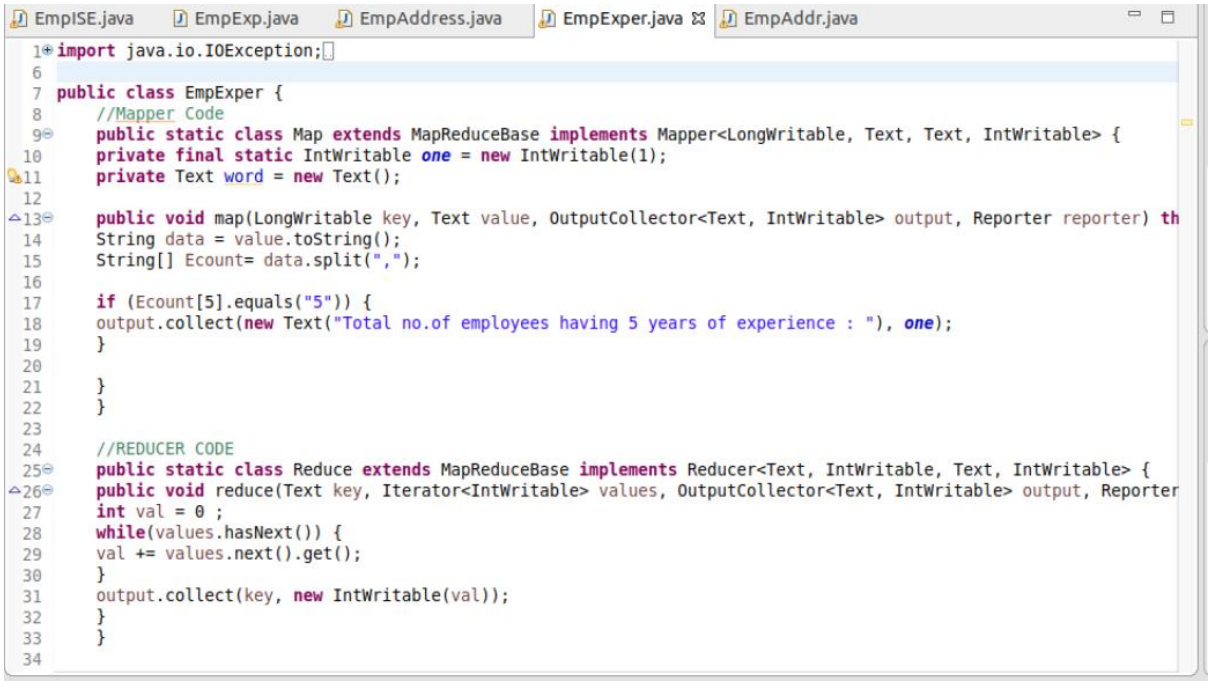
2.EmpExperience Project ->EmpExper class

```
import java.io.IOException;

import java.util.*;

import org.apache.hadoop.fs.Path;

import org.apache.hadoop.io.*;

import org.apache.hadoop.mapred.*;


public class EmpExper {

	//Mapper Code

	public static class Map extends MapReduceBase implements Mapper<LongWritable, Text, Text, IntWritable> {

	private final static IntWritable one = new IntWritable(1);
```

```
private Text word = new Text();


public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable> output,
Reporter reporter) throws IOException {
String data = value.toString();
String[] Ecount= data.split(",");


if (Ecount[5].equals("5")) {
output.collect(new Text("Total no.of employees having 5 years of experience : "), one);
}


}
}


//REDUCER CODE
public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable,
Text, IntWritable> {
public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text,
IntWritable> output, Reporter reporter) throws IOException { //{little: {1,1}}
int val = 0 ;
while(values.hasNext()) {
val += values.next().get();
}
output.collect(key, new IntWritable(val));
}
}


//DRIVER CODE
public static void main(String[] args) throws Exception {
JobConf conf = new JobConf(EmpExper.class);
conf.setJobName("Total no.of employees having 5 years of experience");
conf.setOutputKeyClass(Text.class);
```

```
conf.setOutputValueClass(IntWritable.class);

conf.setMapperClass(Map.class);

conf.setCombinerClass(Reduce.class);

conf.setReducerClass(Reduce.class);

conf.setInputFormat(TextInputFormat.class);

conf.setOutputFormat(TextOutputFormat.class);

FileInputFormat.setInputPaths(conf, new Path(args[0]));

FileOutputFormat.setOutputPath(conf, new Path(args[1]));

JobClient.runJob(conf);

}

}
```

Program:



EmpISE.java | EmpExp.java | EmpAddress.java | EmpExper.java | EmpAddr.java

```
21      }
22      }
23
24      //REDUCER CODE
25      public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritable> {
26      public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text, IntWritable> output, Reporte
27      int val = 0 ;
28      while(values.hasNext()) {
29      val += values.next().get();
30      }
31      output.collect(key, new IntWritable(val));
32      }
33      }
34
35      //DRIVER CODE
36      public static void main(String[] args) throws Exception {
37      JobConf conf = new JobConf(EmpExper.class);
38      conf.setJobName("Total no.of employees having 5 years of experience");
39      conf.setOutputKeyClass(Text.class);
40      conf.setOutputValueClass(IntWritable.class);
41      conf.setMapperClass(Map.class);
42      conf.setCombinerClass(Reduce.class);
43      conf.setReducerClass(Reduce.class);
44      conf.setInputFormat(TextInputFormat.class);
45      conf.setOutputFormat(TextOutputFormat.class);
46      FileInputFormat.setInputPaths(conf, new Path(args[0]));
47      FileOutputFormat.setOutputPath(conf, new Path(args[1]));
48      JobClient.runJob(conf);
49      }
50      }
```

Output: Total number of employees with experience=5 years : 8

Execution:

hdoop@ubuntu:~/Desktop$ hadoop jar EmpExp.jar EmpExp.EmpExp dataset.csv EmpExp.txt

2021-07-04 09:56:04,465 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 09:56:09,024 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 09:56:10,405 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.

2021-07-04 09:56:10,709 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625413465806_0002

2021-07-04 09:56:11,286 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:56:12,643 INFO mapred.FileInputFormat: Total input files to process : 1

2021-07-04 09:56:12,836 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:56:12,862 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:56:12,989 INFO mapreduce.JobSubmitter: number of splits:2

2021-07-04 09:56:13,318 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 09:56:13,366 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625413465806_0002

2021-07-04 09:56:13,366 INFO mapreduce.JobSubmitter: Executing with tokens: []

2021-07-04 09:56:13,903 INFO conf.Configuration: resource-types.xml not found

2021-07-04 09:56:13,904 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.

2021-07-04 09:56:16,566 INFO impl.YarnClientImpl: Submitted application application_1625413465806_0002

2021-07-04 09:56:18,577 INFO mapreduce.Job: The url to track the job: http://ubuntu:8088/proxy/application_1625413465806_0002/

2021-07-04 09:56:18,712 INFO mapreduce.Job: Running job: job_1625413465806_0002

2021-07-04 09:57:23,814 INFO mapreduce.Job: Job job_1625413465806_0002 running in uber mode : false

2021-07-04 09:57:23,818 INFO mapreduce.Job: map 0% reduce 0%

2021-07-04 09:58:21,633 INFO mapreduce.Job: map 100% reduce 0%

2021-07-04 09:58:26,679 INFO mapreduce.Job: map 100% reduce 100%

2021-07-04 09:58:27,708 INFO mapreduce.Job: Job job_1625413465806_0002 completed successfully

2021-07-04 09:58:27,841 INFO mapreduce.Job: Counters: 55

File System Counters

FILE: Number of bytes read=126

FILE: Number of bytes written=677738

FILE: Number of read operations=0

FILE: Number of large read operations=0

FILE: Number of write operations=0

HDFS: Number of bytes read=1141

HDFS: Number of bytes written=57

HDFS: Number of read operations=11

HDFS: Number of large read operations=0

HDFS: Number of write operations=2

HDFS: Number of bytes read erasure-coded=0

Job Counters

Killed map tasks=1

Launched map tasks=2

Launched reduce tasks=1

Data-local map tasks=2

Total time spent by all maps in occupied slots (ms)=107735

Total time spent by all reduces in occupied slots (ms)=2063

Total time spent by all map tasks (ms)=107735

Total time spent by all reduce tasks (ms)=2063

Total vcore-milliseconds taken by all map tasks=107735

Total vcore-milliseconds taken by all reduce tasks=2063

Total megabyte-milliseconds taken by all map tasks=110320640

Total megabyte-milliseconds taken by all reduce tasks=2112512

Map-Reduce Framework

Map input records=20

Map output records=10

Map output bytes=580

Map output materialized bytes=132

Input split bytes=184

Combine input records=10

Combine output records=2

Reduce input groups=1

Reduce shuffle bytes=132

Reduce input records=2

Reduce output records=1

Spilled Records=4

Shuffled Maps =2

Failed Shuffles=0

Merged Map outputs=2

GC time elapsed (ms)=4467

CPU time spent (ms)=45330

Physical memory (bytes) snapshot=812605440

Virtual memory (bytes) snapshot=7793565696

Total committed heap usage (bytes)=626524160

Peak Map Physical memory (bytes)=314843136

Peak Map Virtual memory (bytes)=2597437440

Peak Reduce Physical memory (bytes)=182988800

Peak Reduce Virtual memory (bytes)=2600173568

Shuffle Errors

BAD_ID=0

CONNECTION=0

IO_ERROR=0

WRONG_LENGTH=0

WRONG_MAP=0

WRONG_REDUCE=0

File Input Format Counters

Bytes Read=957

File Output Format Counters

Bytes Written=57

hdoop@ubuntu:~/Desktop$ hadoop fs -ls EmpExp.txt

Found 2 items

-rw-r--r-- 1 hdoop supergroup 0 2021-07-04 09:58 EmpExp.txt/_SUCCESS

-rw-r--r-- 1 hdoop supergroup 57 2021-07-04 09:58 EmpExp.txt/part-00000

hdoop@ubuntu:~/Desktop$ hadoop fs -cat EmpExp.txt/part-00000

2021-07-04 09:58:55,206 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

Total no.of employees having 5 years of experience : 8

3.EmpAddressBangalore Project -> EmpAddr

```
import java.io.IOException;

import java.util.*;

import org.apache.hadoop.fs.Path;

import org.apache.hadoop.conf.*;

import org.apache.hadoop.io.*;

import org.apache.hadoop.mapred.*;

import org.apache.hadoop.util.*;


public class EmpAddr {

        //Mapper Code

                public static class Map extends MapReduceBase implements Mapper<LongWritable,
Text, Text, IntWritable> {

                        private final static IntWritable one = new IntWritable(1);

                        private Text word = new Text();


                        public void map(LongWritable key, Text value, OutputCollector<Text,
IntWritable> output, Reporter reporter) throws IOException {

                                String data = value.toString();

                                String[] Ecount= data.split(",");


                                if (Ecount[3].equals("Bangalore")) {

                                        output.collect(new Text("Total no.of employees who stays
in Bangalore : "), one);

                                }


                        }

                        }
```

```
		//REDUCER CODE
		public static class Reduce extends MapReduceBase implements
Reducer<Text, IntWritable, Text, IntWritable> {
		public void reduce(Text key, Iterator<IntWritable> values,
OutputCollector<Text, IntWritable> output, Reporter reporter) throws IOException { //{little: {1,1}}
			int val = 0 ;
			while(values.hasNext()) {
				val += values.next().get();
			}
			output.collect(key, new IntWritable(val));
		}
		}

		//DRIVER CODE
		public static void main(String[] args) throws Exception {
			JobConf conf = new JobConf(EmpAddr.class);
			conf.setJobName("Total no.of employees having 5 years of
experience");
			conf.setOutputKeyClass(Text.class);
			conf.setOutputValueClass(IntWritable.class);
			conf.setMapperClass(Map.class);
			conf.setCombinerClass(Reduce.class);
			conf.setReducerClass(Reduce.class);
			conf.setInputFormat(TextInputFormat.class);
			conf.setOutputFormat(TextOutputFormat.class);
			FileInputFormat.setInputPaths(conf, new Path(args[0]));
			FileOutputFormat.setOutputPath(conf, new Path(args[1]));
			JobClient.runJob(conf);
		}

}
```

Program:

EmpISE.java | EmpExp.java | EmpAddress.java | EmpExper.java | EmpAddr.java

```
1  import java.io.IOException;
2  import java.util.*;
3  import org.apache.hadoop.fs.Path;
4  import org.apache.hadoop.conf.*;
5  import org.apache.hadoop.io.*;
6  import org.apache.hadoop.mapred.*;
7  import org.apache.hadoop.util.*;
8
9  public class EmpAddr {
10     //Mapper Code
11         public static class Map extends MapReduceBase implements Mapper<LongWritable, Text, Text, IntWritable> {
12             private final static IntWritable one = new IntWritable(1);
13             private Text word = new Text();
14
15             public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable> output, Reporter repo
16                 String data = value.toString();
17                 String[] Ecount= data.split(",");
18
19                 if (Ecount[3].equals("Bangalore")) {
20                     output.collect(new Text("Total no.of employees who stays in Bangalore : "), one);
21                 }
22
23             }
24             }
25
26             //REDUCER CODE
27             public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritab
28             public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text, IntWritable> output,
29                 int val = 0 ;
30                 while(values.hasNext()) {
```

EmpISE.java | EmpExp.java | EmpAddress.java | EmpExper.java | EmpAddr.java

```
25
26             //REDUCER CODE
27             public static class Reduce extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritab
28             public void reduce(Text key, Iterator<IntWritable> values, OutputCollector<Text, IntWritable> output,
29                 int val = 0 ;
30                 while(values.hasNext()) {
31                     val += values.next().get();
32                 }
33                 output.collect(key, new IntWritable(val));
34             }
35             }
36
37             //DRIVER CODE
38             public static void main(String[] args) throws Exception {
39                 JobConf conf = new JobConf(EmpAddr.class);
40                 conf.setJobName("Total no.of employees having 5 years of experience");
41                 conf.setOutputKeyClass(Text.class);
42                 conf.setOutputValueClass(IntWritable.class);
43                 conf.setMapperClass(Map.class);
44                 conf.setCombinerClass(Reduce.class);
45                 conf.setReducerClass(Reduce.class);
46                 conf.setInputFormat(TextInputFormat.class);
47                 conf.setOutputFormat(TextOutputFormat.class);
48                 FileInputFormat.setInputPaths(conf, new Path(args[0]));
49                 FileOutputFormat.setOutputPath(conf, new Path(args[1]));
50                 JobClient.runJob(conf);
51             }
52
53 }
54
```

Output: Count the number of employees who lives in Bangalore: 7

Execution:

hdoop@ubuntu:~/Desktop$ hadoop jar EmpAddress.jar EmpAddress.EmpAddress dataset.csv EmpAddress.txt

2021-07-04 10:00:36,404 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 10:00:36,566 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032

2021-07-04 10:00:36,727 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.

2021-07-04 10:00:36,781 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625413465806_0003

2021-07-04 10:00:36,873 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 10:00:37,008 INFO mapred.FileInputFormat: Total input files to process : 1

2021-07-04 10:00:37,032 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 10:00:37,069 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 10:00:37,077 INFO mapreduce.JobSubmitter: number of splits:2

2021-07-04 10:00:37,177 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

2021-07-04 10:00:37,657 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625413465806_0003

2021-07-04 10:00:37,658 INFO mapreduce.JobSubmitter: Executing with tokens: []

2021-07-04 10:00:37,833 INFO conf.Configuration: resource-types.xml not found

2021-07-04 10:00:37,834 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.

2021-07-04 10:00:37,935 INFO impl.YarnClientImpl: Submitted application application_1625413465806_0003

2021-07-04 10:00:38,102 INFO mapreduce.Job: The url to track the job: http://ubuntu:8088/proxy/application_1625413465806_0003/

2021-07-04 10:00:38,103 INFO mapreduce.Job: Running job: job_1625413465806_0003

2021-07-04 10:00:43,215 INFO mapreduce.Job: Job job_1625413465806_0003 running in uber mode : false

2021-07-04 10:00:43,218 INFO mapreduce.Job: map 0% reduce 0%

2021-07-04 10:00:48,291 INFO mapreduce.Job: map 100% reduce 0%

2021-07-04 10:00:52,327 INFO mapreduce.Job: map 100% reduce 100%

2021-07-04 10:00:53,361 INFO mapreduce.Job: Job job_1625413465806_0003 completed successfully

2021-07-04 10:00:53,449 INFO mapreduce.Job: Counters: 54

File System Counters

FILE: Number of bytes read=114

FILE: Number of bytes written=677780

FILE: Number of read operations=0

FILE: Number of large read operations=0

FILE: Number of write operations=0

HDFS: Number of bytes read=1141

HDFS: Number of bytes written=50

HDFS: Number of read operations=11

HDFS: Number of large read operations=0

HDFS: Number of write operations=2

HDFS: Number of bytes read erasure-coded=0

Job Counters

Launched map tasks=2

Launched reduce tasks=1

Data-local map tasks=2

Total time spent by all maps in occupied slots (ms)=4934

Total time spent by all reduces in occupied slots (ms)=1767

Total time spent by all map tasks (ms)=4934

Total time spent by all reduce tasks (ms)=1767

Total vcore-milliseconds taken by all map tasks=4934

Total vcore-milliseconds taken by all reduce tasks=1767

Total megabyte-milliseconds taken by all map tasks=5052416

Total megabyte-milliseconds taken by all reduce tasks=1809408

Map-Reduce Framework

Map input records=20

Map output records=4

Map output bytes=208

Map output materialized bytes=120

Input split bytes=184

Combine input records=4

Combine output records=2

Reduce input groups=1

Reduce shuffle bytes=120

Reduce input records=2

Reduce output records=1

Spilled Records=4

Shuffled Maps =2

Failed Shuffles=0

Merged Map outputs=2

GC time elapsed (ms)=171

CPU time spent (ms)=1660

Physical memory (bytes) snapshot=729804800

Virtual memory (bytes) snapshot=7796326400

Total committed heap usage (bytes)=606601216

Peak Map Physical memory (bytes)=276217856

Peak Map Virtual memory (bytes)=2597658624

Peak Reduce Physical memory (bytes)=181227520

Peak Reduce Virtual memory (bytes)=2602868736

Shuffle Errors

BAD_ID=0

CONNECTION=0

IO_ERROR=0

WRONG_LENGTH=0

WRONG_MAP=0

WRONG_REDUCE=0

File Input Format Counters

Bytes Read=957

File Output Format Counters

Bytes Written=50

hdoop@ubuntu:~/Desktop$ hadoop fs -ls EmpAddress.txt

Found 2 items

-rw-r--r-- 1 hdoop supergroup 0 2021-07-04 10:00 EmpAddress.txt/_SUCCESS

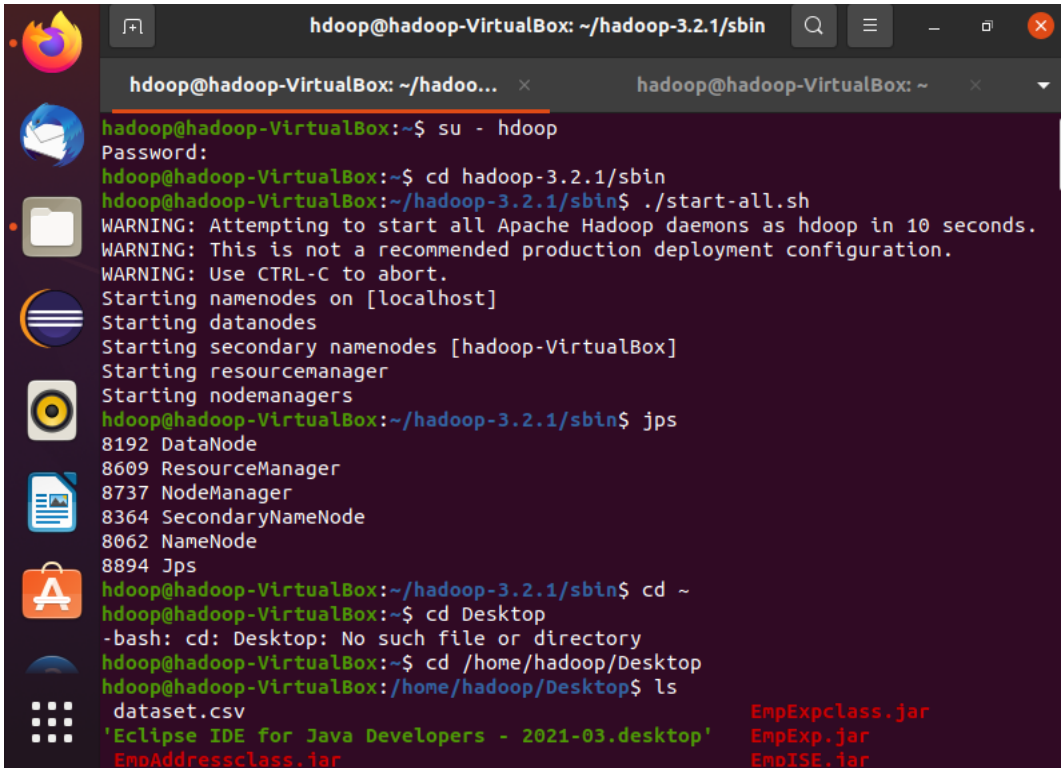
-rw-r--r-- 1 hdoop supergroup 50 2021-07-04 10:00 EmpAddress.txt/part-00000

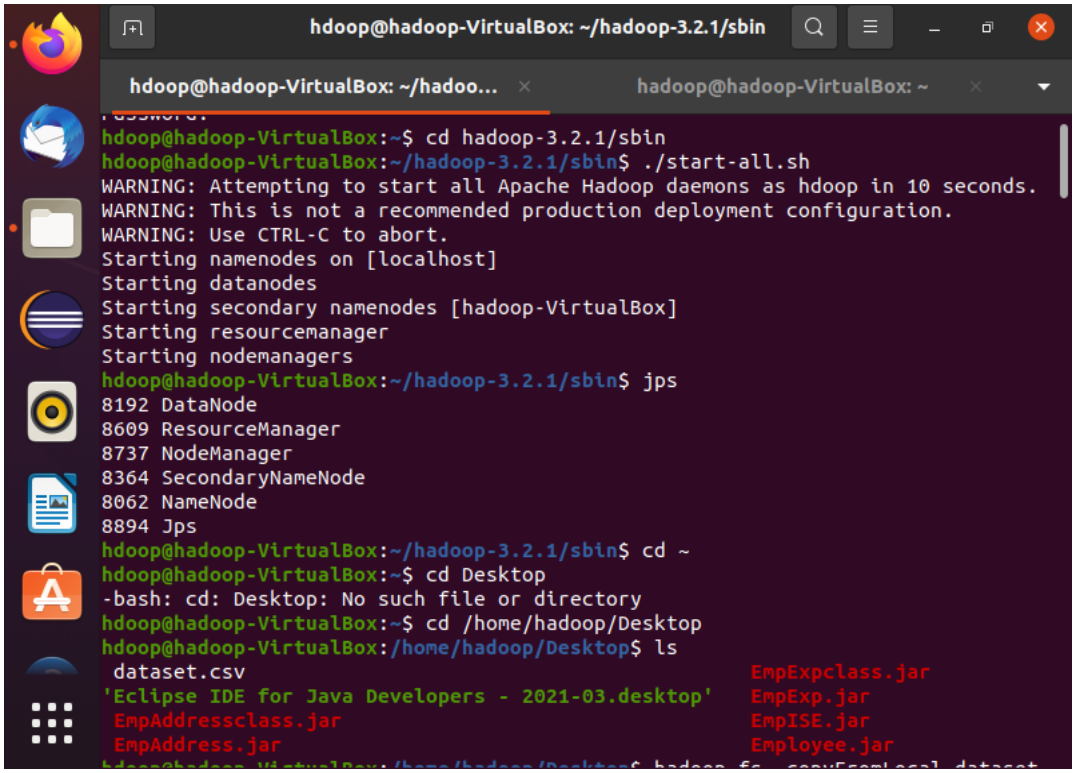
hdoop@ubuntu:~/Desktop$ hadoop fs -cat EmpAddress.txt/part-00000

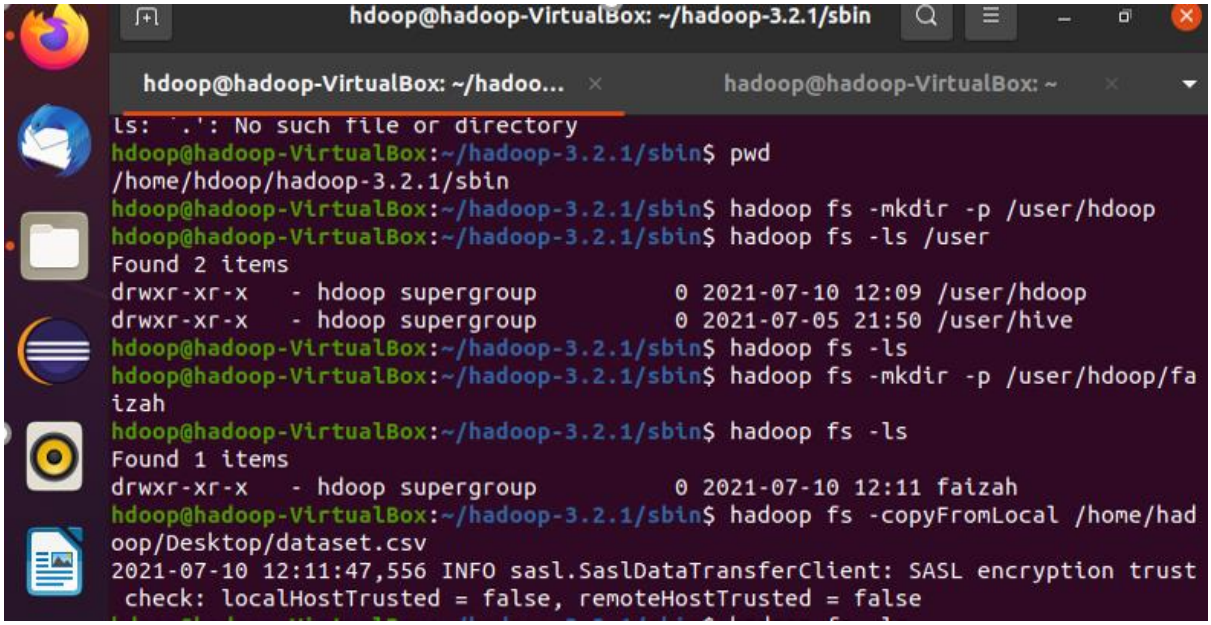
2021-07-04 10:01:18,780 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

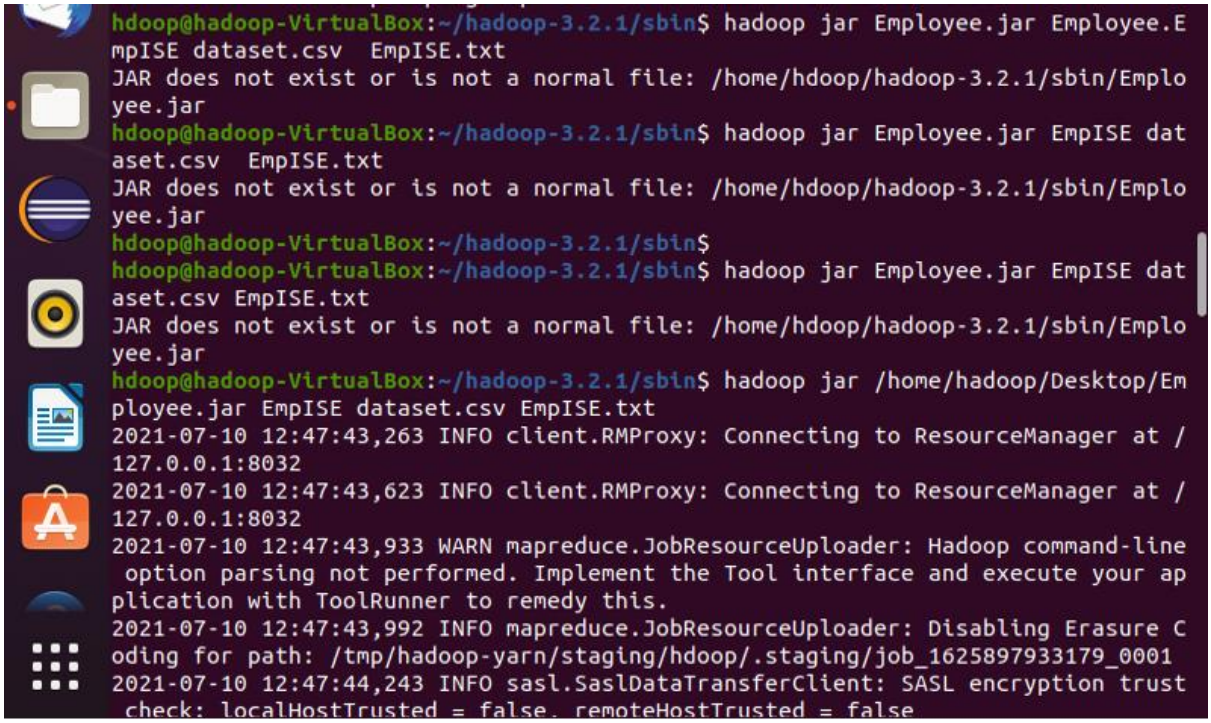
Total no.of employees who lives in Bangalore : 7

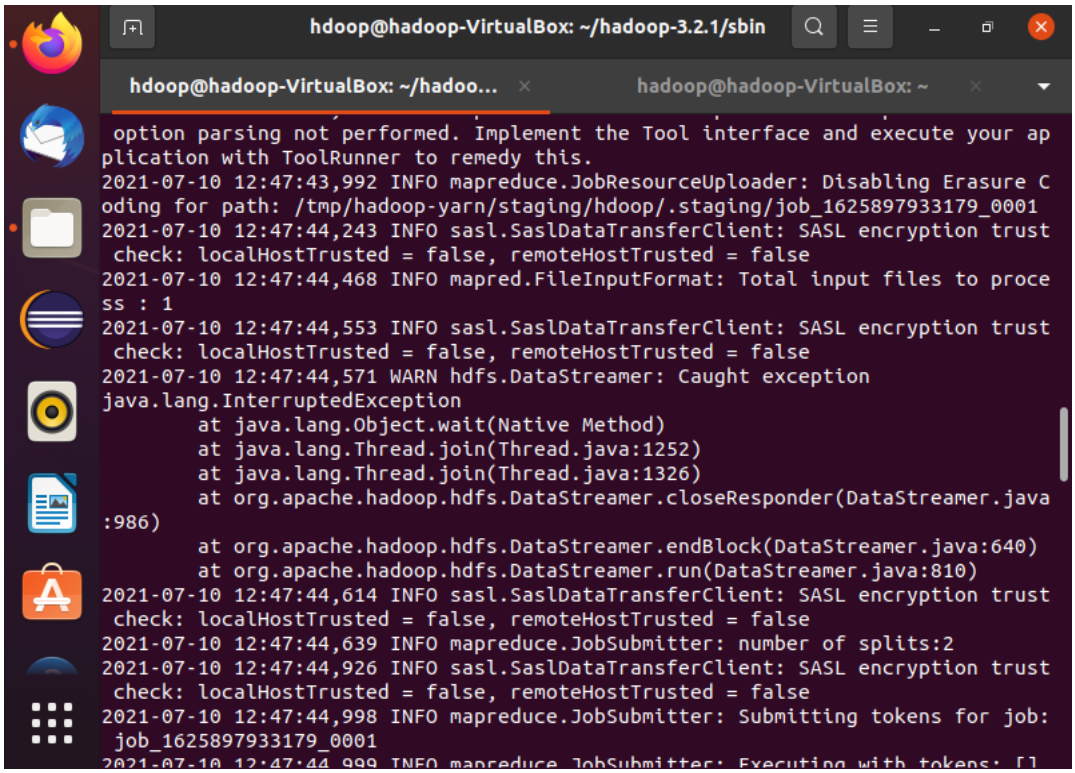
HADOOP MAP REDUCE SCREENSHOTS :

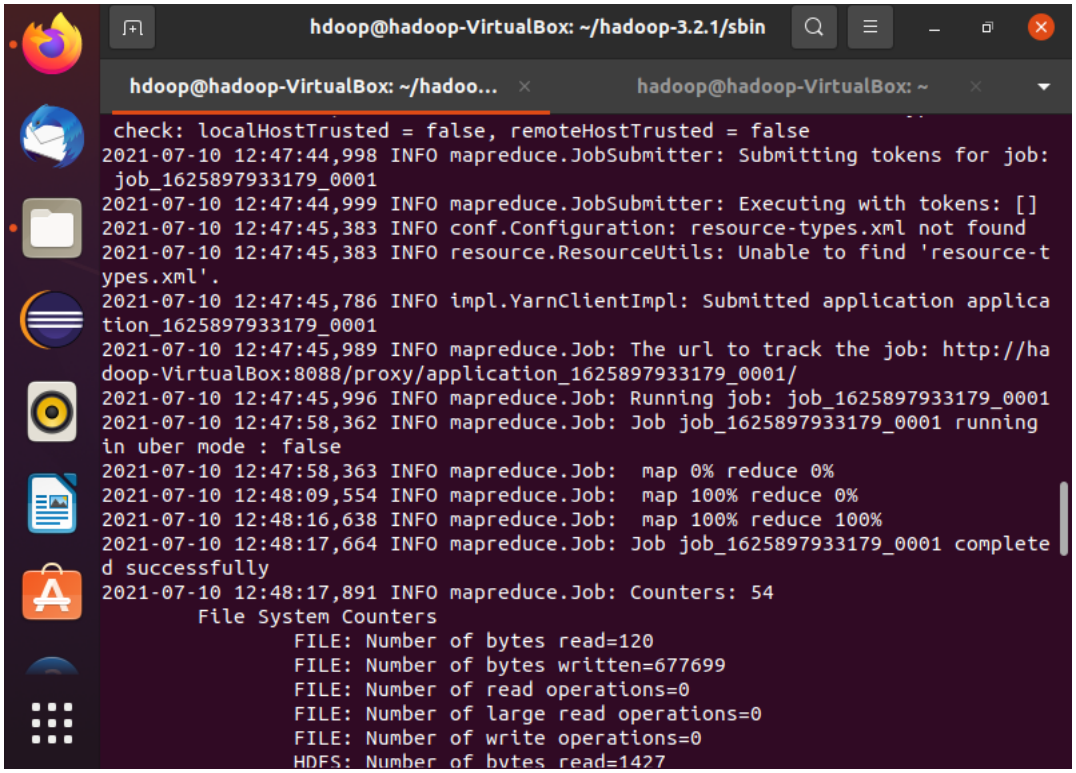


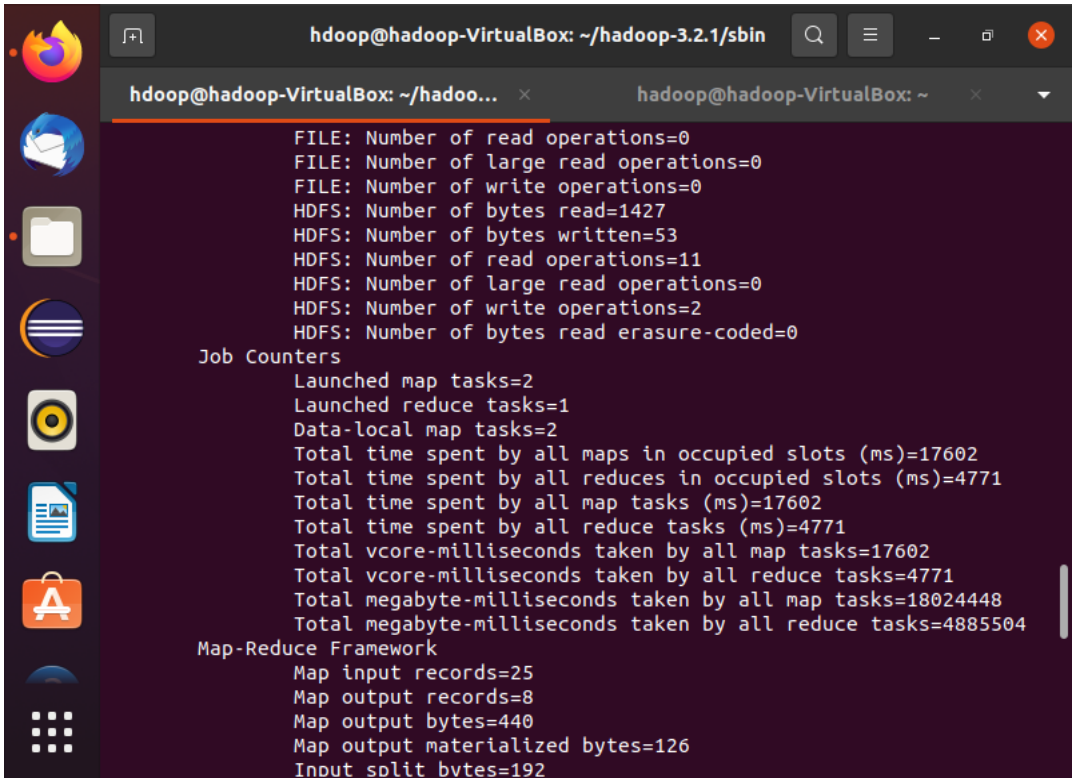

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
hdoop@hadoop-VirtualBox:~$ cd hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ ./start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as hdoop in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [hadoop-VirtualBox]
Starting resourcemanager
Starting nodemanagers
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ jps
8192 DataNode
8609 ResourceManager
8737 NodeManager
8364 SecondaryNameNode
8062 NameNode
8894 Jps
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ cd ~
hdoop@hadoop-VirtualBox:~$ cd Desktop
-bash: cd: Desktop: No such file or directory
hdoop@hadoop-VirtualBox:~$ cd /home/hadoop/Desktop
hdoop@hadoop-VirtualBox:/home/hadoop/Desktop$ ls
dataset.csv
'Eclipse IDE for Java Developers - 2021-03.desktop'
EmpAddressclass.jar
EmpAddress.jar
EmpExpclass.jar
EmpExp.jar
EmpISE.jar
Employee.jar

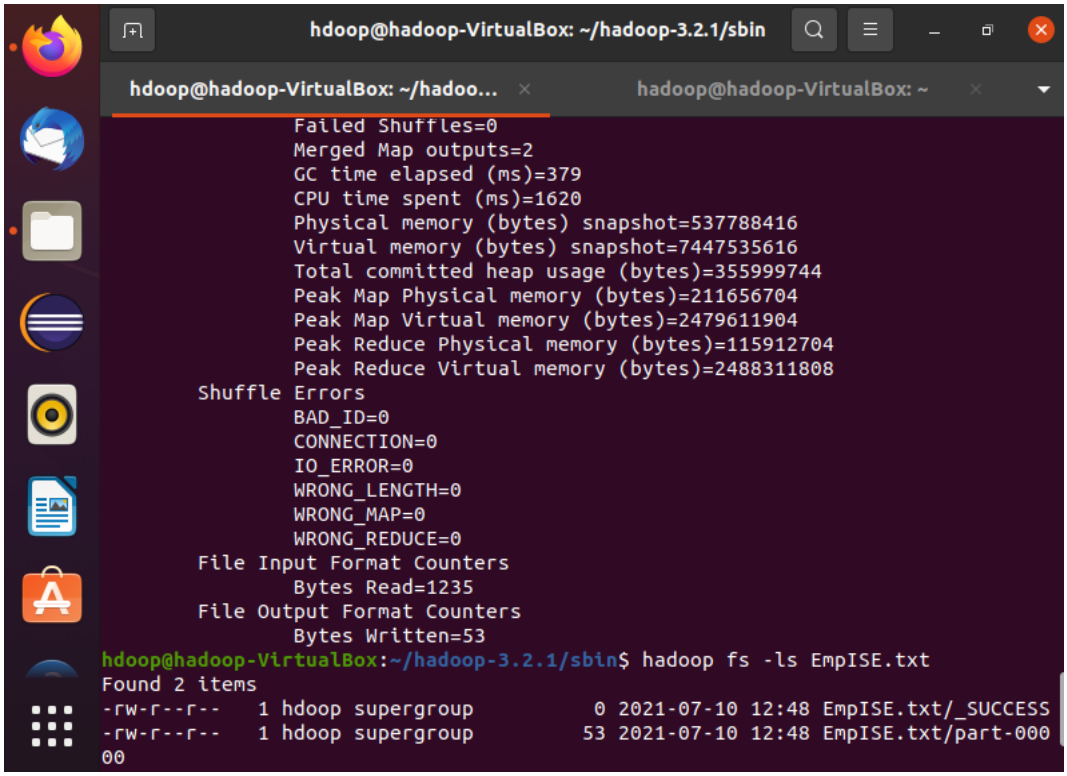

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
ls: '.': No such file or directory
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ pwd
/home/hdoop/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -mkdir -p /user/hdoop
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls /user
Found 2 items
drwxr-xr-x - hdoop supergroup 0 2021-07-10 12:09 /user/hdoop
drwxr-xr-x - hdoop supergroup 0 2021-07-05 21:50 /user/hive
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -mkdir -p /user/hdoop/faizah
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls
Found 1 items
drwxr-xr-x - hdoop supergroup 0 2021-07-10 12:11 faizah
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -copyFromLocal /home/hadoop/Desktop/dataset.csv
2021-07-10 12:11:47,556 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

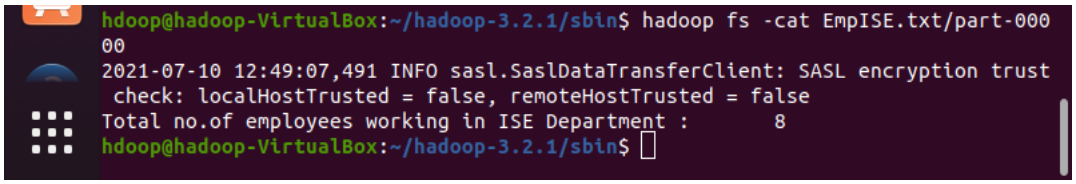

hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar Employee.jar Employee.EmpISE dataset.csv EmpISE.txt
JAR does not exist or is not a normal file: /home/hdoop/hadoop-3.2.1/sbin/Employee.jar
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar Employee.jar EmpISE dataset.csv EmpISE.txt
JAR does not exist or is not a normal file: /home/hdoop/hadoop-3.2.1/sbin/Employee.jar
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar Employee.jar EmpISE dataset.csv EmpISE.txt
JAR does not exist or is not a normal file: /home/hdoop/hadoop-3.2.1/sbin/Employee.jar
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar /home/hadoop/Desktop/Employee.jar EmpISE dataset.csv EmpISE.txt
2021-07-10 12:47:43,263 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 12:47:43,623 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 12:47:43,933 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-07-10 12:47:43,992 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625897933179_0001
2021-07-10 12:47:44,243 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false

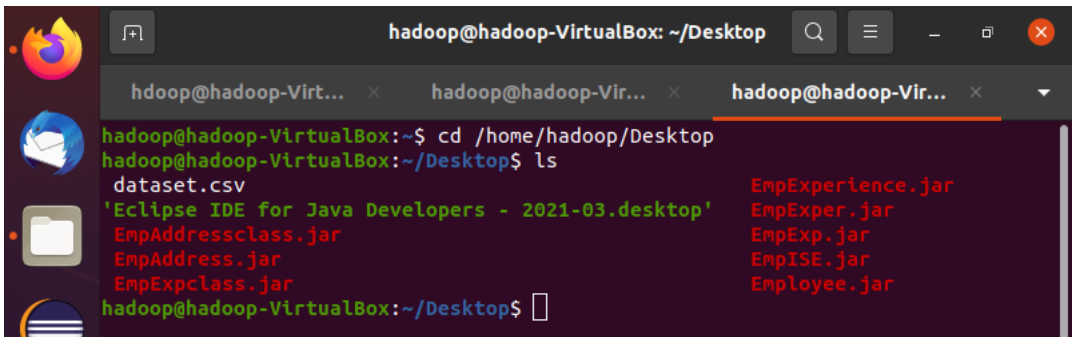

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-07-10 12:47:43,992 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625897933179_0001
2021-07-10 12:47:44,243 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 12:47:44,468 INFO mapred.FileInputFormat: Total input files to process : 1
2021-07-10 12:47:44,553 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 12:47:44,571 WARN hdfs.DataStreamer: Caught exception
java.lang.InterruptedException
at java.lang.Object.wait(Native Method)
at java.lang.Thread.join(Thread.java:1252)
at java.lang.Thread.join(Thread.java:1326)
at org.apache.hadoop.hdfs.DataStreamer.closeResponder(DataStreamer.java:986)
at org.apache.hadoop.hdfs.DataStreamer.endBlock(DataStreamer.java:640)
at org.apache.hadoop.hdfs.DataStreamer.run(DataStreamer.java:810)
2021-07-10 12:47:44,614 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 12:47:44,639 INFO mapreduce.JobSubmitter: number of splits:2
2021-07-10 12:47:44,926 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 12:47:44,998 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625897933179_0001

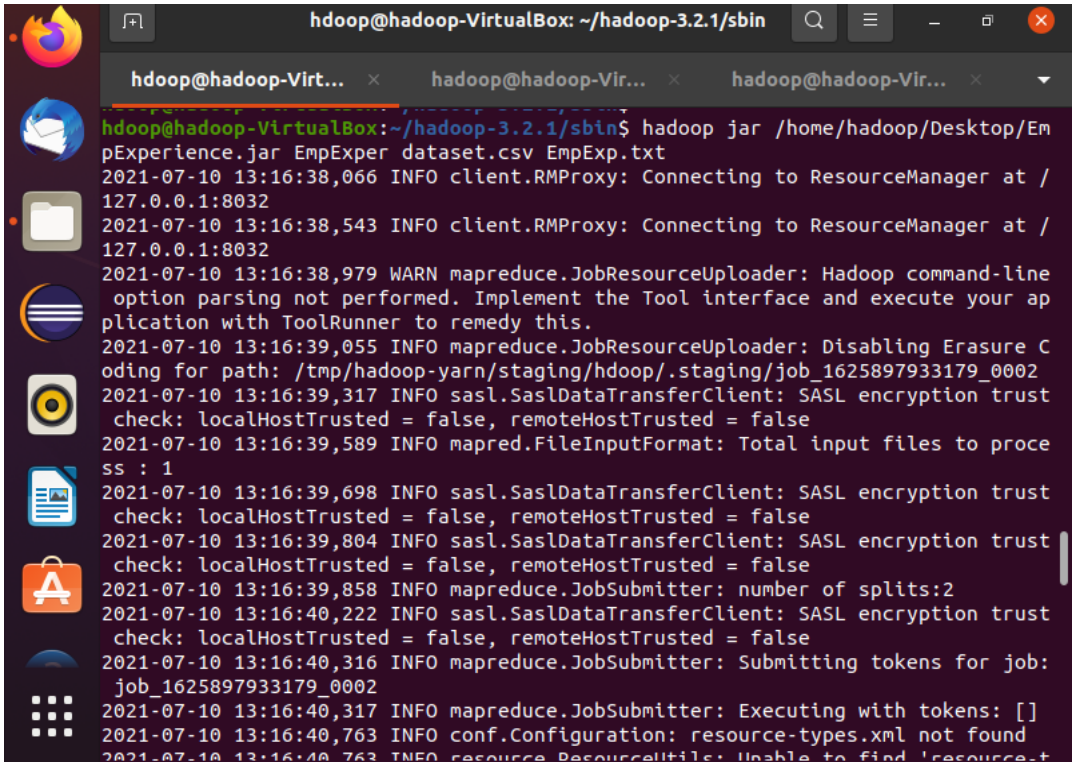

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 12:47:44,998 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625897933179_0001
2021-07-10 12:47:44,999 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-07-10 12:47:45,383 INFO conf.Configuration: resource-types.xml not found
2021-07-10 12:47:45,383 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-07-10 12:47:45,786 INFO impl.YarnClientImpl: Submitted application application_1625897933179_0001
2021-07-10 12:47:45,989 INFO mapreduce.Job: The url to track the job: http://hadoop-VirtualBox:8088/proxy/application_1625897933179_0001/
2021-07-10 12:47:45,996 INFO mapreduce.Job: Running job: job_1625897933179_0001
2021-07-10 12:47:58,362 INFO mapreduce.Job: Job job_1625897933179_0001 running in uber mode : false
2021-07-10 12:47:58,363 INFO mapreduce.Job: map 0% reduce 0%
2021-07-10 12:48:09,554 INFO mapreduce.Job: map 100% reduce 0%
2021-07-10 12:48:16,638 INFO mapreduce.Job: map 100% reduce 100%
2021-07-10 12:48:17,664 INFO mapreduce.Job: Job job_1625897933179_0001 completed successfully
2021-07-10 12:48:17,891 INFO mapreduce.Job: Counters: 54
File System Counters
FILE: Number of bytes read=120
FILE: Number of bytes written=677699
FILE: Number of read operations=0
FILE: Number of large read operations=0
FILE: Number of write operations=0
HDFS: Number of bytes read=1427

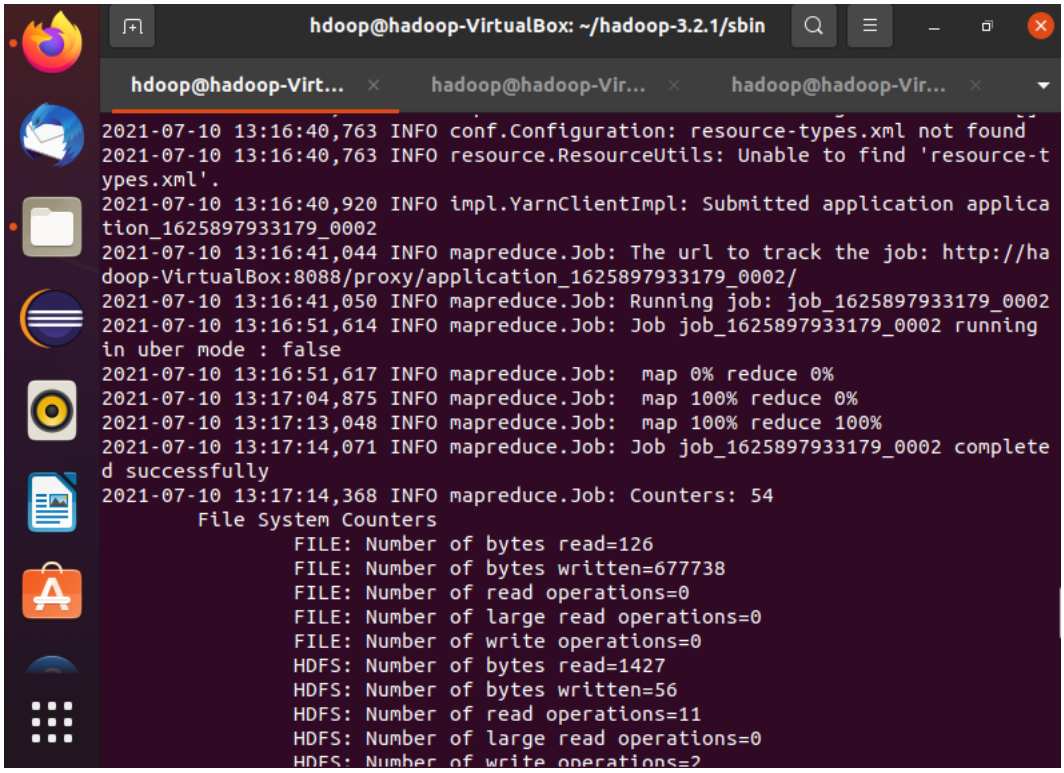

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
FILE: Number of read operations=0
FILE: Number of large read operations=0
FILE: Number of write operations=0
HDFS: Number of bytes read=1427
HDFS: Number of bytes written=53
HDFS: Number of read operations=11
HDFS: Number of large read operations=0
HDFS: Number of write operations=2
HDFS: Number of bytes read erasure-coded=0
Job Counters
Launched map tasks=2
Launched reduce tasks=1
Data-local map tasks=2
Total time spent by all maps in occupied slots (ms)=17602
Total time spent by all reduces in occupied slots (ms)=4771
Total time spent by all map tasks (ms)=17602
Total time spent by all reduce tasks (ms)=4771
Total vcore-milliseconds taken by all map tasks=17602
Total vcore-milliseconds taken by all reduce tasks=4771
Total megabyte-milliseconds taken by all map tasks=18024448
Total megabyte-milliseconds taken by all reduce tasks=4885504
Map-Reduce Framework
Map input records=25
Map output records=8
Map output bytes=440
Map output materialized bytes=126
Input split bytes=192

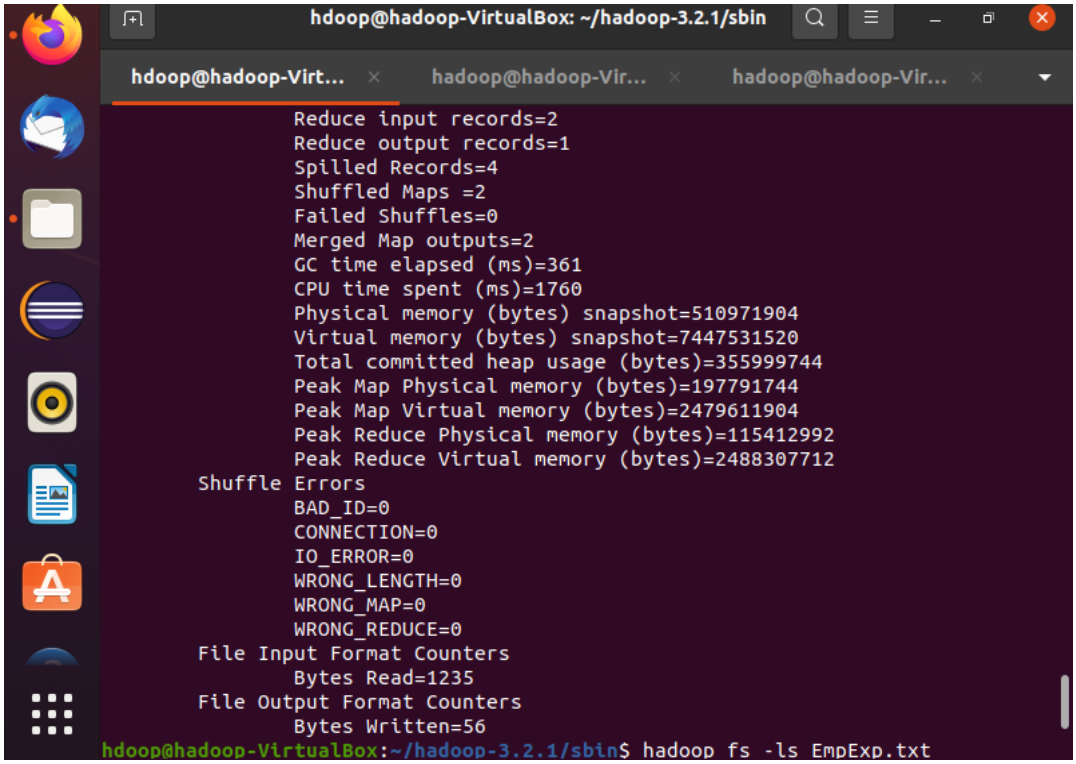

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-VirtualBox: ~/hadoo...
hadoop@hadoop-VirtualBox: ~
Failed Shuffles=0
Merged Map outputs=2
GC time elapsed (ms)=379
CPU time spent (ms)=1620
Physical memory (bytes) snapshot=537788416
Virtual memory (bytes) snapshot=7447535616
Total committed heap usage (bytes)=355999744
Peak Map Physical memory (bytes)=211656704
Peak Map Virtual memory (bytes)=2479611904
Peak Reduce Physical memory (bytes)=115912704
Peak Reduce Virtual memory (bytes)=2488311808
Shuffle Errors
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read=1235
File Output Format Counters
Bytes Written=53
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls EmpISE.txt
Found 2 items
-rw-r--r-- 1 hdoop supergroup 0 2021-07-10 12:48 EmpISE.txt/_SUCCESS
-rw-r--r-- 1 hdoop supergroup 53 2021-07-10 12:48 EmpISE.txt/part-000
00

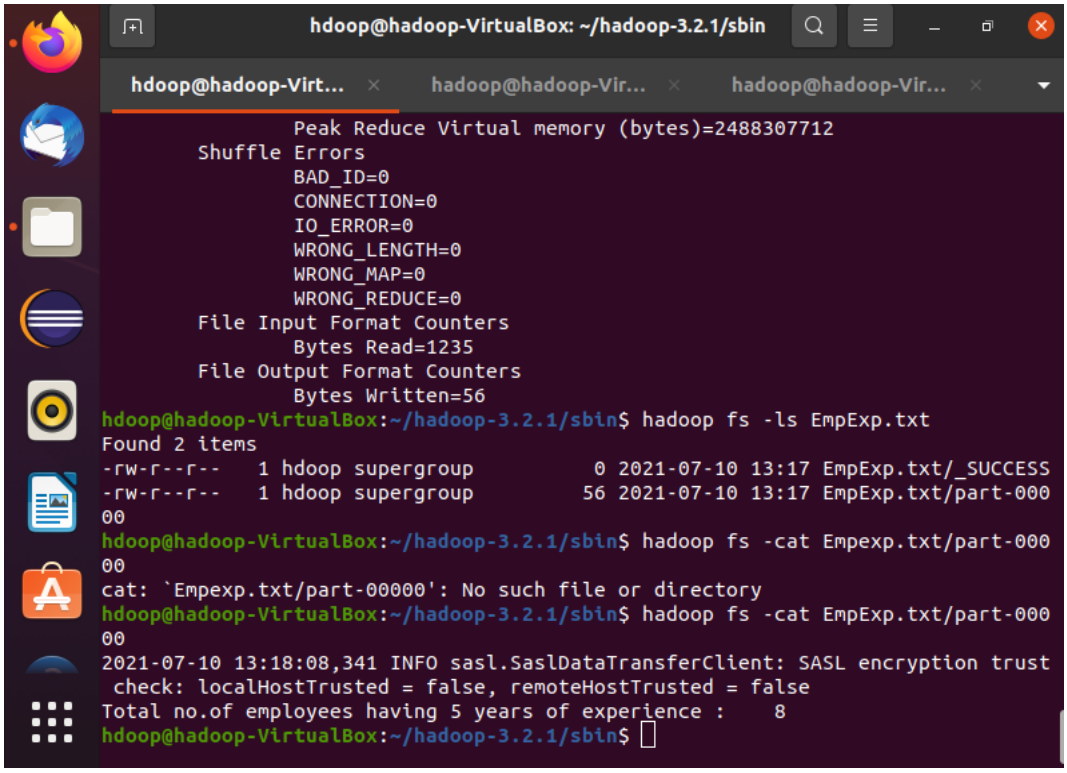

hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -cat EmpISE.txt/part-000
00
2021-07-10 12:49:07,491 INFO sasl.SaslDataTransferClient: SASL encryption trust
check: localHostTrusted = false, remoteHostTrusted = false
Total no.of employees working in ISE Department : 8
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$

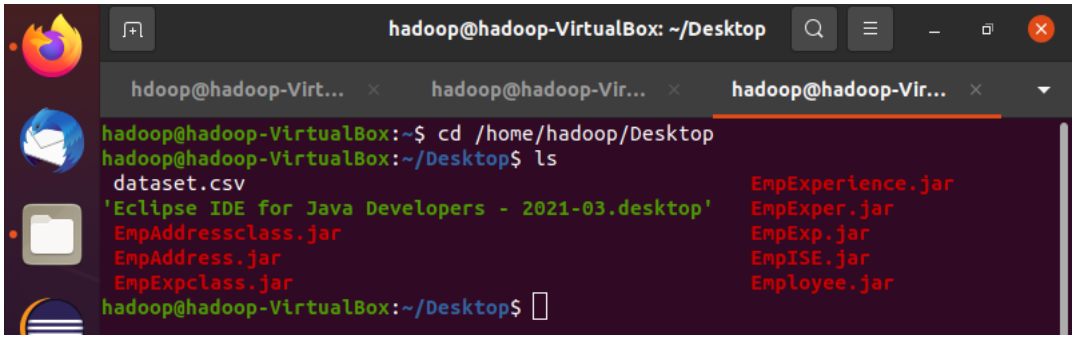

hadoop@hadoop-VirtualBox: ~/Desktop
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
hadoop@hadoop-VirtualBox:~$ cd /home/hadoop/Desktop
hadoop@hadoop-VirtualBox:~/Desktop$ ls
dataset.csv
'Eclipse IDE for Java Developers - 2021-03.desktop'
EmpAddressclass.jar
EmpAddress.jar
EmpExpclass.jar
EmpExperience.jar
EmpExper.jar
EmpExp.jar
EmpISE.jar
Employee.jar
hadoop@hadoop-VirtualBox:~/Desktop$

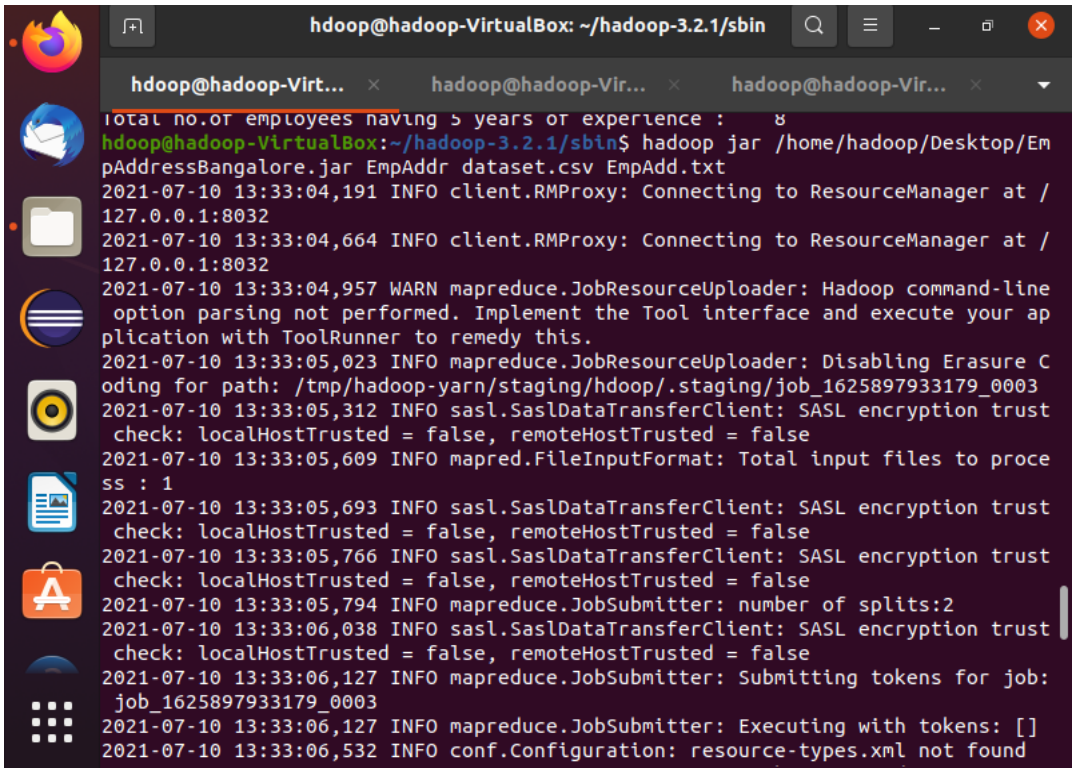

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar /home/hadoop/Desktop/EmpExperience.jar EmpExper dataset.csv EmpExp.txt
2021-07-10 13:16:38,066 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 13:16:38,543 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 13:16:38,979 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-07-10 13:16:39,055 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625897933179_0002
2021-07-10 13:16:39,317 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:16:39,589 INFO mapred.FileInputFormat: Total input files to process : 1
2021-07-10 13:16:39,698 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:16:39,804 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:16:39,858 INFO mapreduce.JobSubmitter: number of splits:2
2021-07-10 13:16:40,222 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:16:40,316 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625897933179_0002
2021-07-10 13:16:40,317 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-07-10 13:16:40,763 INFO conf.Configuration: resource-types.xml not found

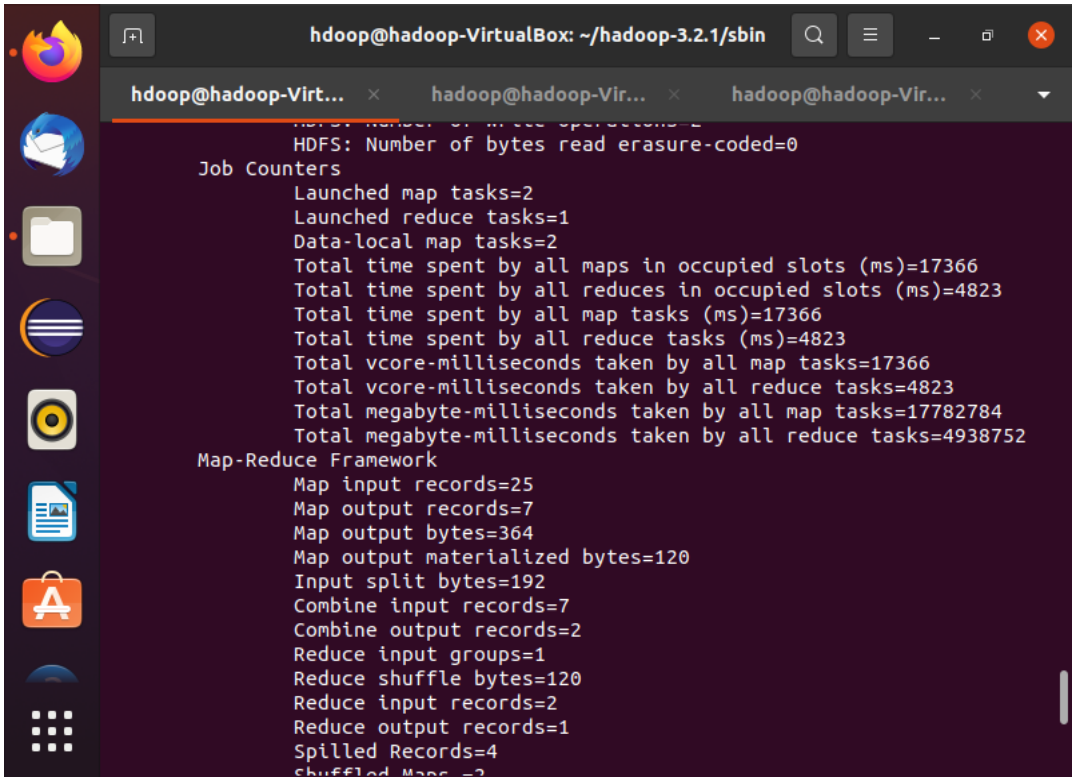

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
2021-07-10 13:16:40,763 INFO conf.Configuration: resource-types.xml not found
2021-07-10 13:16:40,763 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-07-10 13:16:40,920 INFO impl.YarnClientImpl: Submitted application application_1625897933179_0002
2021-07-10 13:16:41,044 INFO mapreduce.Job: The url to track the job: http://hadoop-VirtualBox:8088/proxy/application_1625897933179_0002/
2021-07-10 13:16:41,050 INFO mapreduce.Job: Running job: job_1625897933179_0002
2021-07-10 13:16:51,614 INFO mapreduce.Job: Job job_1625897933179_0002 running in uber mode : false
2021-07-10 13:16:51,617 INFO mapreduce.Job: map 0% reduce 0%
2021-07-10 13:17:04,875 INFO mapreduce.Job: map 100% reduce 0%
2021-07-10 13:17:13,048 INFO mapreduce.Job: map 100% reduce 100%
2021-07-10 13:17:14,071 INFO mapreduce.Job: Job job_1625897933179_0002 completed successfully
2021-07-10 13:17:14,368 INFO mapreduce.Job: Counters: 54
File System Counters
FILE: Number of bytes read=126
FILE: Number of bytes written=677738
FILE: Number of read operations=0
FILE: Number of large read operations=0
FILE: Number of write operations=0
HDFS: Number of bytes read=1427
HDFS: Number of bytes written=56
HDFS: Number of read operations=11
HDFS: Number of large read operations=0

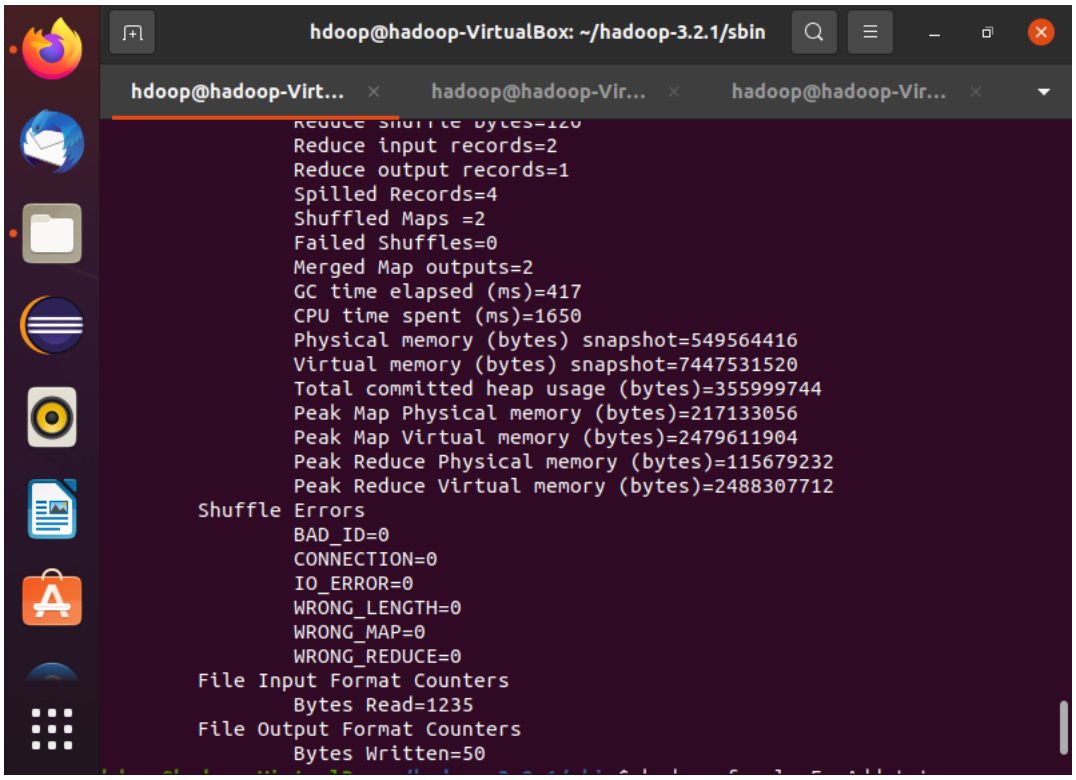

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
Reduce input records=2
Reduce output records=1
Spilled Records=4
Shuffled Maps =2
Failed Shuffles=0
Merged Map outputs=2
GC time elapsed (ms)=361
CPU time spent (ms)=1760
Physical memory (bytes) snapshot=510971904
Virtual memory (bytes) snapshot=7447531520
Total committed heap usage (bytes)=355999744
Peak Map Physical memory (bytes)=197791744
Peak Map Virtual memory (bytes)=2479611904
Peak Reduce Physical memory (bytes)=115412992
Peak Reduce Virtual memory (bytes)=2488307712
Shuffle Errors
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read=1235
File Output Format Counters
Bytes Written=56
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls EmpExp.txt

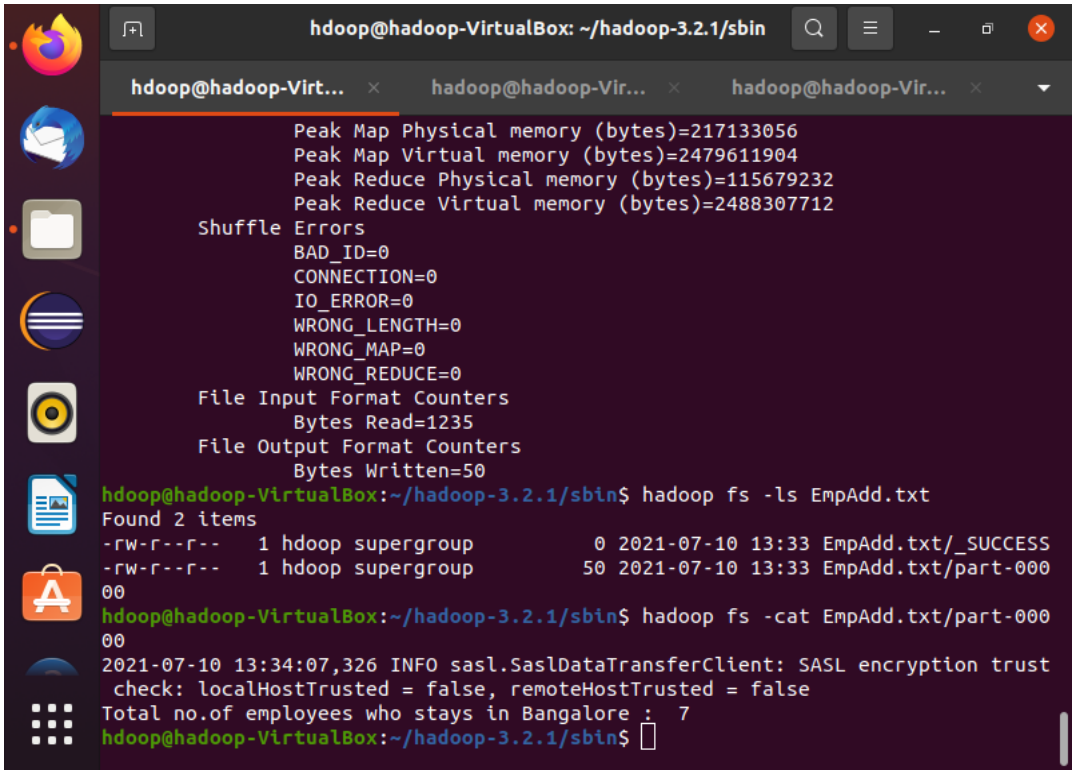

hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
Peak Reduce Virtual memory (bytes)=2488307712
Shuffle Errors
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read=1235
File Output Format Counters
Bytes Written=56
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -ls EmpExp.txt
Found 2 items
-rw-r--r-- 1 hdoop supergroup 0 2021-07-10 13:17 EmpExp.txt/_SUCCESS
-rw-r--r-- 1 hdoop supergroup 56 2021-07-10 13:17 EmpExp.txt/part-00000
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -cat Empexp.txt/part-00000
cat: `Empexp.txt/part-00000': No such file or directory
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop fs -cat EmpExp.txt/part-00000
2021-07-10 13:18:08,341 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
Total no.of employees having 5 years of experience : 8
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$


hadoop@hadoop-VirtualBox: ~/Desktop
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
hadoop@hadoop-VirtualBox:~$ cd /home/hadoop/Desktop
hadoop@hadoop-VirtualBox:~/Desktop$ ls
dataset.csv
'Eclipse IDE for Java Developers - 2021-03.desktop'
EmpAddressclass.jar
EmpAddress.jar
EmpExpclass.jar
EmpExperience.jar
EmpExper.jar
EmpExp.jar
EmpISE.jar
Employee.jar
hadoop@hadoop-VirtualBox:~/Desktop$


hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
Total no.of employees having 5 years of experience : 8
hdoop@hadoop-VirtualBox:~/hadoop-3.2.1/sbin$ hadoop jar /home/hadoop/Desktop/EmpAddressBangalore.jar EmpAddr dataset.csv EmpAdd.txt
2021-07-10 13:33:04,191 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 13:33:04,664 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2021-07-10 13:33:04,957 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-07-10 13:33:05,023 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1625897933179_0003
2021-07-10 13:33:05,312 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:33:05,609 INFO mapred.FileInputFormat: Total input files to process : 1
2021-07-10 13:33:05,693 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:33:05,766 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:33:05,794 INFO mapreduce.JobSubmitter: number of splits:2
2021-07-10 13:33:06,038 INFO sasl.SaslDataTransferClient: SASL encryption trust check: localHostTrusted = false, remoteHostTrusted = false
2021-07-10 13:33:06,127 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1625897933179_0003
2021-07-10 13:33:06,127 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-07-10 13:33:06,532 INFO conf.Configuration: resource-types.xml not found


hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
HDFS: Number of bytes read erasure-coded=0
Job Counters
Launched map tasks=2
Launched reduce tasks=1
Data-local map tasks=2
Total time spent by all maps in occupied slots (ms)=17366
Total time spent by all reduces in occupied slots (ms)=4823
Total time spent by all map tasks (ms)=17366
Total time spent by all reduce tasks (ms)=4823
Total vcore-milliseconds taken by all map tasks=17366
Total vcore-milliseconds taken by all reduce tasks=4823
Total megabyte-milliseconds taken by all map tasks=17782784
Total megabyte-milliseconds taken by all reduce tasks=4938752
Map-Reduce Framework
Map input records=25
Map output records=7
Map output bytes=364
Map output materialized bytes=120
Input split bytes=192
Combine input records=7
Combine output records=2
Reduce input groups=1
Reduce shuffle bytes=120
Reduce input records=2
Reduce output records=1
Spilled Records=4


hdoop@hadoop-VirtualBox: ~/hadoop-3.2.1/sbin
hdoop@hadoop-Virt...
hadoop@hadoop-Vir...
hadoop@hadoop-Vir...
Reduce input records=2
Reduce output records=1
Spilled Records=4
Shuffled Maps =2
Failed Shuffles=0
Merged Map outputs=2
GC time elapsed (ms)=417
CPU time spent (ms)=1650
Physical memory (bytes) snapshot=549564416
Virtual memory (bytes) snapshot=7447531520
Total committed heap usage (bytes)=355999744
Peak Map Physical memory (bytes)=217133056
Peak Map Virtual memory (bytes)=2479611904
Peak Reduce Physical memory (bytes)=115679232
Peak Reduce Virtual memory (bytes)=2488307712
Shuffle Errors
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read=1235
File Output Format Counters
Bytes Written=50



Exercise-II

Use the above dataset in .csv file and create a database called as EmployeeDB. Create a table under the database called as Employee using

HIVEQL.

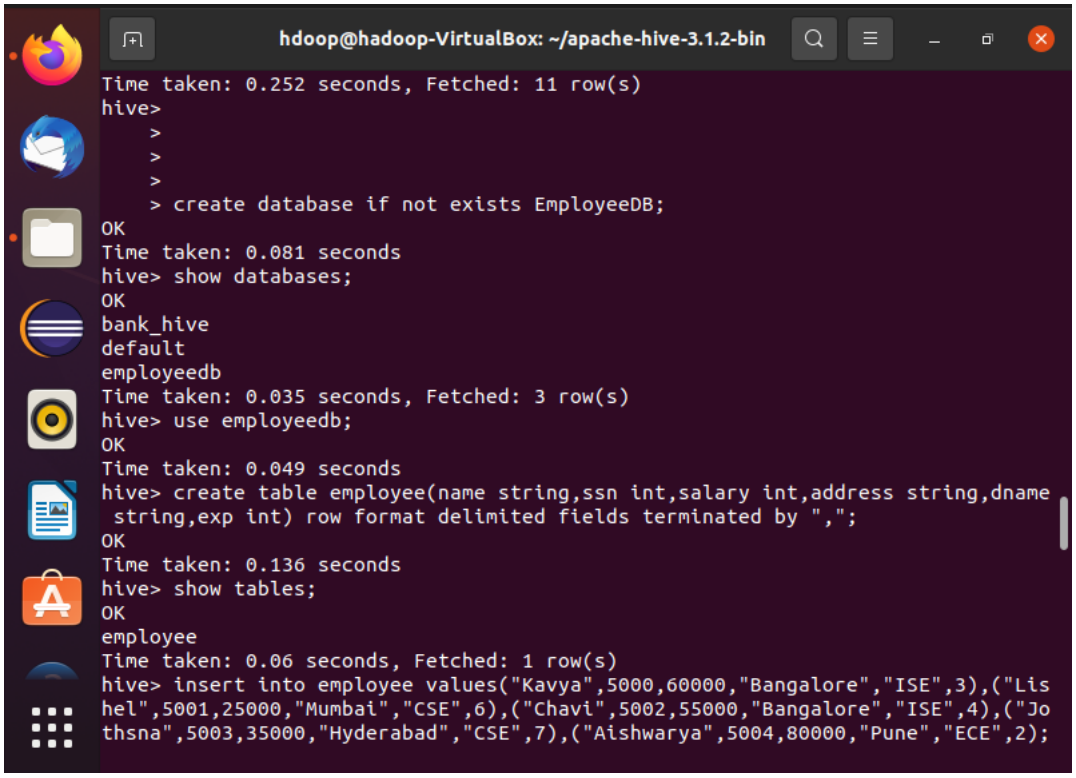
Use the HiveQL language to perform the following Query based Map-reduce operations,

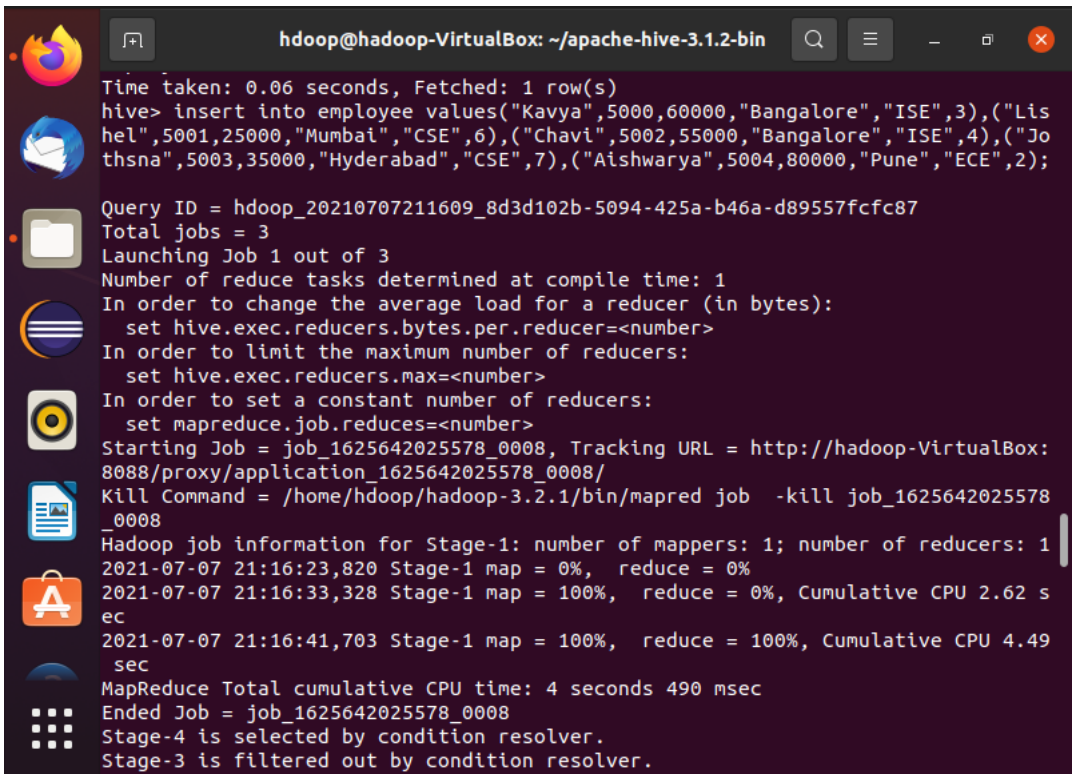
1. **Insert 5 records using INSERT command.**

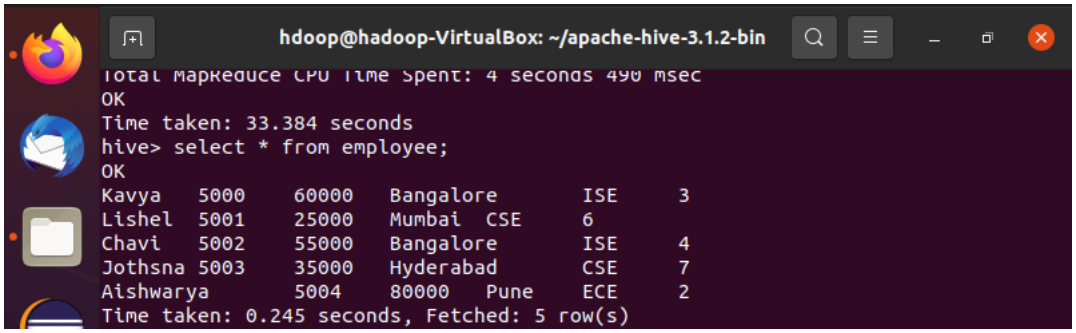
```
hive> create database if not exists EmployeeDB;
OK
Time taken: 0.081 seconds
hive> show databases;
OK
bank_hive
```

```
default
employeedb
Time taken: 0.035 seconds, Fetched: 3 row(s)
hive> use employeedb;
OK
Time taken: 0.049 seconds
hive> create table employee(name string,ssn int,salary int,address string,dname
string,exp int) row format delimited fields terminated by ",";
OK
Time taken: 0.136 seconds
hive> show tables;
OK
employee
Time taken: 0.06 seconds, Fetched: 1 row(s)
hive> insert into employee
values("Kavya",5000,60000,"Bangalore","ISE",3),("Lishel",5001,25000,"Mumbai","CS
E",6),("Chavi",5002,55000,"Bangalore","ISE",4),("Jothsna",5003,35000,"Hyderabad",
"CSE",7),("Aishwarya",5004,80000,"Pune","ECE",2);

hive> select * from employee;
OK
Kavya   5000    60000  Bangalore      ISE      3
Lishel  5001    25000  Mumbai         CSE      6
Chavi   5002    55000  Bangalore      ISE      4
Jothsna         5003    35000  Hyderabad      CSE      7
Aishwarya       5004    80000  Pune    ECE      2
Time taken: 0.245 seconds, Fetched: 5 row(s)
```

Output screenshots :


hdoop@hadoop-VirtualBox: ~/apache-hive-3.1.2-bin
Time taken: 0.252 seconds, Fetched: 11 row(s)
hive>
    >
    >
    >
    > create database if not exists EmployeeDB;
OK
Time taken: 0.081 seconds
hive> show databases;
OK
bank_hive
default
employeedb
Time taken: 0.035 seconds, Fetched: 3 row(s)
hive> use employeedb;
OK
Time taken: 0.049 seconds
hive> create table employee(name string,ssn int,salary int,address string,dname
 string,exp int) row format delimited fields terminated by ",";
OK
Time taken: 0.136 seconds
hive> show tables;
OK
employee
Time taken: 0.06 seconds, Fetched: 1 row(s)
hive> insert into employee values("Kavya",5000,60000,"Bangalore","ISE",3),("Lis
hel",5001,25000,"Mumbai","CSE",6),("Chavi",5002,55000,"Bangalore","ISE",4),("Jo
thsna",5003,35000,"Hyderabad","CSE",7),("Aishwarya",5004,80000,"Pune","ECE",2);


hdoop@hadoop-VirtualBox: ~/apache-hive-3.1.2-bin
Time taken: 0.06 seconds, Fetched: 1 row(s)
hive> insert into employee values("Kavya",5000,60000,"Bangalore","ISE",3),("Lis
hel",5001,25000,"Mumbai","CSE",6),("Chavi",5002,55000,"Bangalore","ISE",4),("Jo
thsna",5003,35000,"Hyderabad","CSE",7),("Aishwarya",5004,80000,"Pune","ECE",2);
Query ID = hdoop_20210707211609_8d3d102b-5094-425a-b46a-d89557fcfc87
Total jobs = 3
Launching Job 1 out of 3
Number of reduce tasks determined at compile time: 1
In order to change the average load for a reducer (in bytes):
  set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
  set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
  set mapreduce.job.reduces=<number>
Starting Job = job_1625642025578_0008, Tracking URL = http://hadoop-VirtualBox:
8088/proxy/application_1625642025578_0008/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578
_0008
Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
2021-07-07 21:16:23,820 Stage-1 map = 0%, reduce = 0%
2021-07-07 21:16:33,328 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 2.62 s
ec
2021-07-07 21:16:41,703 Stage-1 map = 100%, reduce = 100%, Cumulative CPU 4.49
 sec
MapReduce Total cumulative CPU time: 4 seconds 490 msec
Ended Job = job_1625642025578_0008
Stage-4 is selected by condition resolver.
Stage-3 is filtered out by condition resolver.



dataset in .csv file loaded into employee table :-

hive> LOAD DATA LOCAL INPATH '/home/hadoop/Desktop/dataset.csv' into table employee;

Loading data to table employeedb.employee

OK

Time taken: 0.864 seconds

hive> select * from employee;

OK

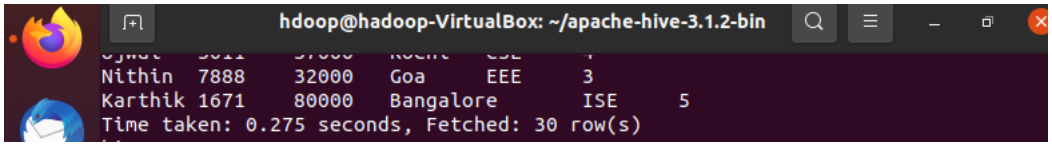
Kavya	5000	60000	Bangalore	ISE	3
Lishel	5001	25000	Mumbai	CSE	6
Chavi	5002	55000	Bangalore	ISE	4
Jothsna	5003	35000	Hyderabad	CSE	7
Aishwarya	5004	80000	Pune	ECE	2
Anusha	6747	70000	Bangalore	ISE	5
Avani	4325	30000	Kerala	CSE	3
Deepti	7901	58000	Delhi	ISE	5
Khushi	2135	25000	Punjab	ECE	2
Monika	3984	67000	Kanpur	EEE	4
Vanditha	1299	43000	Mumbai	ME	6
Gaurav	7733	21000	Rajasthan	CSE	7
Anjali	5231	65000	Bangalore	ISE	5
Namitha	1177	54000	Pune	ECE	4
Ajay	3662	73000	Chennai	EEE	6

Akash	9815	20000	Bangalore	ISE	5	
Darshan		8000	45000	Kolkata	CSE	8
Anish	3712	35000	Patna	AE	2	
Nandan		8868	15000	Bhopal	TC	3
Purnima		6734	67000	Bangalore	ISE	5
Sharada		4599	34000	Indore	CSE	2
Pratik	2001	75000	Bangalore	ISE	5	
Pooja	6021	28000	Shimla	EEE	4	
Vikas	4378	32000	Agra	CSE	2	
Keerthi	1008	65000	Bangalore	ISE	5	
Sahana	4289	26000	Mangalore	EEE	4	
Deepak		6710	77000	Coimbatore	ECE	6
Ujwal	3011	37000	Kochi	CSE	4	
Nithin	7888	32000	Goa	EEE	3	
Karthik	1671	80000	Bangalore	ISE	5	

Time taken: 0.275 seconds, Fetched: 30 row(s)

```
hive> LOAD DATA LOCAL INPATH '/home/hadoop/Downloads/dataset.csv' into table em
ployee;
Loading data to table employeedb.employee
OK
```

```
hive> select * from employee;
OK
Kavya   5000    60000   Bangalore       ISE     3
Lishel  5001    25000   Mumbai  CSE     6
Chavi   5002    55000   Bangalore       ISE     4
Jothsna 5003    35000   Hyderabad       CSE     7
Aishwarya       5004    80000   Pune    ECE     2
Anusha  6747    70000   Bangalore       ISE     5
Avani   4325    30000   Kerala  CSE     3
Deepti  7901    58000   Delhi   ISE     5
Khushi  2135    25000   Punjab  ECE     2
Monika  3984    67000   Kanpur  EEE     4
Vanditha        1299    43000   Mumbai  ME      6
Gaurav  7733    21000   Rajasthan       CSE     7
Anjali  5231    65000   Bangalore       ISE     5
Namitha 1177    54000   Pune    ECE     4
Ajay    3662    73000   Chennai EEE     6
Akash   9815    20000   Bangalore       ISE     5
Darshan 8000    45000   Kolkata CSE     8
Anish   3712    35000   Patna   AE      2
Nandan  8868    15000   Bhopal  TC      3
Purnima 6734    67000   Bangalore       ISE     5
Sharada 4599    34000   Indore  CSE     2
Pratik  2001    75000   Bangalore       ISE     5
Pooja   6021    28000   Shimla  EEE     4
Vikas   4378    32000   Agra    CSE     2
Keerthi 1008    65000   Bangalore       ISE     5
Sahana  4289    26000   Mangalore       EEE     4
Deepak  6710    77000   Coimbatore      ECE     6
```



2. Demonstrate the Alter command for the following cases,

a. Rename the table name to “Emp”.

hive> alter table employee rename to emp;

OK

Time taken: 0.335 seconds

hive> show tables;

OK

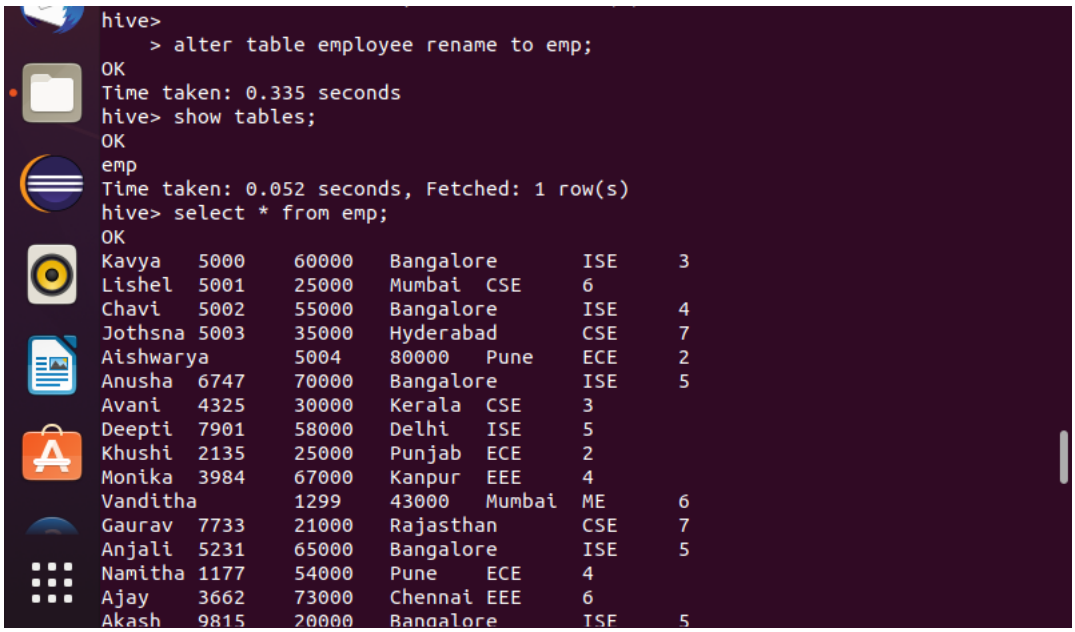
emp

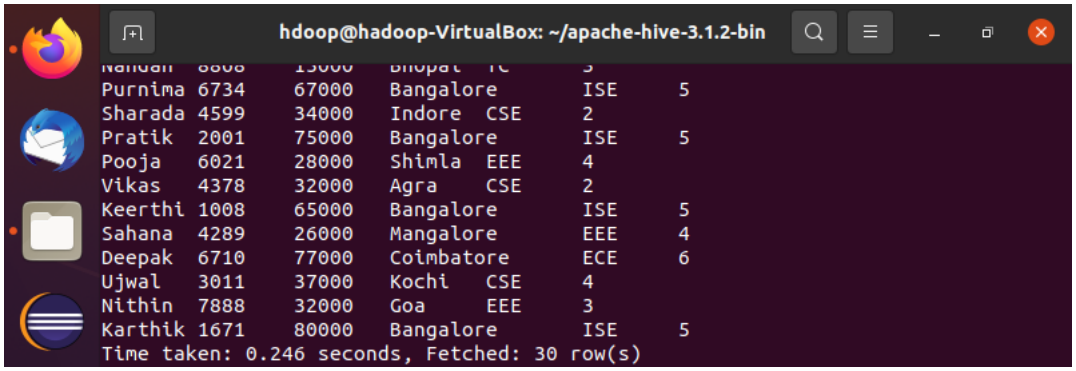
Time taken: 0.052 seconds, Fetched: 1 row(s)

hive> select * from emp;

OK

Output screenshots :





b. Rename the column name "Dname" to "Dept_name".

hive> alter table emp change dname Dept_name string;

OK

Time taken: 0.179 seconds

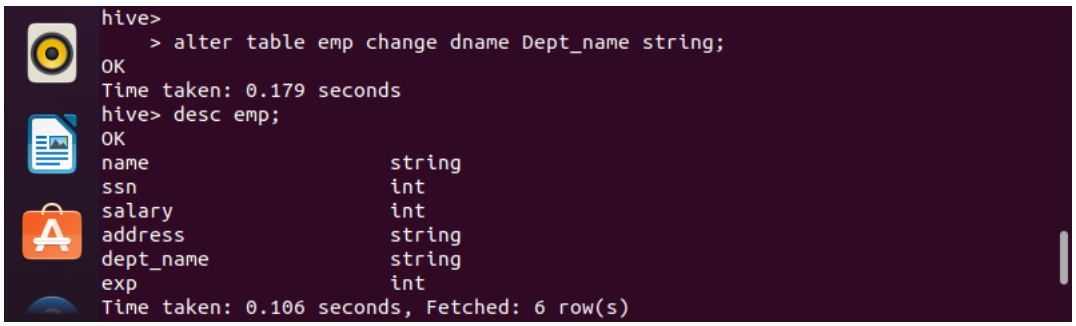
hive> desc emp;

OK

name	string	
ssn	int	
salary	int	
address	string	
dept_name	string	
exp	int	

Time taken: 0.106 seconds, Fetched: 6 row(s)

Output screenshots :

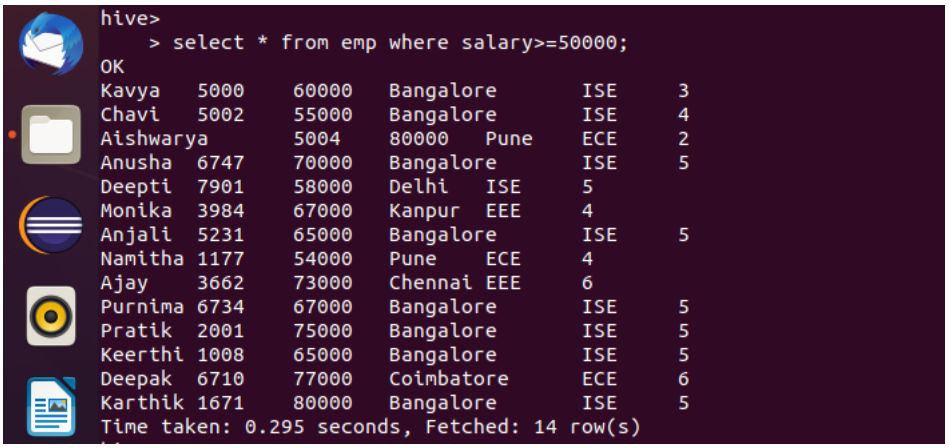


3.Retrieve all the employees who's salary is not less than 50000.

hive> select * from emp where salary>=50000;

OK

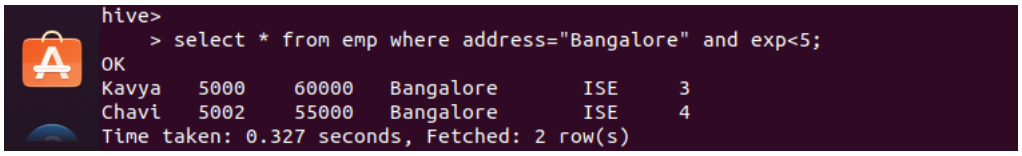
Output screenshots :



4. Extract all employees who live in Bangalore but having less than 5 years of experience

hive> select * from emp where address="Bangalore" and exp<5;

OK



5. Create separate view containing Name, Dept_name of employees

hive> create view emp_dept as select name,dept_name from emp;

OK

Time taken: 0.264 seconds

hive> show tables;

OK

emp

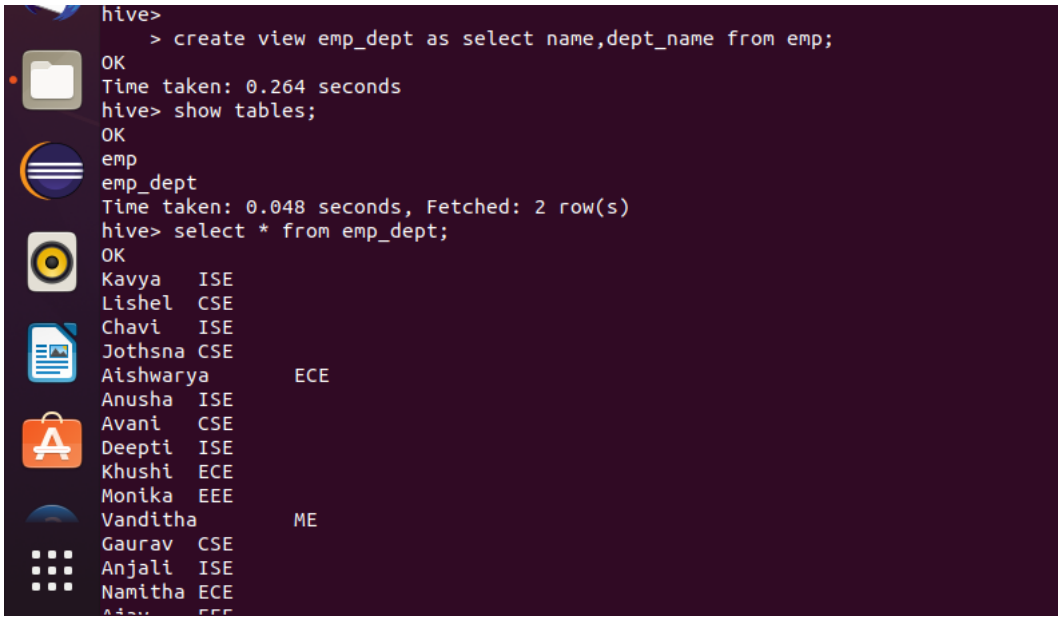
emp_dept

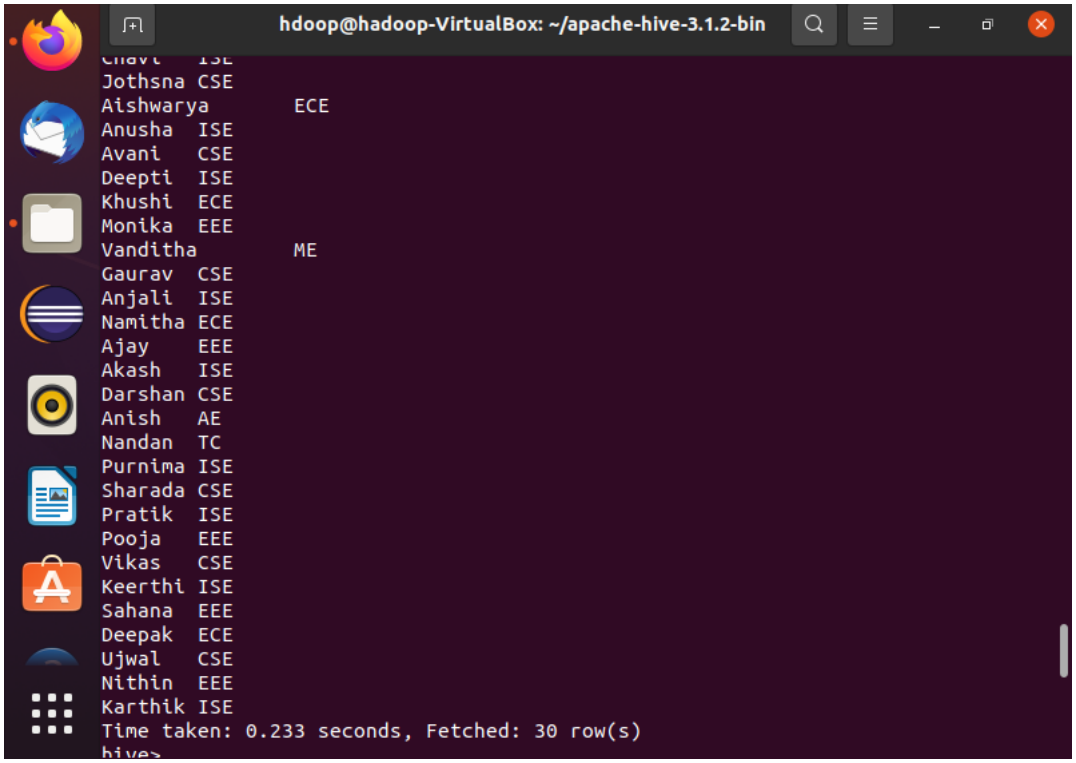
Time taken: 0.048 seconds, Fetched: 2 row(s)

hive> select * from emp_dept;

OK

Output screenshots :

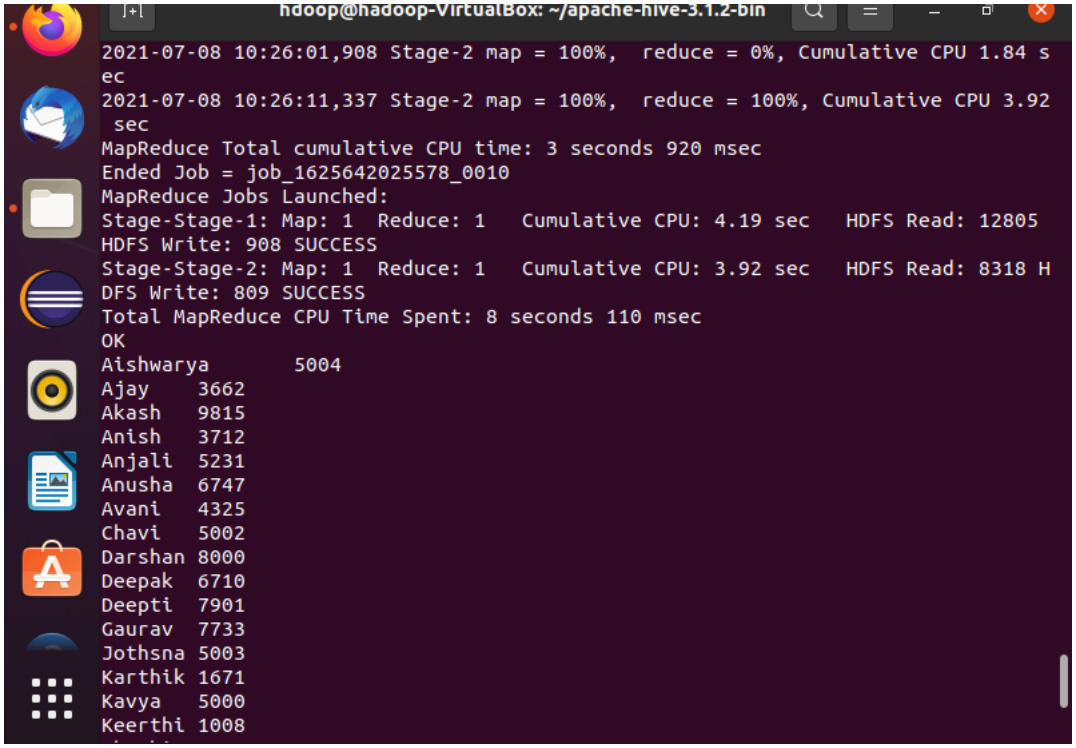


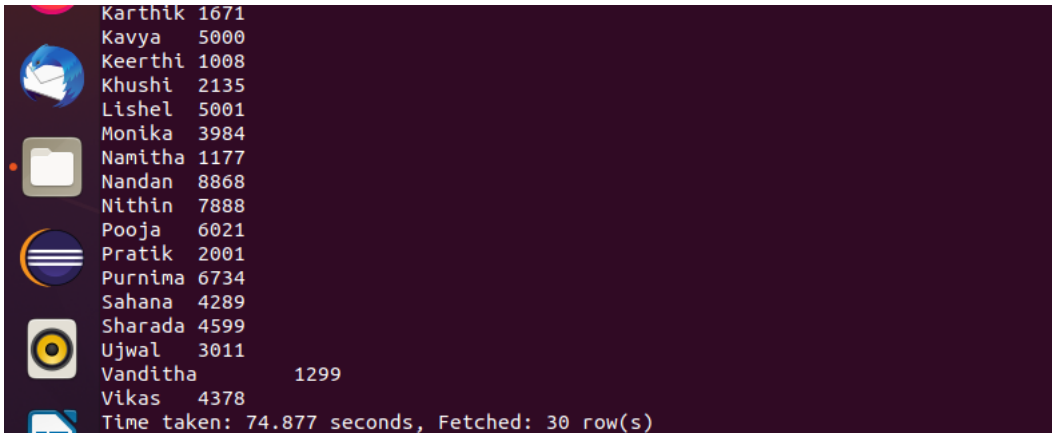


6. Display Name and SSN and use group by SSN and order by Name

hive> select name,ssn from emp group by ssn,name order by name;

Output screenshots :

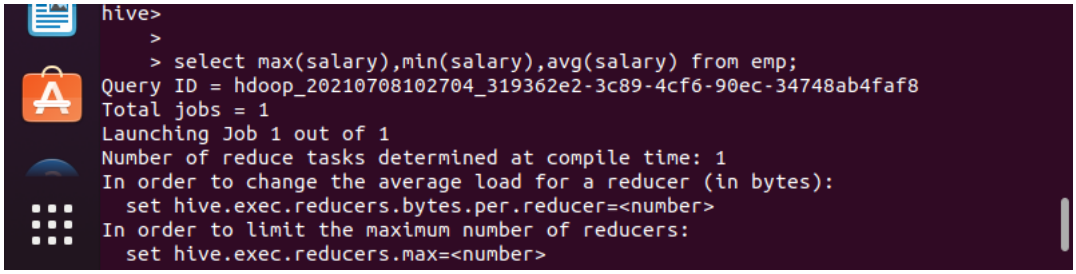


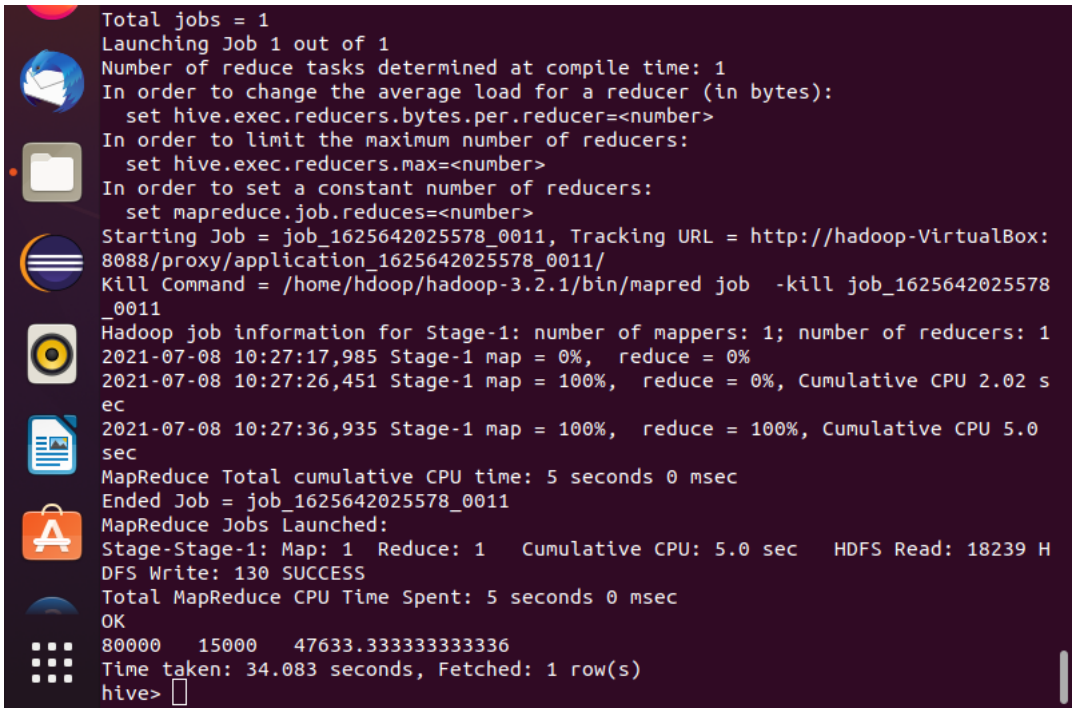


7. Retrieve Maximum salary, minimum salary and Average salary of the employees

hive> select max(salary),min(salary),avg(salary) from emp;

Output screenshots :

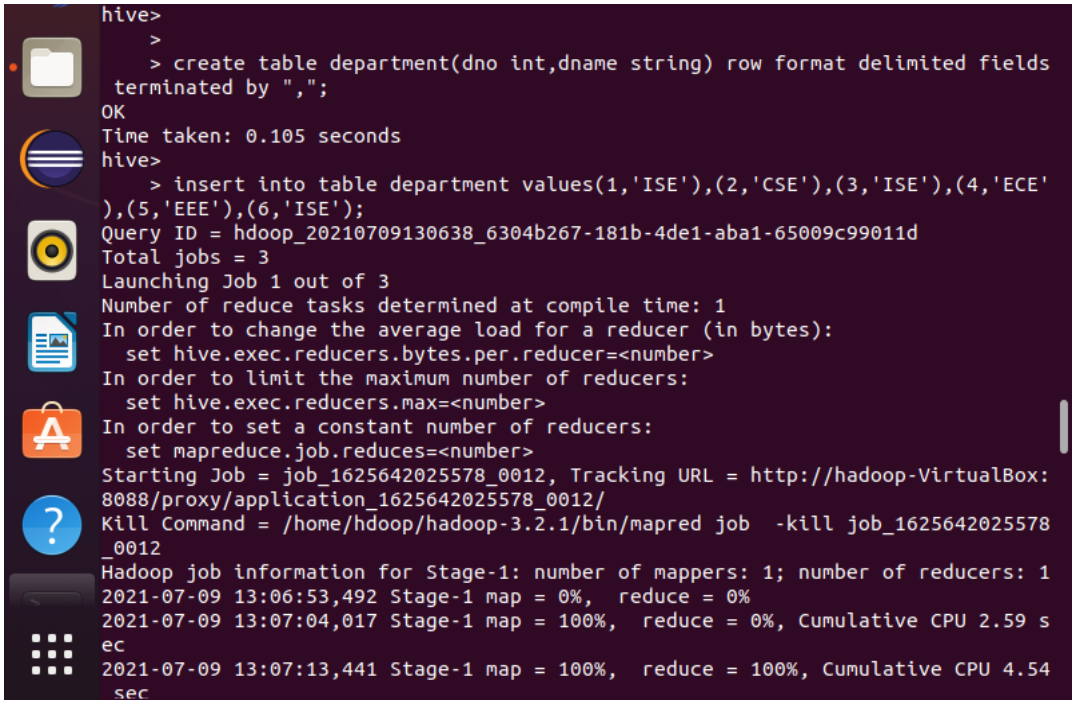


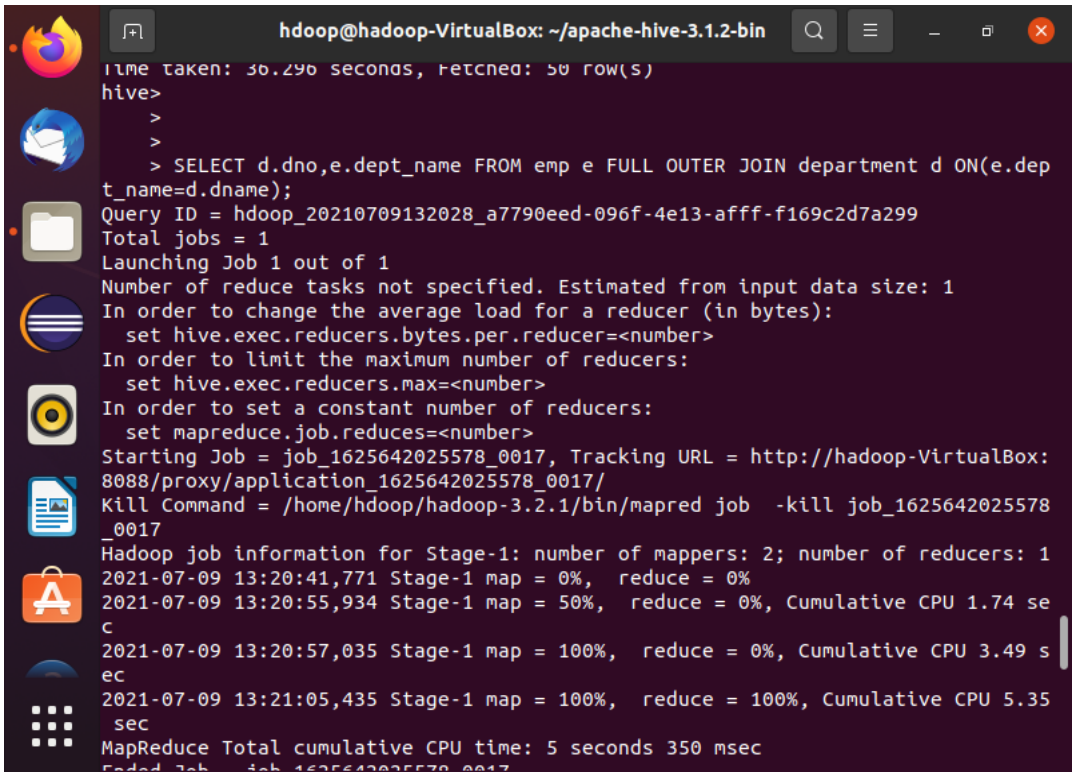


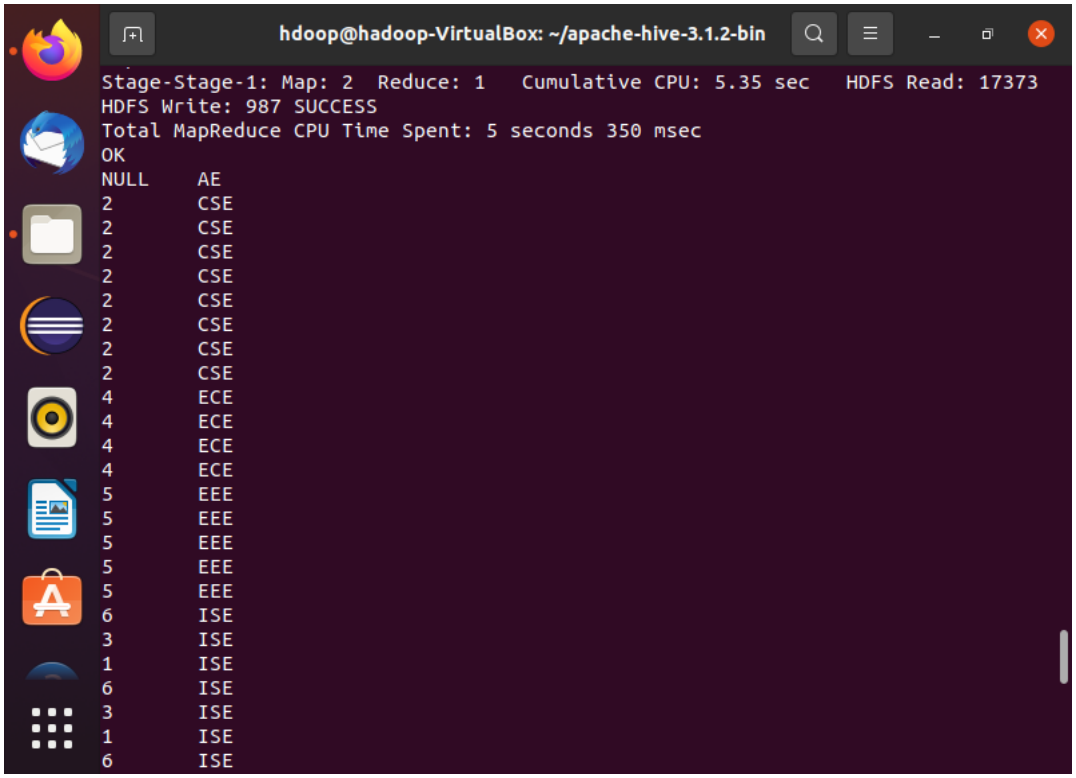
8. Create Another table called Department with the following fields (Dname = Dept_name and perform the following joins
(outer, left outer, right outer) over Dname

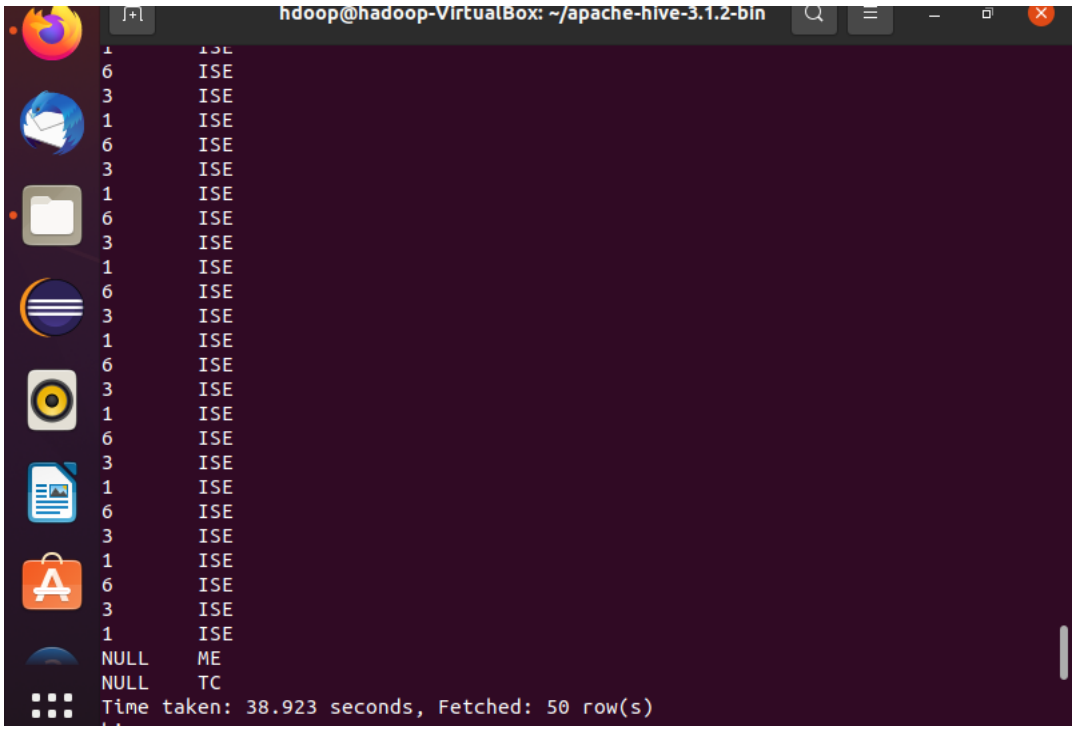
Dno	Dname
6	ISE

Outer join :-

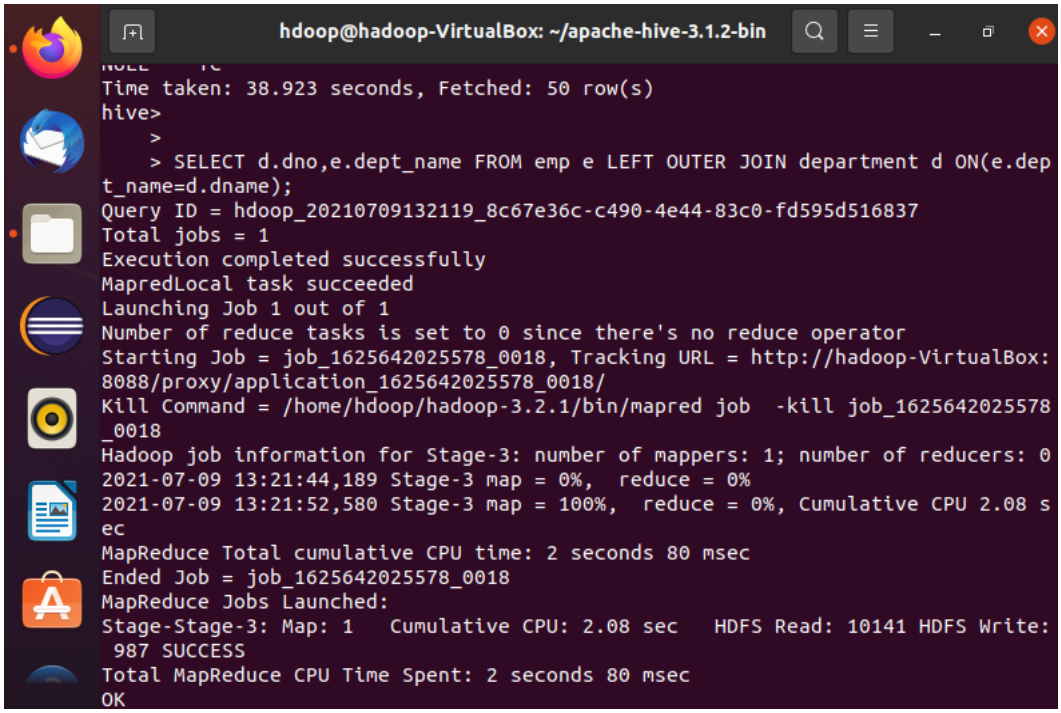

hive>
>
> create table department(dno int,dname string) row format delimited fields terminated by ",";
OK
Time taken: 0.105 seconds
hive>
> insert into table department values(1,'ISE'),(2,'CSE'),(3,'ISE'),(4,'ECE'),(5,'EEE'),(6,'ISE');
Query ID = hdoop_20210709130638_6304b267-181b-4de1-aba1-65009c99011d
Total jobs = 3
Launching Job 1 out of 3
Number of reduce tasks determined at compile time: 1
In order to change the average load for a reducer (in bytes):
set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
set mapreduce.job.reduces=<number>
Starting Job = job_1625642025578_0012, Tracking URL = http://hadoop-VirtualBox:8088/proxy/application_1625642025578_0012/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578_0012
Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
2021-07-09 13:06:53,492 Stage-1 map = 0%, reduce = 0%
2021-07-09 13:07:04,017 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 2.59 sec
2021-07-09 13:07:13,441 Stage-1 map = 100%, reduce = 100%, Cumulative CPU 4.54 sec

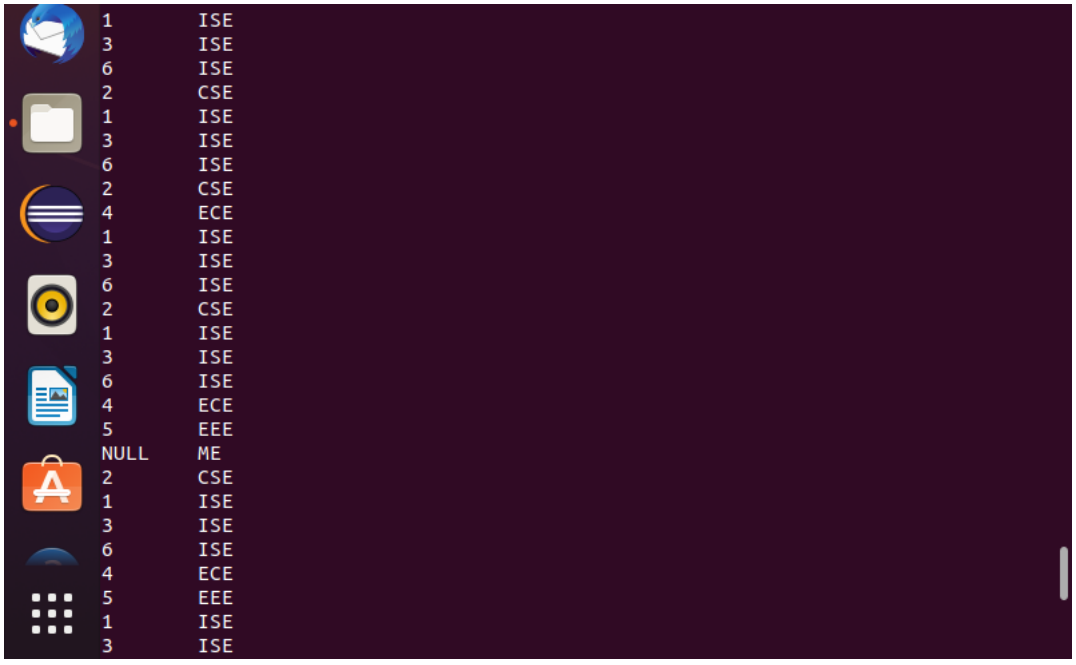

hdoop@hadoop-VirtualBox: ~/apache-hive-3.1.2-bin
Time taken: 36.296 seconds, Fetched: 50 row(s)
hive>
>
>
> SELECT d.dno,e.dept_name FROM emp e FULL OUTER JOIN department d ON(e.dept_name=d.dname);
Query ID = hdoop_20210709132028_a7790eed-096f-4e13-afff-f169c2d7a299
Total jobs = 1
Launching Job 1 out of 1
Number of reduce tasks not specified. Estimated from input data size: 1
In order to change the average load for a reducer (in bytes):
set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
set mapreduce.job.reduces=<number>
Starting Job = job_1625642025578_0017, Tracking URL = http://hadoop-VirtualBox:8088/proxy/application_1625642025578_0017/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578_0017
Hadoop job information for Stage-1: number of mappers: 2; number of reducers: 1
2021-07-09 13:20:41,771 Stage-1 map = 0%, reduce = 0%
2021-07-09 13:20:55,934 Stage-1 map = 50%, reduce = 0%, Cumulative CPU 1.74 sec
2021-07-09 13:20:57,035 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 3.49 sec
2021-07-09 13:21:05,435 Stage-1 map = 100%, reduce = 100%, Cumulative CPU 5.35 sec
MapReduce Total cumulative CPU time: 5 seconds 350 msec

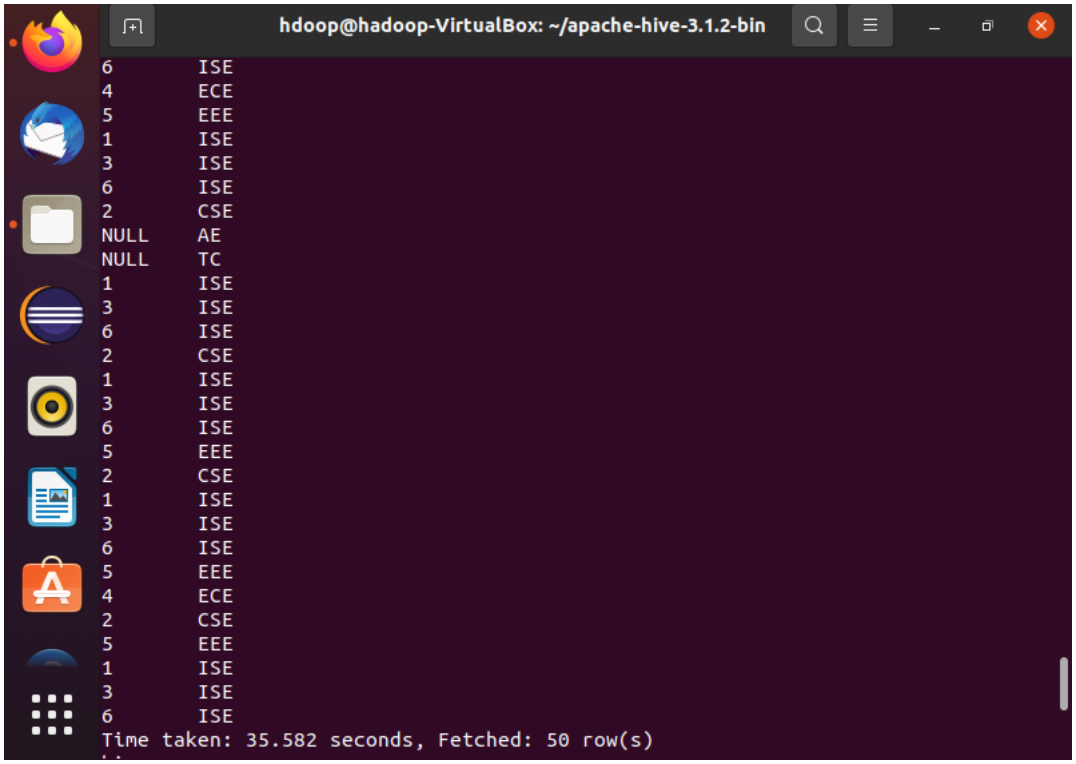




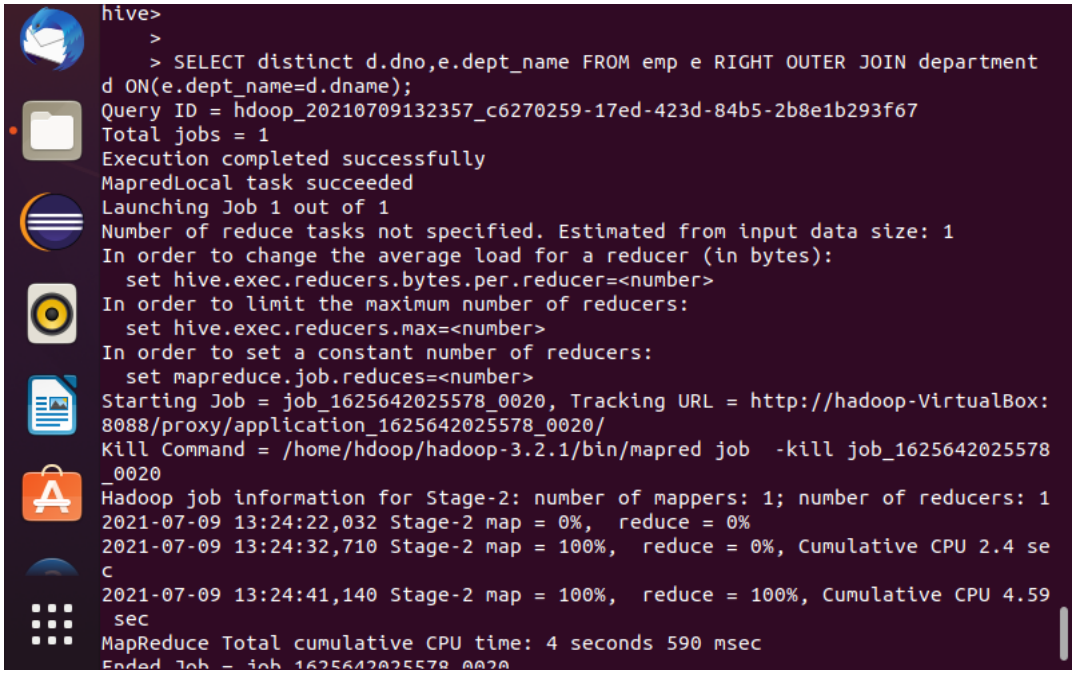
Left outer join :-

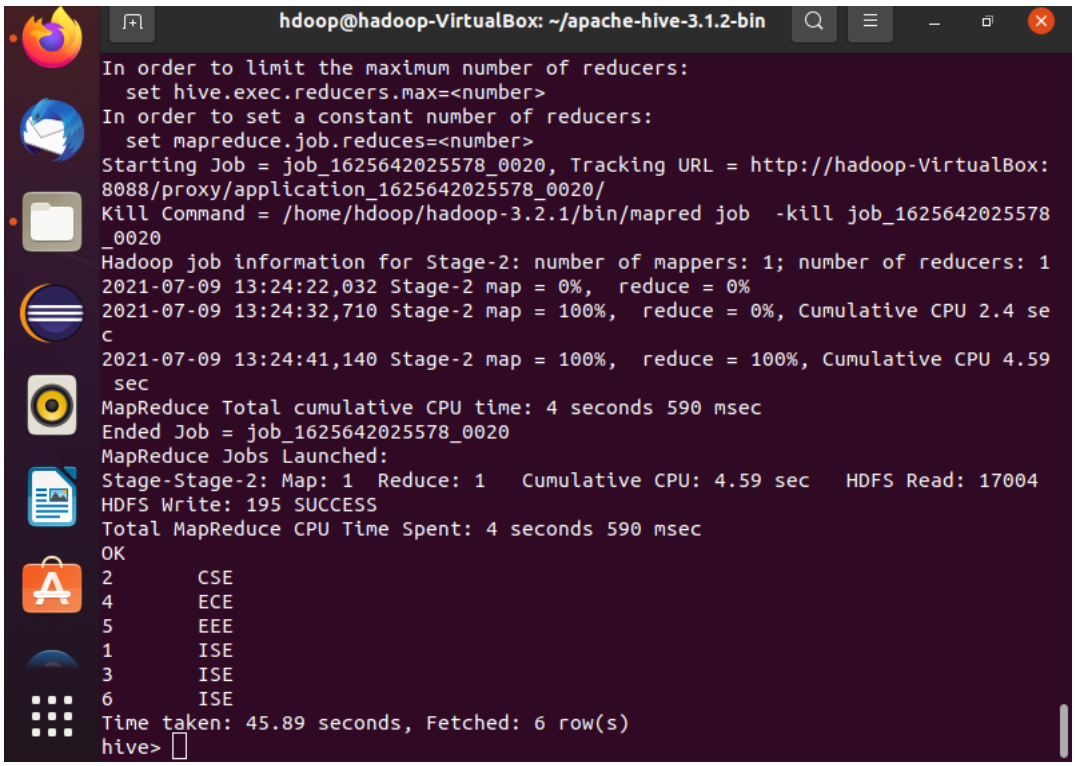

hdoop@hadoop-VirtualBox: ~/apache-hive-3.1.2-bin
Time taken: 38.923 seconds, Fetched: 50 row(s)
hive>
    >
    > SELECT d.dno,e.dept_name FROM emp e LEFT OUTER JOIN department d ON(e.dept_name=d.dname);
Query ID = hdoop_20210709132119_8c67e36c-c490-4e44-83c0-fd595d516837
Total jobs = 1
Execution completed successfully
MapredLocal task succeeded
Launching Job 1 out of 1
Number of reduce tasks is set to 0 since there's no reduce operator
Starting Job = job_1625642025578_0018, Tracking URL = http://hadoop-VirtualBox:8088/proxy/application_1625642025578_0018/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578_0018
Hadoop job information for Stage-3: number of mappers: 1; number of reducers: 0
2021-07-09 13:21:44,189 Stage-3 map = 0%, reduce = 0%
2021-07-09 13:21:52,580 Stage-3 map = 100%, reduce = 0%, Cumulative CPU 2.08 sec
MapReduce Total cumulative CPU time: 2 seconds 80 msec
Ended Job = job_1625642025578_0018
MapReduce Jobs Launched:
Stage-Stage-3: Map: 1   Cumulative CPU: 2.08 sec   HDFS Read: 10141 HDFS Write: 987 SUCCESS
Total MapReduce CPU Time Spent: 2 seconds 80 msec
OK


1 ISE
3 ISE
6 ISE
2 CSE
1 ISE
3 ISE
6 ISE
2 CSE
4 ECE
1 ISE
3 ISE
6 ISE
2 CSE
1 ISE
3 ISE
6 ISE
4 ECE
5 EEE
NULL ME
2 CSE
1 ISE
3 ISE
6 ISE
4 ECE
5 EEE
1 ISE
3 ISE



Right outer join:-


hive>
> SELECT distinct d.dno,e.dept_name FROM emp e RIGHT OUTER JOIN department
d ON(e.dept_name=d.dname);
Query ID = hdoop_20210709132357_c6270259-17ed-423d-84b5-2b8e1b293f67
Total jobs = 1
Execution completed successfully
MapredLocal task succeeded
Launching Job 1 out of 1
Number of reduce tasks not specified. Estimated from input data size: 1
In order to change the average load for a reducer (in bytes):
set hive.exec.reducers.bytes.per.reducer=<number>
In order to limit the maximum number of reducers:
set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
set mapreduce.job.reduces=<number>
Starting Job = job_1625642025578_0020, Tracking URL = http://hadoop-VirtualBox:
8088/proxy/application_1625642025578_0020/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578
_0020
Hadoop job information for Stage-2: number of mappers: 1; number of reducers: 1
2021-07-09 13:24:22,032 Stage-2 map = 0%, reduce = 0%
2021-07-09 13:24:32,710 Stage-2 map = 100%, reduce = 0%, Cumulative CPU 2.4 se
c
2021-07-09 13:24:41,140 Stage-2 map = 100%, reduce = 100%, Cumulative CPU 4.59
sec
MapReduce Total cumulative CPU time: 4 seconds 590 msec


hdoop@hadoop-VirtualBox: ~/apache-hive-3.1.2-bin
In order to limit the maximum number of reducers:
set hive.exec.reducers.max=<number>
In order to set a constant number of reducers:
set mapreduce.job.reduces=<number>
Starting Job = job_1625642025578_0020, Tracking URL = http://hadoop-VirtualBox:
8088/proxy/application_1625642025578_0020/
Kill Command = /home/hdoop/hadoop-3.2.1/bin/mapred job -kill job_1625642025578
_0020
Hadoop job information for Stage-2: number of mappers: 1; number of reducers: 1
2021-07-09 13:24:22,032 Stage-2 map = 0%, reduce = 0%
2021-07-09 13:24:32,710 Stage-2 map = 100%, reduce = 0%, Cumulative CPU 2.4 se
c
2021-07-09 13:24:41,140 Stage-2 map = 100%, reduce = 100%, Cumulative CPU 4.59
sec
MapReduce Total cumulative CPU time: 4 seconds 590 msec
Ended Job = job_1625642025578_0020
MapReduce Jobs Launched:
Stage-Stage-2: Map: 1 Reduce: 1 Cumulative CPU: 4.59 sec HDFS Read: 17004
HDFS Write: 195 SUCCESS
Total MapReduce CPU Time Spent: 4 seconds 590 msec
OK
2 CSE
4 ECE
5 EEE
1 ISE
3 ISE
6 ISE
Time taken: 45.89 seconds, Fetched: 6 row(s)
hive>