Assignment -2

AIM: Design a distributed application using MapReduce which processes a log file of a system.

Code:

1> LogFileMapper.java (Use for mapping the IP addresses from input csv file)

```
package LogFileCountry;
import java.io.IOException;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.*;

public class LogFileMapper extends MapReduceBase implements Mapper<LongWritable, Text, Text,
IntWritable> {
	private final static IntWritable one = new IntWritable(1);

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

		String valueString  =  value.toString();
		String[] SingleIpData = valueString.split("-");
		output.collect(new Text(SingleIpData[0]), one);
	}
}
```

2>LogFileReduce.java (Use for reducing data received from mapper process to final output)

```
package LogFileCountry;
import java.io.IOException;
import java.util.*;

import org.apache.hadoop.io.IntWritable;
import   org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.*;

public class LogFileReducer extends MapReduceBase implements Reducer<Text, IntWritable, Text,
IntWritable> {
	public void reduce(Text t_key, Iterator<IntWritable> values, OutputCollector<Text,IntWritable>
output, Reporter reporter) throws IOException {
		Text key = t_key;
		int frequencyForIp = 0;
		while (values.hasNext()) {
			// replace type of value with the actual type of our value
			IntWritable value = (IntWritable) values.next();
			frequencyForIp += value.get();
		}
		output.collect(key, new IntWritable(frequencyForIp));
```

```
	}
}
```

3>LogFileCountryDriver.java (The driver code to run map-reduce on hdfs)

```
package LogFileCountry;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.*;
import org.apache.hadoop.mapred.*;

public class LogFileCountryDriver {
	public static void main(String[] args) {
		JobClient my_client = new JobClient();
		// Create a configuration object for the job
		JobConf job_conf = new JobConf(LogFileCountryDriver.class);

		// Set a name of the Job
		job_conf.setJobName("LogFileIP");
		// Specify data type of output key and value
		job_conf.setOutputKeyClass(Text.class);
		job_conf.setOutputValueClass(IntWritable.class);
		// Specify names of Mapper and Reducer Class
		job_conf.setMapperClass(LogFileCountry.LogFileMapper.class);
		job_conf.setReducerClass(LogFileCountry.LogFileReducer.class);

		// Specify formats of the data type of Input and output
		job_conf.setInputFormat(TextInputFormat.class);
		job_conf.setOutputFormat(TextOutputFormat.class);

		// Set input and output directories using command line arguments,
		//arg[0] = name of input directory on HDFS, and arg[1] = name of output directory to be
created to store the output file.

		FileInputFormat.setInputPaths(job_conf, new Path(args[0]));
		FileOutputFormat.setOutputPath(job_conf, new Path(args[1]));

		my_client.setConf(job_conf);
		try {  // Run the job
			JobClient.runJob(job_conf);
		} catch (Exception e) {
			e.printStackTrace();
		}
	}
}
```

4> log_file.txt (Input file sample)

```
0.223.157.186 - - [15/Jul/2009:20:50:32 -0700] "GET /assets/js/the-associates.js HTTP/1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/home-logo.png HTTP/1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/dummy/primary-news-2.jpg HTTP/1.1" 304 -
```

10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/dummy/primary-news-1.jpg HTTP1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/home-media-block-placeholder.jpg HTTP/1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/dummy/secondary-news-4.jpg HTTP/1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/loading.gif HTTP/1.1" 304 -
10.223.157.186 - - [15/Jul/2009:20:50:33 -0700] "GET /assets/img/search-button.gif HTTP/1.1" 304 –

5> **Output** (part-00000.txt On Hadoop) (sample)

10.1.1.236	7
10.1.181.142	14
10.1.232.31	5
10.10.55.142	14
10.102.101.66	1
10.103.184.104	1
10.103.190.81	53
10.103.63.29	1
10.104.73.51	1
10.105.160.183	1
10.108.91.151	15
10.109.21.76	1
10.11.131.40	1
10.111.71.20	8
10.112.227.184	6
10.114.74.30	1
10.115.118.78	1
10.117.224.230	1

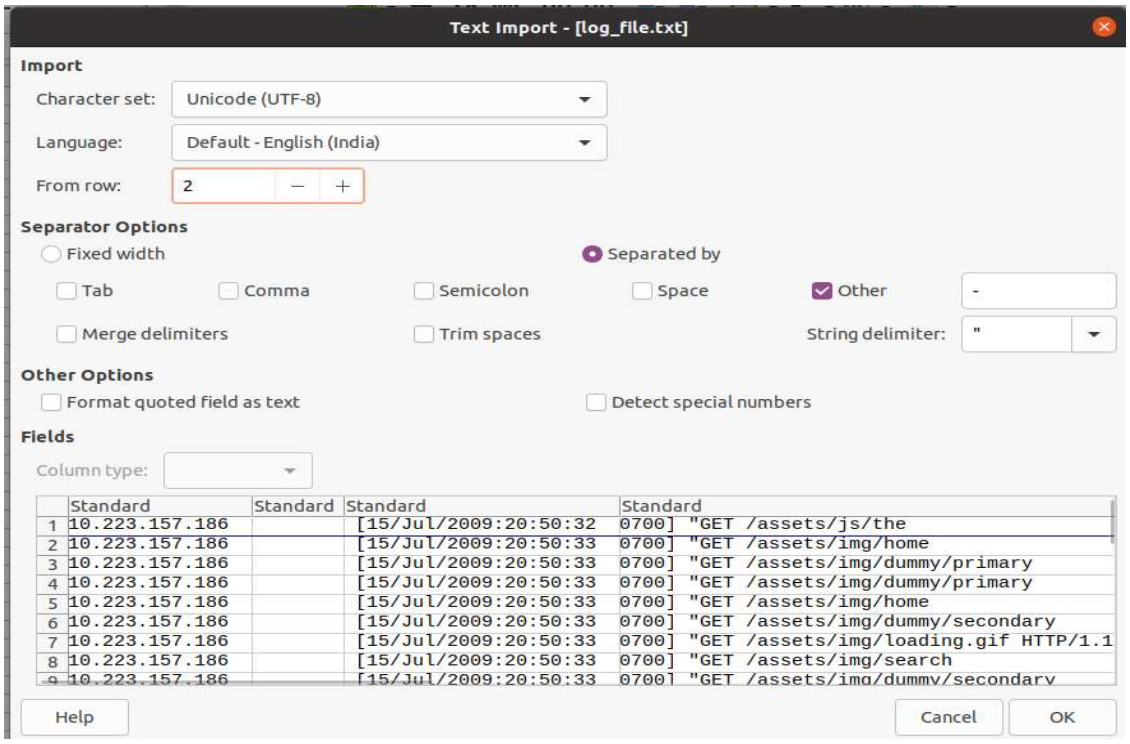
Step For Logs File Code:

13. Starting Hadoop and check if it is started.

    $ start-all.sh

14. Create folder “LogFileTut”. Copy the log_file.txt given and create the java files.
    i. LogFileMapper.java
    ii. LogFileReducer.java
    iii. LogFileCountryDriver.java

15. Convert the log_file.txt to .csv file. Open LibreOffice Calc-> Open -> log_file.txt. Save As .csv in the LogFileTut folder.



16. Give Read permission to all the files in directories.

    $ sudo chmod +r *.*

17. Set HADOOP_CLASSPATH environment variable.

    $ export HADOOP_CLASSPATH=$(hadoop classpath)

    or

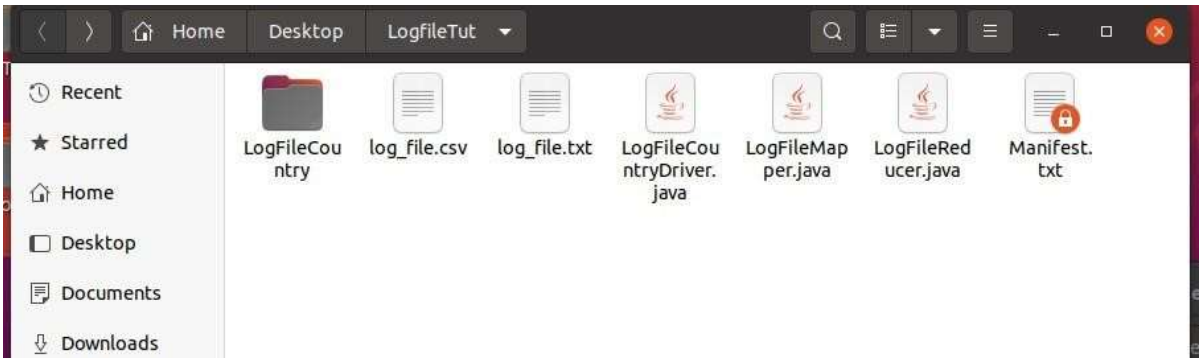
    $ export CLASSPATH=
    "$HADOOP_HOME/share/hadoop/mapreduce/hadoop-mapreduce-client-core-3.2.2.jar:
    $HADOOP_HOME/share/hadoop/mapreduce/hadoop-mapreduce-client-common-3.2.2.jar:
    $HADOOP_HOME/share/hadoop/common/hadoop-common-3.2.2.jar: $HADOOP_HOME/lib/*:
    ~/home/huser/Desktop/LogFileTut/*"

18. Compile the java code:

    $ javac -classpath $(HADOOP_CLASSPATH) -d '/home/huser/Desktop/LogFileTut/exp_classfile
    .*java

19. Create Manifest.txt file.

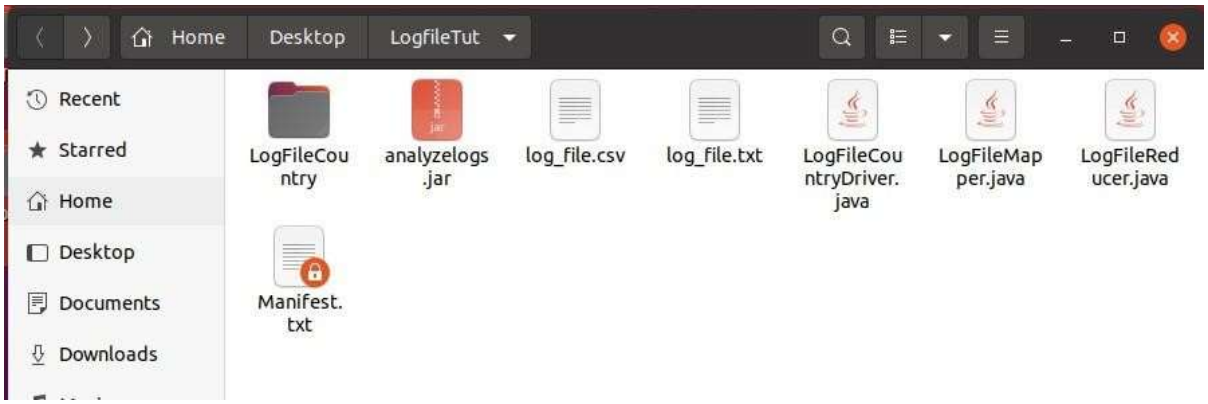
```
huser@ubuntu-college:~/Desktop/LogfileTut$ javac -d '/home/huser/Desktop/LogfileTut/exp_classfile' LogFileMa
pper.java LogFileReducer.java LogFileCountryDriver.java
huser@ubuntu-college:~/Desktop/LogfileTut$ sudo gedit Manifest.txt
[sudo] password for huser:

(gedit:59507): Tepl-WARNING **: 22:24:16.402: GVfs metadata is not supported. Fallback to TeplMetadataManage
r. Either GVfs is not correctly installed or GVfs metadata are not supported on this platform. In the latter
 case, you should configure Tepl with --disable-gvfs-metadata.
```



20. Creation .jar file of classes:

$ jar -cvfm analyzelogs.jar Manifest.txt LogFileCountry/*.class

```
huser@ubuntu-college:~/Desktop/LogfileTut$ jar -cvfm analyzelogs.jar Manifest.txt LogFileCountry/*.class
added manifest
adding: LogFileCountry/LogFileCountryDriver.class(in = 1677) (out= 825)(deflated 50%)
adding: LogFileCountry/LogFileMapper.class(in = 1713) (out= 645)(deflated 62%)
adding: LogFileCountry/LogFileReducer.class(in = 1580) (out= 635)(deflated 59%)
```



21. Create a directory on HDFS .And check on localhost:9870

$ hdfs dfs -mkdir / LogFileExp

$ hdfs dfs -mkdir / LogFileExp/Input

$ hdfs dfs -mkdir / LogFileExp/Output

22. Upload the log_file.csv in hadoop dir /LogFileExp/Input

$ hdfs dfs -put '/home/huser/Desktop/LogFileTut/log_file.csv' /LogFileExp/Input

23. Running the jar file on Hadoop.

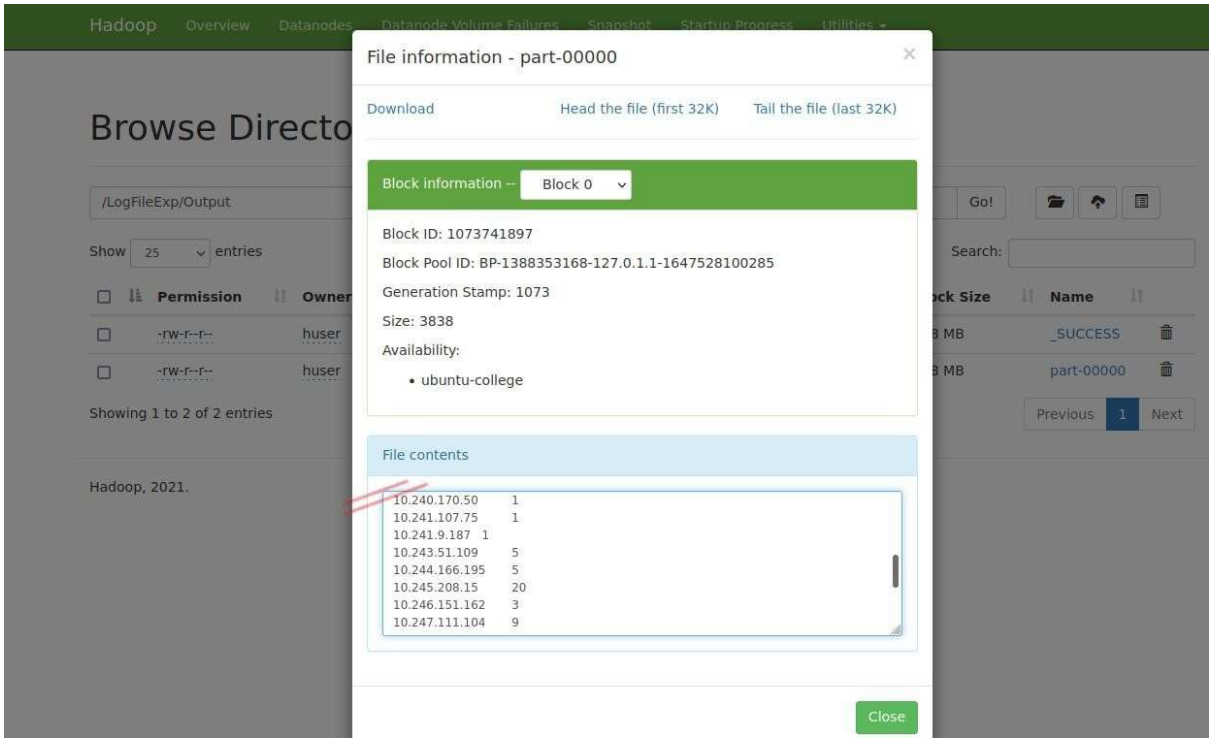
$ hadoop jar analyzelogs.jar /LogFileExp/Input /LogFileExp/Output

```
huser@ubuntu-college:~/Desktop/LogfileTut$ hadoop jar analyzelogs.jar /LogFileExp/Input /LogFileExp/Output
2022-04-12 22:51:25,988 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2022-04-12 22:51:27,403 INFO client.RMProxy: Connecting to ResourceManager at /127.0.0.1:8032
2022-04-12 22:51:35,208 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement th
e Tool interface and execute your application with ToolRunner to remedy this.
2022-04-12 22:51:36,276 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hu
ser/.staging/job_1649777619248_0001
2022-04-12 22:51:39,085 INFO mapred.FileInputFormat: Total input files to process : 1
2022-04-12 22:51:40,281 INFO mapreduce.JobSubmitter: number of splits:2
2022-04-12 22:51:40,821 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1649777619248_0001
2022-04-12 22:51:40,823 INFO mapreduce.JobSubmitter: Executing with tokens: []
2022-04-12 22:51:42,337 INFO conf.Configuration: resource-types.xml not found
2022-04-12 22:51:42,337 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2022-04-12 22:52:55,956 INFO impl.YarnClientImpl: Submitted application application_1649777619248_0001
2022-04-12 22:52:58,540 INFO mapreduce.Job: The url to track the job: http://ubuntu-college:8088/proxy/application_1649777
619248_0001/
2022-04-12 22:52:58,584 INFO mapreduce.Job: Running job: job_1649777619248_0001
2022-04-12 22:57:02,946 INFO mapreduce.Job: Job job_1649777619248_0001 running in uber mode : false
2022-04-12 22:57:03,272 INFO mapreduce.Job:  map 0% reduce 0%
2022-04-12 23:00:09,974 INFO mapreduce.Job:  map 83% reduce 0%
2022-04-12 23:00:27,106 INFO mapreduce.Job:  map 100% reduce 0%
2022-04-12 23:01:05,301 INFO mapreduce.Job:  map 100% reduce 100%
2022-04-12 23:01:08,520 INFO mapreduce.Job: Job job_1649777619248_0001 completed successfully
2022-04-12 23:01:24,647 INFO mapreduce.Job: Counters: 54
```

24. Check the Output file.

$ hdfs dfs -cat /LogFileExp/Output/part-00000

```
huser@ubuntu-college:~/Desktop/LogfileTut$ hdfs dfs -cat /LogFileExp/Output/part-00000
10.1.1.236      7
10.1.181.142    14
10.1.232.31     5
10.10.55.142    14
10.102.101.66   1
10.103.184.104  1
10.103.190.81   53
10.103.63.29    1
10.104.73.51    1
10.105.160.183  1
10.108.91.151   1
10.109.21.76    1
10.11.131.40    1
10.111.71.20    8
```



25. Stop all processes :

$ stop-all.sh