PartA: Assignment No2

Aim: Design a distributed application using MapReduce which processes log file of asystem.List out users who have logged for maximum period on the system.

Name of input file is access_log_short.csv

PARTA

1. Open Eclipse> File > New > Java Project >(Name it – MRProgramsDemo) > Next>Click on Libraries Tab>Click on Add External JARS tab

   jar FILE LOCATION
   /usr/lib/Hadoop ->select all jar files
   /usr/lib/Hadoop/client ->select all jar files

2. Right Click > New > Package (Name it - mrLogFile_demo > Finish.
3. Right Click on mrLogFile_demo Package > New > Class (Name it – UserLogDriver).

Add following code in that class

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

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

		// Set a name of the Job
		job_conf.setJobName("MaxLoggedUsers");

		// 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(UserLogMapper.class);


		job_conf.setReducerClass(UserLogReducer .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();
		}
	}
}
```

 # Save the file

4. Right Click on mrLogFile_demo Package > New > Class (Name it – `UserLogReducer`).

```
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 UserLogReducer  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 frequencyForUser = 0;
            while (values.hasNext()) {
                  // replace type of value with the actual type of our value
                  IntWritable value = (IntWritable) values.next();
                  frequencyForUser += value.get();

            }
            output.collect(key, new IntWritable(frequencyForUser));
      }
}
```

 # Save the file

5. **Right Click on mrLogFile_demo Package > New > Class (Name it – `UserLogMapper`).**

Add following code in that class

```
package MRLogFile;
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 UserLogMapper 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[] SingleUserData = valueString.split("-");
            output.collect(new Text(SingleUserData[0]), one);
      }
}
```

Save the file

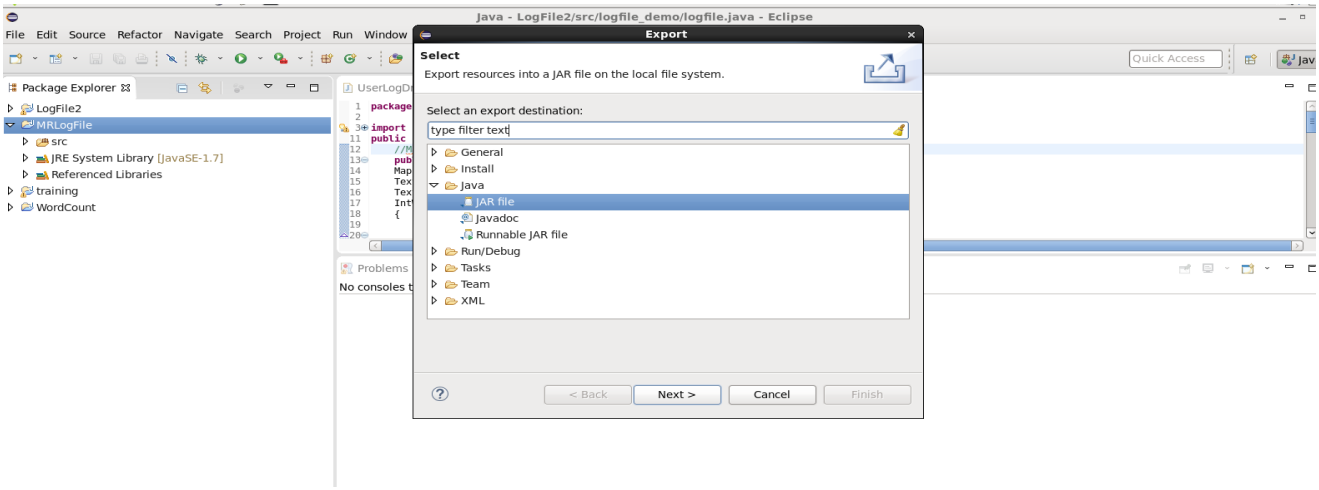
PART B

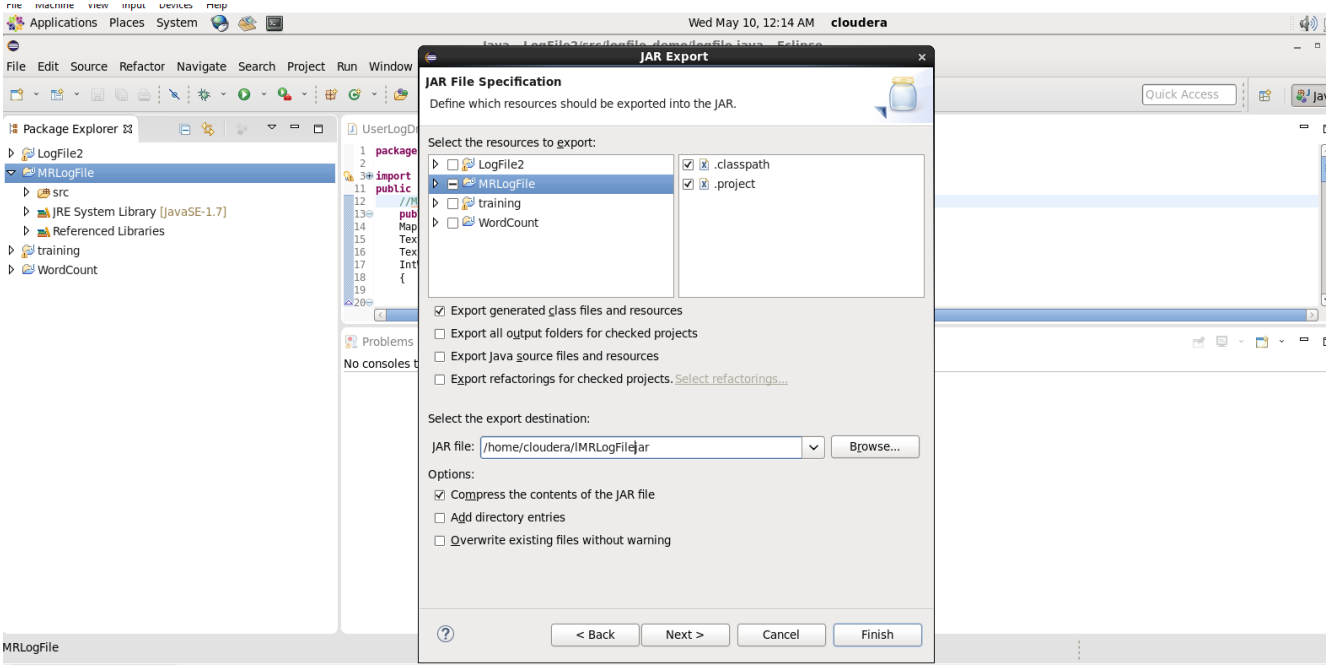
Create .jar file for your program execution :

Make a jar file

In eclipse Right click on MRLogFile Project > then select Export> Click on Java>JAR Files>Click on Next>then select export destination for JAR file as /home/Cloudera/MRlogFile.jar>Finish

*MRLogFile.jar file will get created in your /home/Cloudera/ folder





PART C:

 # Open terminal

#Check for present working Directory

```
[cloudera@quickstart ~]$ pwd
/home/cloudera
```

#Create inputfoder with name MRinputfolder1

```
[cloudera@quickstart ~]$ hdfs dfs -mkdir /MRinputfolder1
```

```
[cloudera@quickstart ~]$ hdfs dfs -ls /
Found 21 items
drwxr-xr-x   - cloudera supergroup          0 2023-05-10 00:22 /MRInputfolder
drwxr-xr-x   - cloudera supergroup          0 2023-05-10 00:29 /MRInputfolder1
drwxr-xr-x   - cloudera supergroup          0 2023-05-10 00:38
/MRoutputfolder1
drwxrwxrwx   - hdfs     supergroup          0 2017-10-23 09:15 /benchmarks
drwxr-xr-x   - hbase    supergroup          0 2023-05-10 00:02 /hbase
drwxr-xr-x   - cloudera supergroup          0 2023-05-06 01:27 /inputfolder
drwxr-xr-x   - cloudera supergroup          0 2023-05-07 23:02 /inputfolder1
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 01:45 /inputfolder5
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:10 /inputfolder8
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:13 /inputfolder9
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:31 /out10
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:38 /out11
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:50 /out14
drwxr-xr-x   - cloudera supergroup          0 2023-05-07 23:55 /out2
drwxr-xr-x   - cloudera supergroup          0 2023-05-08 03:22 /out9
drwxr-xr-x   - cloudera supergroup          0 2023-05-06 01:28 /outputfolder
drwxr-xr-x   - cloudera supergroup          0 2023-05-07 23:04 /outputfolder1
drwxr-xr-x   - solr     solr                0 2017-10-23 09:18 /solr
drwxrwxrwt   - hdfs     supergroup          0 2023-05-05 23:26 /tmp
drwxr-xr-x   - hdfs     supergroup          0 2017-10-23 09:17 /user
drwxr-xr-x   - hdfs     supergroup          0 2017-10-23 09:17 /var
```

```
[cloudera@quickstart ~]$ hdfs dfs -put
/home/cloudera/access_log_short.txt /MRInputfolder1

[cloudera@quickstart ~]$ hdfs dfs -cat
/MRInputfolder1/access_log_short.txt

[cloudera@quickstart ~]$ hadoop jar /home/cloudera/MRLogFile.jar
mrLogFile_demo.UserLogDriver /MRInputfolder1/access_log_short.txt
/MRoutputfolder1
```

```
23/05/10 00:38:06 INFO client.RMProxy: Connecting to ResourceManager at
/0.0.0.0:8032
23/05/10 00:38:06 INFO client.RMProxy: Connecting to ResourceManager at
/0.0.0.0:8032
```

```
23/05/10 00:38:07 WARN mapreduce.JobResourceUploader: Hadoop command-line
option parsing not performed. Implement the Tool interface and execute your
application with ToolRunner to remedy this.
23/05/10 00:38:07 INFO mapred.FileInputFormat: Total input paths to process :
1
23/05/10 00:38:07 WARN hdfs.DFSClient: Caught exception
java.lang.InterruptedException
      at java.lang.Object.wait(Native Method)
      at java.lang.Thread.join(Thread.java:1281)
      at java.lang.Thread.join(Thread.java:1355)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.closeResponder(DFSOutputSt
ream.java:967)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.endBlock(DFSOutputStream.j
ava:705)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.run(DFSOutputStream.java:8
94)
23/05/10 00:38:07 WARN hdfs.DFSClient: Caught exception
java.lang.InterruptedException
      at java.lang.Object.wait(Native Method)
      at java.lang.Thread.join(Thread.java:1281)
      at java.lang.Thread.join(Thread.java:1355)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.closeResponder(DFSOutputSt
ream.java:967)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.endBlock(DFSOutputStream.j
ava:705)
      at
org.apache.hadoop.hdfs.DFSOutputStream$DataStreamer.run(DFSOutputStream.java:8
94)
23/05/10 00:38:07 INFO mapreduce.JobSubmitter: number of splits:2
23/05/10 00:38:08 INFO mapreduce.JobSubmitter: Submitting tokens for job:
job_1683702103820_0001
23/05/10 00:38:08 INFO impl.YarnClientImpl: Submitted application
application_1683702103820_0001
23/05/10 00:38:08 INFO mapreduce.Job: The url to track the job:
http://quickstart.cloudera:8088/proxy/application_1683702103820_0001/
23/05/10 00:38:08 INFO mapreduce.Job: Running job: job_1683702103820_0001
23/05/10 00:38:19 INFO mapreduce.Job: Job job_1683702103820_0001 running in
uber mode : false
23/05/10 00:38:19 INFO mapreduce.Job:  map 0% reduce 0%
23/05/10 00:38:37 INFO mapreduce.Job:  map 100% reduce 0%
23/05/10 00:38:46 INFO mapreduce.Job:  map 100% reduce 100%
23/05/10 00:38:47 INFO mapreduce.Job: Job job_1683702103820_0001 completed
successfully
23/05/10 00:38:47 INFO mapreduce.Job: Counters: 49
      File System Counters
            FILE: Number of bytes read=26793
            FILE: Number of bytes written=484376
            FILE: Number of read operations=0
            FILE: Number of large read operations=0
            FILE: Number of write operations=0
            HDFS: Number of bytes read=147418
            HDFS: Number of bytes written=3838
            HDFS: Number of read operations=9
            HDFS: Number of large read operations=0
            HDFS: Number of write operations=2
      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)=28992
		Total time spent by all reduces in occupied slots (ms)=7394
		Total time spent by all map tasks (ms)=28992
		Total time spent by all reduce tasks (ms)=7394
		Total vcore-milliseconds taken by all map tasks=28992
		Total vcore-milliseconds taken by all reduce tasks=7394
		Total megabyte-milliseconds taken by all map tasks=29687808
		Total megabyte-milliseconds taken by all reduce tasks=7571456
	Map-Reduce Framework
		Map input records=1295
		Map output records=1295
		Map output bytes=24197
		Map output materialized bytes=26799
		Input split bytes=238
		Combine input records=0
		Combine output records=0
		Reduce input groups=227
		Reduce shuffle bytes=26799
		Reduce input records=1295
		Reduce output records=227
		Spilled Records=2590
		Shuffled Maps =2
		Failed Shuffles=0
		Merged Map outputs=2
		GC time elapsed (ms)=311
		CPU time spent (ms)=2690
		Physical memory (bytes) snapshot=556244992
		Virtual memory (bytes) snapshot=4519596032
		Total committed heap usage (bytes)=391979008
	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=147180
	File Output Format Counters
		Bytes Written=3838
[cloudera@quickstart ~]$ hdfs dfs -ls /MRoutputfolder1
Found 2 items
-rw-r--r--   1 cloudera supergroup          0 2023-05-10 00:38
/MRoutputfolder1/_SUCCESS
-rw-r--r--   1 cloudera supergroup       3838 2023-05-10 00:38
/MRoutputfolder1/part-00000
[cloudera@quickstart ~]$ hdfs dfs -cat /MRoutputfolder1/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
10.112.227.184   6
10.114.74.30     1
10.115.118.78    1
```

10.117.224.230 1
10.117.76.22 12
10.118.19.97 1
10.118.250.30 7
10.119.117.132 23
10.119.33.245 1
10.119.74.120 1
10.12.113.198 2
10.12.219.30 1
10.120.165.113 1
10.120.207.127 4
10.123.124.47 1
10.123.35.235 1
10.124.148.99 1
10.124.155.234 1
10.126.161.13 7
10.127.162.239 1
10.128.11.75 10
10.13.42.232 1
10.130.195.163 8
10.130.70.80 1
10.131.163.73 1
10.131.209.116 5
10.132.19.125 2
10.133.222.184 12
10.134.110.196 13
10.134.242.87 1
10.136.84.60 5
10.14.2.86 8
10.14.4.151 2
10.140.139.116 1
10.140.141.1 9
10.140.67.116 1
10.141.221.57 5
10.142.203.173 7
10.143.126.177 32
10.144.147.8 1
10.15.208.56 1
10.15.23.44 13
10.150.212.239 14
10.150.227.16 1
10.150.24.40 13
10.152.195.138 8
10.153.23.63 2
10.153.239.5 25
10.155.95.124 9
10.156.152.9 1
10.157.176.158 1
10.164.130.155 1
10.164.49.105 8
10.164.95.122 10
10.165.106.173 14
10.167.1.145 19
10.169.158.88 1
10.170.178.53 1
10.171.104.4 1
10.172.169.53 18
10.174.246.84 3
10.175.149.65 1
10.175.204.125 15
10.177.216.164 6
10.179.107.170 2
10.181.38.207 13
10.181.87.221 1

10.185.152.140	1
10.186.56.126	16
10.186.56.183	1
10.187.129.140	6
10.187.177.220	1
10.187.212.83	1
10.187.28.68	1
10.19.226.186	2
10.190.174.142	10
10.190.41.42	5
10.191.172.11	1
10.193.116.91	1
10.194.174.4	7
10.198.138.192	1
10.199.103.248	2
10.199.189.15	1
10.2.202.135	1
10.200.184.212	1
10.200.237.222	1
10.200.9.128	2
10.203.194.139	10
10.205.72.238	2
10.206.108.96	2
10.206.175.236	1
10.206.73.206	7
10.207.190.45	17
10.208.38.46	1
10.208.49.216	4
10.209.18.39	9
10.209.54.187	3
10.211.47.159	10
10.212.122.173	1
10.213.181.38	7
10.214.35.48	1
10.215.222.114	1
10.216.113.172	48
10.216.134.214	1
10.216.227.195	16
10.217.151.145	10
10.217.32.16	1
10.218.16.176	8
10.22.108.103	4
10.220.112.1	34
10.221.40.89	5
10.221.62.23	13
10.222.246.34	1
10.223.157.186	11
10.225.137.152	1
10.225.234.46	1
10.226.130.133	1
10.229.60.23	1
10.230.191.135	6
10.231.55.231	1
10.234.15.156	1
10.236.231.63	1
10.238.230.235	1
10.239.100.52	1
10.239.52.68	4
10.24.150.4	5
10.24.67.131	13
10.240.144.183	15
10.240.170.50	1
10.241.107.75	1
10.241.9.187	1

10.243.51.109 5
10.244.166.195 5
10.245.208.15 20
10.246.151.162 3
10.247.111.104 9
10.247.175.65 1
10.247.229.13 1
10.248.24.219 1
10.248.36.117 3
10.249.130.132 3
10.25.132.238 2
10.25.44.247 6
10.250.166.232 1
10.27.134.23 1
10.30.164.32 1
10.30.47.170 8
10.31.225.14 7
10.32.138.48 11
10.32.247.175 4
10.32.55.216 12
10.33.181.9 8
10.34.233.107 1
10.36.200.176 1
10.39.45.70 2
10.39.94.109 4
10.4.59.153 1
10.4.79.47 15
10.41.170.233 9
10.41.40.17 1
10.42.208.60 1
10.43.81.13 1
10.46.190.95 10
10.48.81.158 5
10.5.132.217 1
10.5.148.29 1
10.50.226.223 9
10.50.41.216 3
10.52.161.126 1
10.53.58.58 1
10.54.242.54 10
10.54.49.229 1
10.56.48.40 16
10.59.42.194 11
10.6.238.124 6
10.61.147.24 1
10.61.161.218 1
10.61.23.77 8
10.61.232.147 3
10.62.78.165 2
10.63.233.249 7
10.64.224.191 13
10.66.208.82 2
10.69.20.85 26
10.70.105.238 1
10.70.238.46 6
10.72.137.86 6
10.72.208.27 1
10.73.134.9 4
10.73.238.200 1
10.73.60.200 1
10.73.64.91 1
10.74.218.123 1
10.75.116.199 1
10.76.143.30 1

```
10.76.68.178      16
10.78.95.24       8
10.80.10.131      10
10.80.215.116     17
10.81.134.180     1
10.82.30.199      63
10.82.64.235      1
10.84.236.242     1
10.87.209.46      1
10.87.88.214      1
10.88.204.177     1
10.89.178.62      1
10.89.244.42      1
10.94.196.42      1
10.95.136.211     4
10.95.232.88      1
10.98.156.141     1
10.99.228.224     1
[cloudera@quickstart ~]$
```

OR

Goto Browser and enter
localhost:50070 and check the output in output directory.