Exp No: 10 **Date: 22/10/2024**

HADOOP

DEMONSTRATE THE MAP REDUCE PROGRAMMING MODEL BY COUNTING THE NUMBER OF WORDS IN A FILE

AIM:

To demonstrate the MAP REDUCE programming model for counting the number of words in a file.

PROCEDURE:

Step 1 - Open Terminal

$ su hduser

Password:

Step 2 - Start dfs and mapreduce services

$ cd /usr/local/hadoop/hadoop-2.7.2/sbin

$ start-dfs.sh

$ start-yarn.sh

$ jps

Step 3 - Check Hadoop through web UI

// Go to browser type http://localhost:8088 – All Applications Hadoop Cluster

// Go to browser type http://localhost:50070 – Hadoop Namenode

Step 4 – Open New Terminal

$ cd Desktop/

$ mkdir inputdata

$ cd inputdata/

$ echo “Hai, Hello, How are you? How is your health?” >> hello.txt

$ cat>> hello.txt

Step 5 – Go back to old Terminal

$ hadoop fs –copyFromLocal /home/hduser/Desktop/inputdata/hello.txt

/folder/hduser // Check in hello.txt in Namenode using Web UI

Step 6 – Download and open eclipse by creating workspace

Create a new java project.

Step 7 – Add jar to the project

You need to remove dependencies by adding jar files in the hadoop source folder. Now Click on Project tab and go to Properties.Under Libraries tab, click Add External JARs and select all the jars in the folder (click on 1st jar, and Press Shift and Click on last jat to select all jars in between and click ok)

/usr/local/hadoop/hadoop-2.7.2/share/hadoop/commonand

/usr/local/hadoop/hadoop-2.7.2/share/hadoop/mapreduce folders.

Step -8 – WordCount Program

Create 3 java files named

- WordCount.java
- WordCountMapper.java
- WordCountReducer.java

WordCount.java

```
import org.apache.hadoop.conf.Configured;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.mapred.FileInputFormat;
import org.apache.hadoop.mapred.FileOutputFormat;
import org.apache.hadoop.mapred.JobClient; import
org.apache.hadoop.mapred.JobConf;
```

```
import org.apache.hadoop.util.Tool;
import org.apache.hadoop.util.ToolRunner;
import org.apache.hadoop.io.Text;

public class WordCount extends Configured implements Tool {

@Override
public int run(String[] arg0) throws Exception {
// TODO Auto-generated method
stub if(arg0.length<2)
{

System.out.println("check the command line arguments");

}
JobConf conf=new JobConf(WordCount.class);
FileInputFormat.setInputPaths(conf, new Path(arg0[0]));
FileOutputFormat.setOutputPath(conf, new
Path(arg0[1])); conf.setMapperClass(WordMapper.class);
conf.setReducerClass(WordReducer.class);

conf.setOutputKeyClass(Text.class);
conf.setOutputValueClass(IntWritable.class);
conf.setOutputKeyClass(Text.class);
conf.setOutputValueClass(IntWritable.class);
JobClient.runJob(conf);

return 0;
```

```
}
public static void main(String args[]) throws Exception
{
int exitcode=ToolRunner.run(new WordCount(),
args); System.exit(exitcode);

}
}
```

WordCountMapper.java

```
import java.io.IOException;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.mapred.MapReduceBase;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reporter;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.Mapper;
public class WordCountMapper extends MapReduceBase implements
Mapper<LongWritable,Text,Text,IntWritable>
{
@Override
public void map(LongWritable arg0, Text arg1, OutputCollector<Text,
IntWritable> arg2, Reporter arg3)

throws IOException {
// TODO Auto-generated method stub
```

```
String s=arg1.toString();
for(String word:s.split(" "))
{

arg2.collect(new Text(word),new IntWritable(1));

}
}
}
```

WordCountReducer.java

```
import java.io.IOException;
import java.util.Iterator;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.mapred.JobConf;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reducer;
import org.apache.hadoop.mapred.Reporter;
import org.apache.hadoop.io.Text;
public class WordCountReducer implements
Reducer<Text,IntWritable,Text,IntWritable> { @Override

public void configure(JobConf arg0) {

// TODO Auto-generated method stub
}
@Override
public void close() throws IOException {
```

```
// TODO Auto-generated method stub
}
@Override

public void reduce(Text arg0, Iterator<IntWritable> arg1,
OutputCollector<Text, IntWritable> arg2, Reporter arg3)
throws IOException {
// TODO Auto-generated method
stub int count=0;
while(arg1.hasNext())
{
IntWritable i=arg1.next();
count+=i.get();
}
arg2.collect(arg0,new IntWritable(count));

}
}
```

Step 9 - Creatr JAR file

Now Click on the Run tab and click Run-Configurations. Click on New Configuration button on the left top side and Apply after filling the following properties.

Step 10 - Export JAR file

Now click on File tab and select Export. under Java, select Runnable Jar.

In Launch Config – select the config fie you created in Step 9 (WordCountConfig).

➢ Select an export destination (let's say desktop.)

➢ Under Library handling, select Extract Required Libraries into generated JAR and click Finish. ➢ Right-Click the jar file, go to Properties and under Permissions tab, Check Allow executing file

as a program. and give Read and Write access to all the users

Step 11 – Go back to old Terminal for Execution of WordCount Program $hadoop jar

wordcount.jar/usr/local/hadoop/input/usr/local/hadoop/output

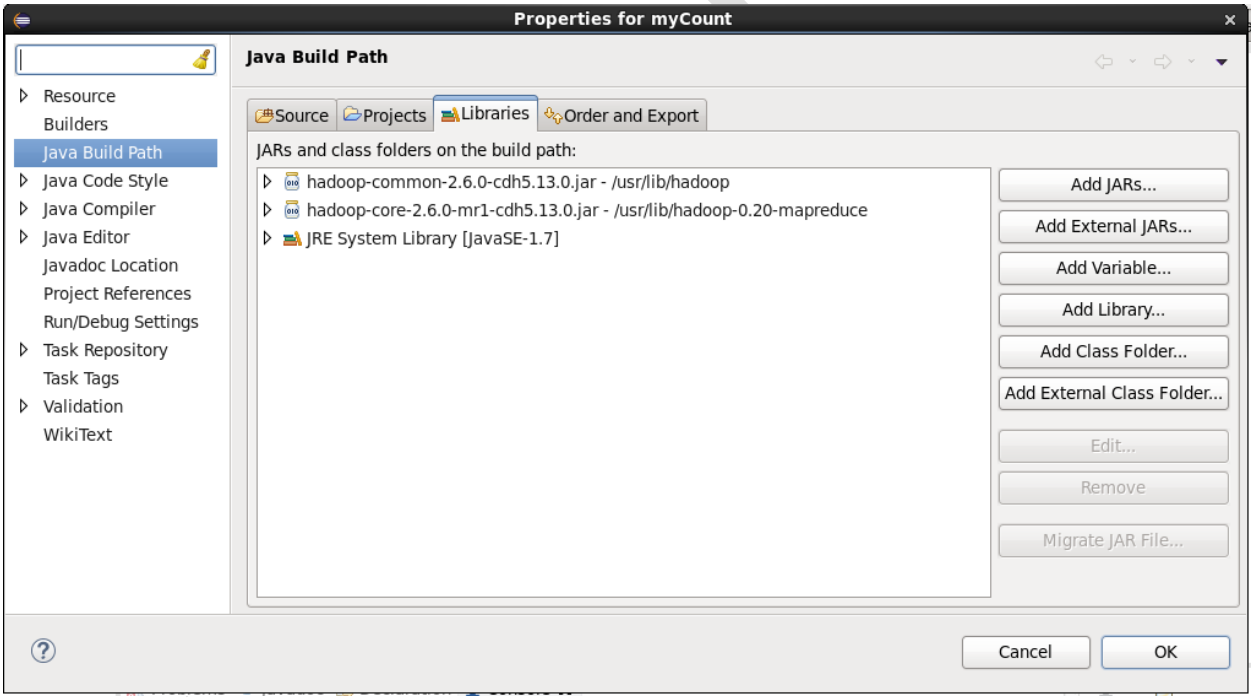
Step 12 – To view results in old Terminal

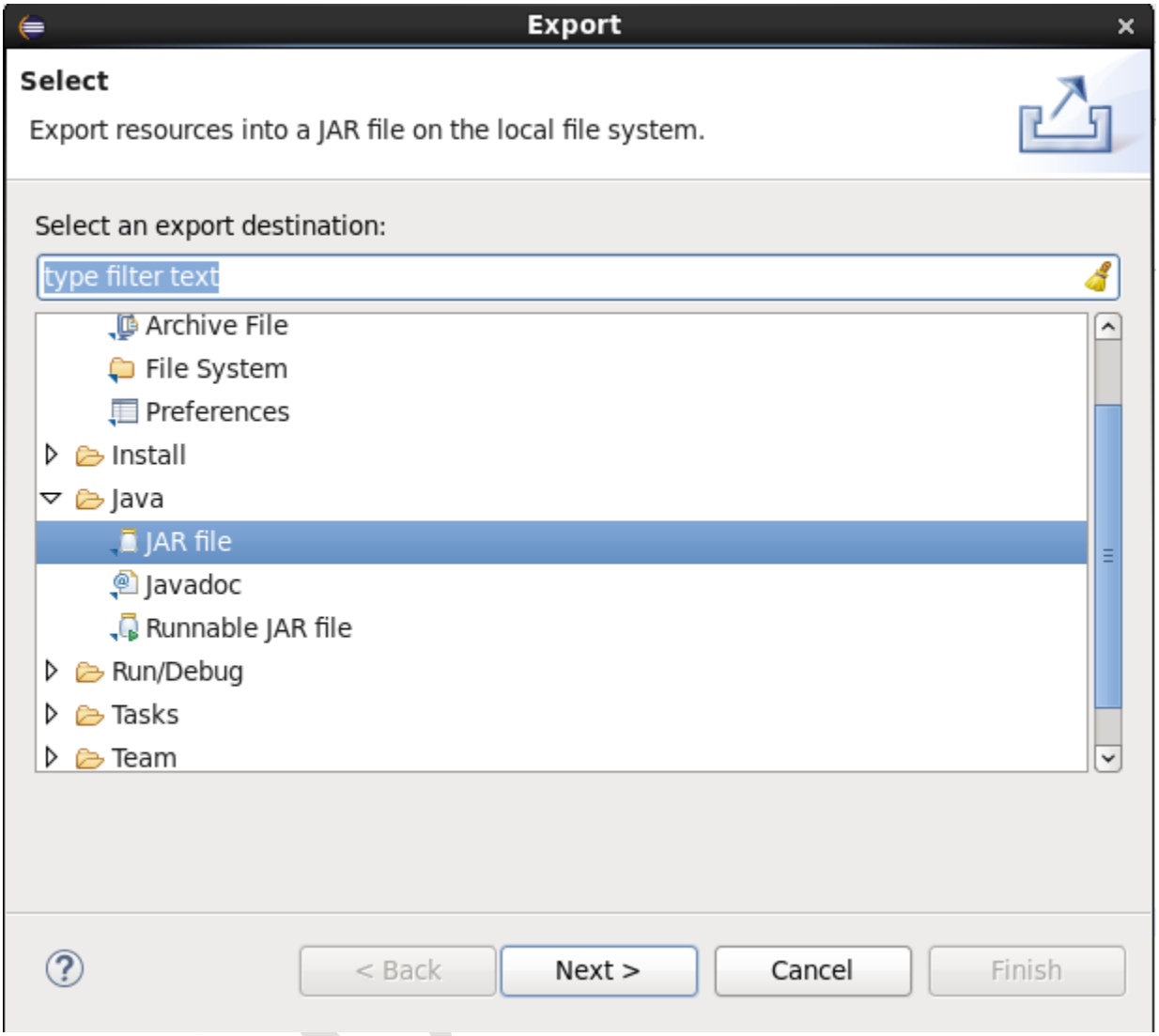
$hdfs dfs -cat /usr/local/hadoop/output/part-r-00000

Step 13 - To Remove folders created using hdfs

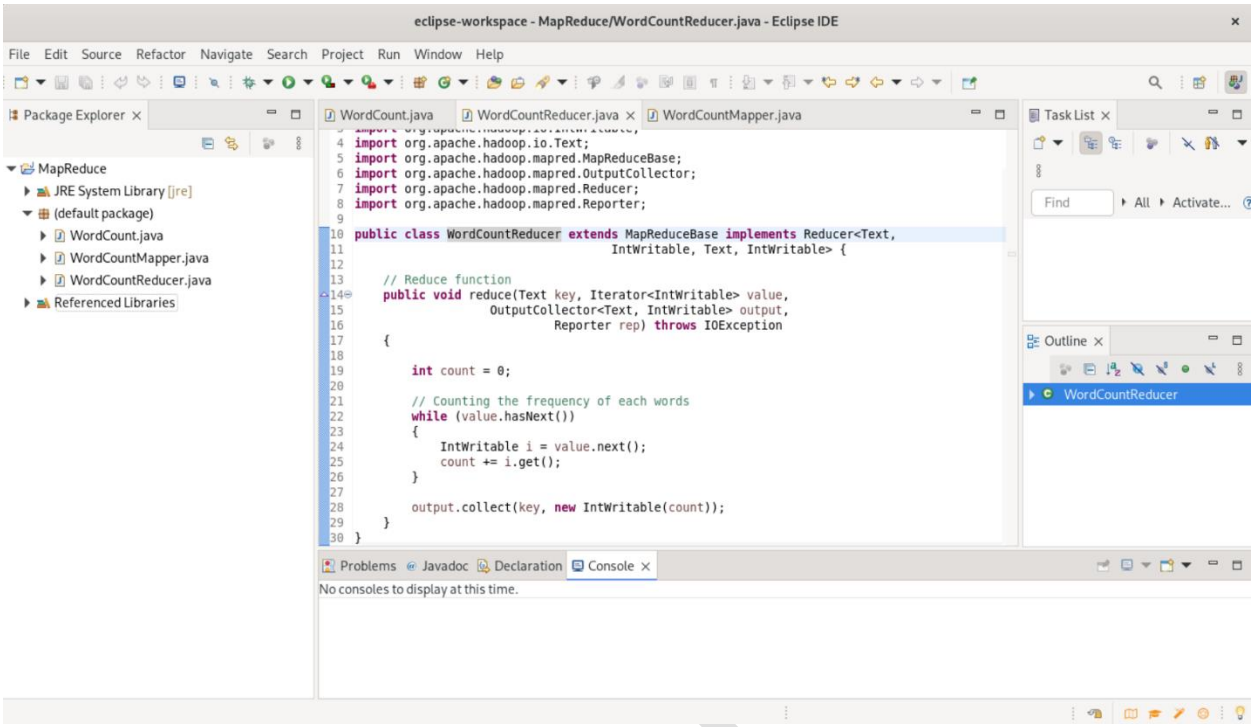
$ hdfs dfs -rm -R /usr/local/hadoop/output

OUTPUT:






```
haresh@fedora:~/Documents/CCLab$ hadoop jar WordCountV8.jar WordCount /CCLab/hello.txt output.txt
2024-11-18 11:22:41,429 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-11-18 11:22:41,558 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-11-18 11:22:41,703 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute
our application with ToolRunner to remedy this.
2024-11-18 11:22:41,758 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/haresh/.staging/job_17319085909
0_0003
2024-11-18 11:22:42,398 INFO mapred.FileInputFormat: Total input files to process : 1
2024-11-18 11:22:43,342 INFO mapreduce.JobSubmitter: number of splits:2
2024-11-18 11:22:43,592 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1731908590940_0003
2024-11-18 11:22:43,592 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-11-18 11:22:43,758 INFO conf.Configuration: resource-types.xml not found
2024-11-18 11:22:43,758 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-11-18 11:22:44,191 INFO impl.YarnClientImpl: Submitted application application_1731908590940_0003
2024-11-18 11:22:44,285 INFO mapreduce.Job: The url to track the job: http://fedora:8088/proxy/application_1731908590940_0003/
2024-11-18 11:22:44,287 INFO mapreduce.Job: Running job: job_1731908590940_0003
2024-11-18 11:22:51,546 INFO mapreduce.Job: Job job_1731908590940_0003 running in uber mode : false
2024-11-18 11:22:51,550 INFO mapreduce.Job:  map 0% reduce 0%
2024-11-18 11:22:56,863 INFO mapreduce.Job:  map 100% reduce 0%
2024-11-18 11:23:03,004 INFO mapreduce.Job:  map 100% reduce 100%
2024-11-18 11:23:05,180 INFO mapreduce.Job: Job job_1731908590940_0003 completed successfully
2024-11-18 11:23:05,554 INFO mapreduce.Job: Counters: 54
        File System Counters
```




```
haresh@fedora:~/Documents/CCLab$ hadoop fs -cat output/part-00000~
cat: `output/part-00000~': No such file or directory
haresh@fedora:~/Documents/CCLab$ hadoop fs -cat output/part-00000
cat: `output/part-00000': No such file or directory
haresh@fedora:~/Documents/CCLab$ hadoop fs -cat output.txt/part-00000
Hello,  1
How     2
are     1
health?"        1
is      1
you?    1
your    1
"Hai,   1
```

RESULT:

Map Reduce program has been successfully executed and the output has been verified.