Exp No: 10 **Date:**

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 - Create 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

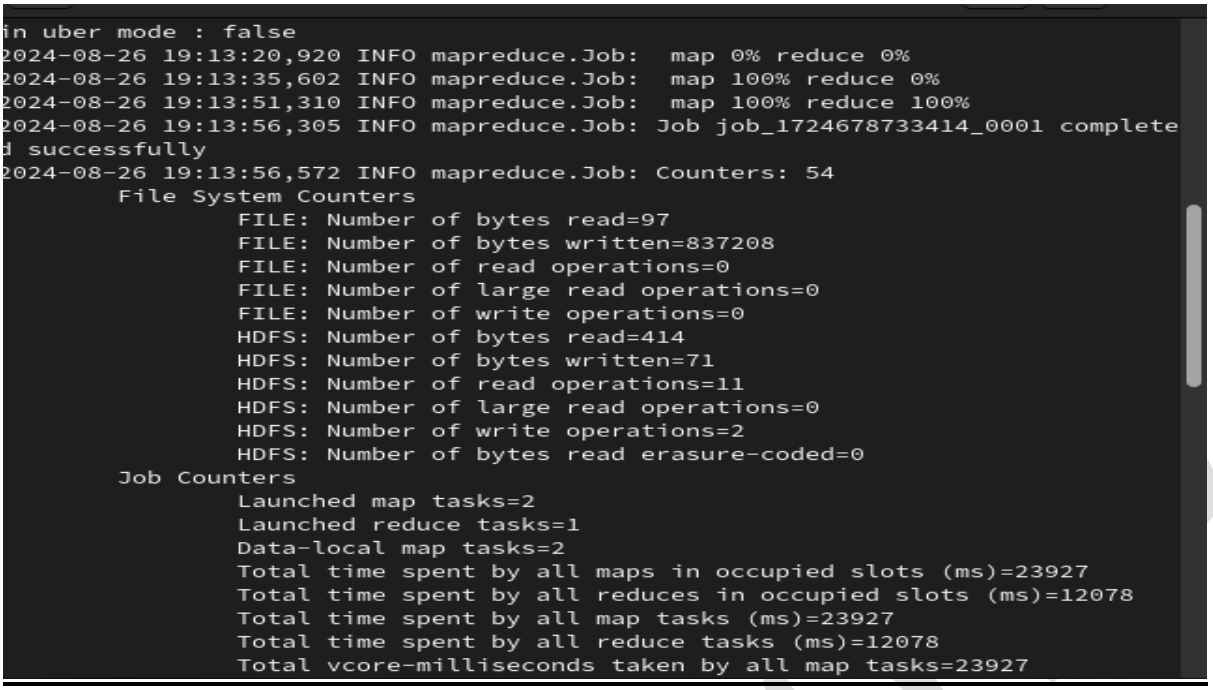
Step 12 – To view results in old Terminal
$hdfs dfs -cat /usr/local/hadoop/output/part-r-00000

Step 13 - To Remove folders created using hdfs

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

OUTPUT:

```
helen@fedora:~/exp1$ hadoop jar $HADOOP_STREAMING -input /exp1/data.txt -output /exp1/output -mapper ~/exp2/m
apper.py -reducer ~/exp3/reducer.py
packageJobJar: [/tmp/hadoop-unjar15351965686473805907/] [] /tmp/streamjob5641409443902651758.jar tmpDir=null
2024-10-12 07:43:42,110 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0
.0.0:8032
2024-10-12 07:43:42,263 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0
.0.0:8032
2024-10-12 07:43:42,414 ERROR streaming.StreamJob: Error Launching job : Output directory hdfs://localhost:90
00/exp1/output already exists
```



```
in uber mode : false
2024-08-26 19:13:20,920 INFO mapreduce.Job:  map 0% reduce 0%
2024-08-26 19:13:35,602 INFO mapreduce.Job:  map 100% reduce 0%
2024-08-26 19:13:51,310 INFO mapreduce.Job:  map 100% reduce 100%
2024-08-26 19:13:56,305 INFO mapreduce.Job: Job job_1724678733414_0001 complete
d successfully
2024-08-26 19:13:56,572 INFO mapreduce.Job: Counters: 54
        File System Counters
                FILE: Number of bytes read=97
                FILE: Number of bytes written=837208
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=414
                HDFS: Number of bytes written=71
                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)=23927
                Total time spent by all reduces in occupied slots (ms)=12078
                Total time spent by all map tasks (ms)=23927
                Total time spent by all reduce tasks (ms)=12078
                Total vcore-milliseconds taken by all map tasks=23927
```

```
harithaah@fedora:~/CC/exp2$ hdfs dfs -cat /CC/output/part-00000
B       1
CSE     1
From    1
Hello   1
Hey     1
We      1
a       1
an      1
are     1
awesome 1
be      1
ever    1
found   1
get     1
girl    2
happy   1
have    2
her     2
here    1
i       3
if      1
is      1
like    1
never   1
```

RESULT

Thus a word count program in java is implemented using Map Reduce.