LABORATORY PROGRAM – 5

Implement Wordcount program on Hadoop framework

Code & command with output:

Driver Code:

```
// Importing libraries
import java.io.IOException;
import org.apache.hadoop.conf.Configured;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
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;

public class WCDriver extends Configured implements Tool {

    public int run(String[] args) throws IOException {
        if (args.length < 2) {
            System.out.println("Please give valid inputs");
            return -1;
        }

        JobConf conf = new JobConf(WCDriver.class);
        conf.setJobName("WordCount");

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

        conf.setMapperClass(WCMapper.class);
        conf.setReducerClass(WCReducer.class);

        conf.setMapOutputKeyClass(Text.class);
        conf.setMapOutputValueClass(IntWritable.class);

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

        JobClient.runJob(conf);
        return 0;
    }

    // Main Method
    public static void main(String[] args) throws Exception {
        int exitCode = ToolRunner.run(new WCDriver(), args);
        System.out.println("Job Exit Code: " + exitCode);
    }
}
```

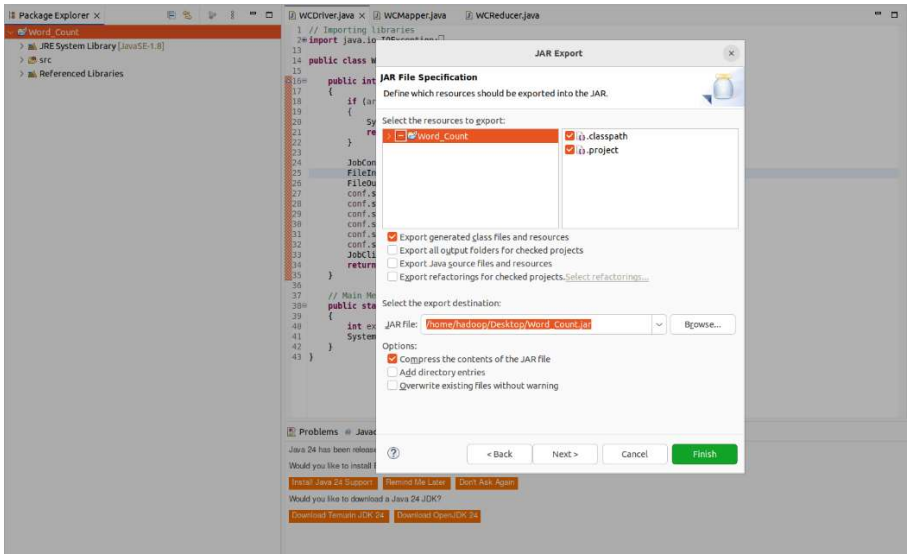
Mapper Code:

```
// Importing libraries
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.MapReduceBase;
import org.apache.hadoop.mapred.Mapper;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reporter;

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

   // Map function
   public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable> output, Reporter reporter)
         throws IOException {
      String line = value.toString();

      // Splitting the line on whitespace
      for (String word : line.split("\\s+")) {
         if (word.length() > 0) {
            output.collect(new Text(word), new IntWritable(1));
         }
      }
   }
}
```

Reducer Code:

```
// Importing libraries
import java.io.IOException;
import java.util.Iterator;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.MapReduceBase;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reducer;
import org.apache.hadoop.mapred.Reporter;

public class WCReducer extends MapReduceBase implements Reducer<Text, IntWritable, Text, IntWritable> {

   // Reduce function
   public void reduce(Text key, Iterator<IntWritable> values,
                  OutputCollector<Text, IntWritable> output,
                  Reporter reporter) throws IOException {
      int count = 0;

      // Counting the frequency of each word
      while (values.hasNext()) {
         count += values.next().get();
      }

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




```
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
localhost: namenode is running as process 7043.  Stop it first and ensure /tmp/hadoop-hadoop-namenode.pid file is empty before retry.
Starting datanodes
localhost: datanode is running as process 7227.  Stop it first and ensure /tmp/hadoop-hadoop-datanode.pid file is empty before retry.
Starting secondary namenodes [bmscecse-HP-Elite-Tower-800-G9-Desktop-PC]
bmscecse-HP-Elite-Tower-800-G9-Desktop-PC: secondarynamenode is running as process 7521.  Stop it first and ensure /tmp/hadoop-hadoop-secondarynamenode.pid file is empty before retry.
Starting resourcemanager
resourcemanager is running as process 7808.  Stop it first and ensure /tmp/hadoop-hadoop-resourcemanager.pid file is empty before retry.
Starting nodemanagers
localhost: nodemanager is running as process 7969.  Stop it first and ensure /tmp/hadoop-hadoop-nodemanager.pid file is empty before retry.
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hdfs dfs -mkdir /Lab06
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ nano file1.txt
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop fs -mkdir /rgs
mkdir: `/rgs': File exists
```

```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop fs -copyFromLocal -f /home/hadoop/Desktop/file1.txt /rgs/test.txt
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop jar /home/hadoop/Desktop/WordCount.jar wordcount.WordCount /rgs/test.txt /output
JAR does not exist or is not a normal file: /home/hadoop/Desktop/WordCount.jar
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop jar /home/hadoop/Desktop/WordCount.jar wordcount.WordCount /rgs/test.txt /output
JAR does not exist or is not a normal file: /home/hadoop/Desktop/WordCount.jar
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop jar /home/hadoop/Desktop/WordCount.jar wordcount.Word_Count /rgs/test.txt /output
JAR does not exist or is not a normal file: /home/hadoop/Desktop/WordCount.jar
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop jar /home/hadoop/Desktop/Word_Count.jar wordcount.WordCount /rgs/test.txt /output
Exception in thread "main" java.lang.ClassNotFoundException: wordcount.WordCount
        at java.base/java.net.URLClassLoader.findClass(URLClassLoader.java:476)
        at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:594)
        at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:527)
        at java.base/java.lang.Class.forName0(Native Method)
        at java.base/java.lang.Class.forName(Class.java:398)
        at org.apache.hadoop.util.RunJar.run(RunJar.java:321)
        at org.apache.hadoop.util.RunJar.main(RunJar.java:241)
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop fs -cat /output/part-00000
are     1
brother 1
family  1
hi      1
how     5
is      4
job     1
sister  1
you     1
your    4
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$ hadoop fs -ls /output
Found 2 items
-rw-r--r--   1 hadoop supergroup          0 2024-05-21 14:56 /output/_SUCCESS
-rw-r--r--   1 hadoop supergroup         69 2024-05-21 14:56 /output/part-00000
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~/Desktop$
```