#### Ex.No:3

Date:

# IMPLEMENT AN MR PROGRAM THAT PROCESSES A WEATHER DATASET

#### AIM:

Map Reduce program to that processes a weather dataset R.

### **PROCEDURE:**

- 1. Analyze the input file content.
- 2. Develop the code.
  - a. Writing a map function.
  - b. Writing a reduce function.
  - c. Writing the Driver class.
- 3. Compiling the source.
- 4. Building the JAR file.
- 5. Starting the DFS.
- 6. Creating Input path in HDFS and moving the data into Input path.
- 7. Executing the program.

```
PROGRAM:
import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.lib.output.MultipleOutputs;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;
```

public static String nyOutputName = "Newyork";

```
public static String njOutputName = "Newjersy";
       public static String ausOutputName = "Austin";
       public static String bosOutputName = "Boston";
       public static String balOutputName = "Baltimore";
       public static class WhetherForcastMapper extends
                     Mapper<Object, Text, Text, Text> {
             public void map(Object keyOffset, Text dayReport, Context con)
                            throws IOException, InterruptedException {
                     StringTokenizer strTokens = new StringTokenizer(
                                  dayReport.toString(), "\t");
                     int counter = 0;
                     Float currnetTemp = null;
                     Float minTemp = Float.MAX VALUE;
                     Float maxTemp = Float.MIN_VALUE;
                     String date = null;
                     String currentTime = null;
                     String minTempANDTime = null;
                     String maxTempANDTime = null;
                     while (strTokens.hasMoreElements()) {
                           if (counter == 0) {
                                  date = strTokens.nextToken();
                            } else {
                                  if (counter \% 2 == 1) {
                                          currentTime = strTokens.nextToken();
                                   } else {
                                          currnetTemp =
Float.parseFloat(strTokens.nextToken());
                                          if (minTemp > currnetTemp) {
                                                 minTemp = currnetTemp;
                                                 minTempANDTime = minTemp + "AND" +
currentTime;
                                          if (maxTemp < currnetTemp) {</pre>
                                                 maxTemp = currnetTemp;
                                                 maxTempANDTime = maxTemp + "AND"
+ currentTime;
                                          }
                                   }
                           counter++;
                     // Write to context - MinTemp, MaxTemp and corresponding time
                     Text temp = new Text();
                     temp.set(maxTempANDTime);
                     Text dateText = new Text();
```

```
dateText.set(date);
              try {
                      con.write(dateText, temp);
               } catch (Exception e) {
                      e.printStackTrace();
              temp.set(minTempANDTime);
              dateText.set(date);
              con.write(dateText, temp);
public static class WhetherForcastReducer extends
              Reducer<Text, Text, Text, Text> {
       MultipleOutputs<Text, Text> mos;
       public void setup(Context context) {
              mos = new MultipleOutputs<Text, Text>(context);
       public void reduce(Text key, Iterable<Text> values, Context context)
                      throws IOException, InterruptedException {
              int counter = 0;
              String reducerInputStr[] = null;
              String f1Time = "";
              String f2Time = "";
              String f1 = "", f2 = "";
              Text result = new Text();
              for (Text value : values) {
                      if (counter == 0) {
                             reducerInputStr = value.toString().split("AND");
                             f1 = reducerInputStr[0];
                             f1Time = reducerInputStr[1];
                      else {
                             reducerInputStr = value.toString().split("AND");
                             f2 = reducerInputStr[0];
                             f2Time = reducerInputStr[1];
                      counter = counter + 1;
              if (Float.parseFloat(f1) > Float.parseFloat(f2)) {
                      result = new Text("Time: " + f2Time + " MinTemp: " + f2 + "\t"
                                    + "Time: " + f1Time + " MaxTemp: " + f1);
              } else {
                      result = new Text("Time: " + f1Time + " MinTemp: " + f1 + "\t"
                             + "Time: " + f2Time + " MaxTemp: " + f2);
               }
```

```
String fileName = "";
              if (key.toString().substring(0, 2).equals("CA")) {
                     fileName = CalculateMaxAndMinTemerature.calOutputName;
              } else if (key.toString().substring(0, 2).equals("NY")) {
                     fileName = CalculateMaxAndMinTemerature.nyOutputName;
              } else if (key.toString().substring(0, 2).equals("NJ")) {
                     fileName = CalculateMaxAndMinTemerature.njOutputName;
              } else if (key.toString().substring(0, 3).equals("AUS")) {
                     fileName = CalculateMaxAndMinTemerature.ausOutputName;
              } else if (key.toString().substring(0, 3).equals("BOS")) {
                     fileName = CalculateMaxAndMinTemerature.bosOutputName;
              } else if (key.toString().substring(0, 3).equals("BAL")) {
                     fileName = CalculateMaxAndMinTemerature.balOutputName;
              String strArr[] = key.toString().split("_");
              key.set(strArr[1]);
      mos.write(fileName, key, result);
       @Override
      public void cleanup(Context context) throws IOException,
                     InterruptedException {
              mos.close();
}}
public static void main(String[] args) throws IOException,
              ClassNotFoundException, InterruptedException {
      Configuration conf = new Configuration();
      Job job = Job.getInstance(conf, "Wheather Statistics of USA");
      job.setJarByClass(CalculateMaxAndMinTemeratureWithTime.class);
      job.setMapperClass(WhetherForcastMapper.class);
      // job.setCombinerClass(IntSumReducer.class);
      job.setReducerClass(WhetherForcastReducer.class);
      job.setMapOutputKeyClass(Text.class);
      job.setMapOutputValueClass(Text.class);
      job.setOutputKeyClass(Text.class);// <hadoop,4>
      job.setOutputValueClass(Text.class);
      MultipleOutputs.addNamedOutput(job, calOutputName,
                     TextOutputFormat.class, Text.class, Text.class);
      MultipleOutputs.addNamedOutput(job, nyOutputName,
                     TextOutputFormat.class, Text.class, Text.class);
      MultipleOutputs.addNamedOutput(job, njOutputName,
                     TextOutputFormat.class, Text.class, Text.class);
      MultipleOutputs.addNamedOutput(job, bosOutputName,
                     TextOutputFormat.class, Text.class, Text.class);
      MultipleOutputs.addNamedOutput(job, ausOutputName,
                     TextOutputFormat.class, Text.class, Text.class);
      MultipleOutputs.addNamedOutput(job, balOutputName,
```

```
TextOutputFormat.class, Text.class, Text.class);

// FileInputFormat.addInputPath(job, new Path(args[0]));

// FileOutputFormat.setOutputPath(job, new Path(args[1]));

Path pathInput = new Path(

"hdfs://192.168.213.133:54310/wheatherInputData/input_temp.txt");

Path pathOutputDir = new Path(

"hdfs://192.168.213.133:54310/user/hduser1/testfs/output_mapred5");

FileInputFormat.addInputPath(job, pathInput);

FileOutputFormat.setOutputPath(job, pathOutputDir);

try {

System.exit(job.waitForCompletion(true) ? 0 : 1);

System.out.println("Job executed successfully!!");
} catch (Exception e) {

// TODO Auto-generated catch block

e.printStackTrace();
```

## **Input Dataset:**

}}}

CA_25-Jan-2014	00:12:345	15.7	01:19	:345	23.1	02:34	:542	12.3	
03:12:187	16 04:00	0:093	-14	05:12:	345	35.7	06:19	:345	23.1
07:34:542	12.3 08:17	2:187	16	09:00:	093	-7	10:12	2:345	15.7
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CA_26-Jan-2014	00:54:245	15.7	01:19	:345	23.1	02:34	:542	12.3	
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07:34:542	12.3 08:12	2:187	16	09:00:	093	-7	10:12	2:345	15.7
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CA_27-Jan-2014	00:14:045	35.7	01:19:	:345	23.1	02:34	:542	-22.3	
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03:12:187 07:34:542	16 04:00 12.3 08:12 23.1 12:34	0:093 2:187	-14 16	05:12:: 09:00:	345 093 187	35.7 -7	06:19 10:12	0:345 0:345 0:093	15.7
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AUS_29-Jan-2014	00:15:345 15.7	01:19:345 23.1	02:34:542 62.9	
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15:12:345	15.7 16:19:345	23.1 19:34:542	12.3 20:12:187	36
22:00:093	-7	23.1 17.34.342	12.5 20.12.107	30
BOS_29-Jan-2014	00:15:345 15.7	01:19:345 23.1	02:34:542 52.9	
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22:00:093	-7	23.1 19.34.342	12.3 20.12.167	10
BOS 30-Jan-2014	00:22:445 15.7	01:19:345 13.1	02:34:542 12.3	
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22:00:093	-27						
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11:19:345	23.1	12:34:542	12.3	13:12:187	16	14:00:093	-7
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07:34:542	12.3	08:12:187	16	09:00:093	-7	10:12:345	15.7
11:19:345	23.1	12:34:542	12.3	13:12:187	16	14:00:093	-17
15:12:345	-15.7	16:19:345	23.1	19:34:542	32.3	20:12:187	16
22:00:093	-17						

## **RESULT:**

Thus the Map Reduce program that processes a weather dataset R is executed successfully.

#### **OUTPUT:**

 $hduser 1 @ubuntu:/usr/local/hadoop 2.6.1/bin \$./hadoop \ fs \ -cat$ 

/user/hduser1/testfs/output\_mapred3/Austin-r-00000

25-Jan-2018 Time: 12:34:542 MinTemp: -22.3 Time: 05:12:345 MaxTemp: 35.7 26-Jan-2018 Time: 22:00:093 MinTemp: -27.0 Time: 05:12:345 MaxTemp: 55.7 27-Jan-2018 Time: 02:34:542 MinTemp: -22.3 Time: 05:12:345 MaxTemp: 55.7 29-Jan-2018 Time: 14:00:093 MinTemp: -17.0 Time: 02:34:542 MaxTemp: 62.9 30-Jan-2018 Time: 22:00:093 MinTemp: -27.0 Time: 05:12:345 MaxTemp: 49.2 31-Jan-2018 Time: 14:00:093 MinTemp: -17.0 Time: 03:12:187 MaxTemp: 56.0