Exp .No : 10 **Roll no:210701309**

IMPLEMENT THE MAX TEMPERATURE MAPREDUCE PROGRAM TO IDENTIFY THE YEAR WISE MAXIMUM TEMPERATURE FROM SENSOR

AIM:

To implement the max temperature Mapreduce program to identify the year wise maximum temperature from sensor.

PROCEDURE:

Step 1: Create Data File:

Create a file named "sample_weather.txt" and populate it with text data that you wish to analyse.

```
690190 13910 20060201_0 51.75   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_1 54.74   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_2 50.59   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_3 51.67   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_4 65.67   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_5 55.37   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_6 49.26   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_7 55.44   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_8 64.05   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_9 68.77   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_10 48.93   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_11 65.37   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_12 69.45   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_13 52.91   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_14 53.69   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_15 53.30   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_16 66.17   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_17 53.83   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_18 50.54   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
690190 13910 20060201_19 50.27   33.0 24 1006.3 24  943.9 24  15.0 24  10.7 24  22.0  28.9  0.00I 999.9 000000
```

Step 2: Mapper Logic - mapper.py:

Create a file named "mapper.py" to implement the logic for the mapper. The mapper will read input data from STDIN, split lines into words, and output each word with its count.

mapper.py:

```
#!/usr/bin/python3
import sys
def map1():
    for line in sys.stdin:
        tokens = line.strip().split()
        if len(tokens) < 13:
            continue
        station = tokens[0]
        if "STN" in station:
            continue
        date_hour = tokens[2]
        temp  =  tokens[3]
        dew = tokens[4]
        wind = tokens[12]
        if temp == "9999.9" or dew == "9999.9" or wind == "999.9":
            continue
```

```
        hour = int(date_hour.split("_")[-1])
        date = date_hour[:date_hour.rfind("_")-2]
        if 4 < hour <= 10:
            section = "section1"
        elif 10 < hour <= 16:
            section = "section2"
        elif 16 < hour <= 22:
            section = "section3"
        else:
            section = "section4"
        key_out = f"{station}_{date}_{section}"
        value_out = f"{temp} {dew} {wind}"
        print(f"{key_out}\t{value_out}")
if __name__== "__main__":
    map1()
```

Step 3: Reducer Logic - reducer.py:
Create a file named "reducer.py" to implement the logic for the reducer. The reducer will aggregate the occurrences of each word and generate the final output.

reducer.py:

```
#!/usr/bin/python3
import sys
def reduce1():
    current_key = None
    sum_temp, sum_dew, sum_wind = 0, 0, 0
    count = 0
    for line in sys.stdin:
        key, value = line.strip().split("\t")
        temp, dew, wind = map(float, value.split())
        if current_key is None:
            current_key = key
        if key == current_key:
            sum_temp += temp
            sum_dew += dew
            sum_wind += wind
            count += 1
        else:
            avg_temp = sum_temp / count
            avg_dew = sum_dew / count
            avg_wind = sum_wind / count
            print(f"{current_key}\t{avg_temp} {avg_dew} {avg_wind}")

            current_key = key
            sum_temp, sum_dew, sum_wind = temp, dew, wind
            count = 1
    if current_key is not None:
        avg_temp = sum_temp / count
        avg_dew = sum_dew / count
        avg_wind = sum_wind / count
        print(f"{current_key}\t{avg_temp} {avg_dew} {avg_wind}")
```

```
if __name__ == "__main__":
    reduce1()
```

Step 4: Prepare Hadoop Environment:

Start the Hadoop daemons and create a directory in HDFS to store your data. Run the following commands to store the data in the WeatherData Directory.

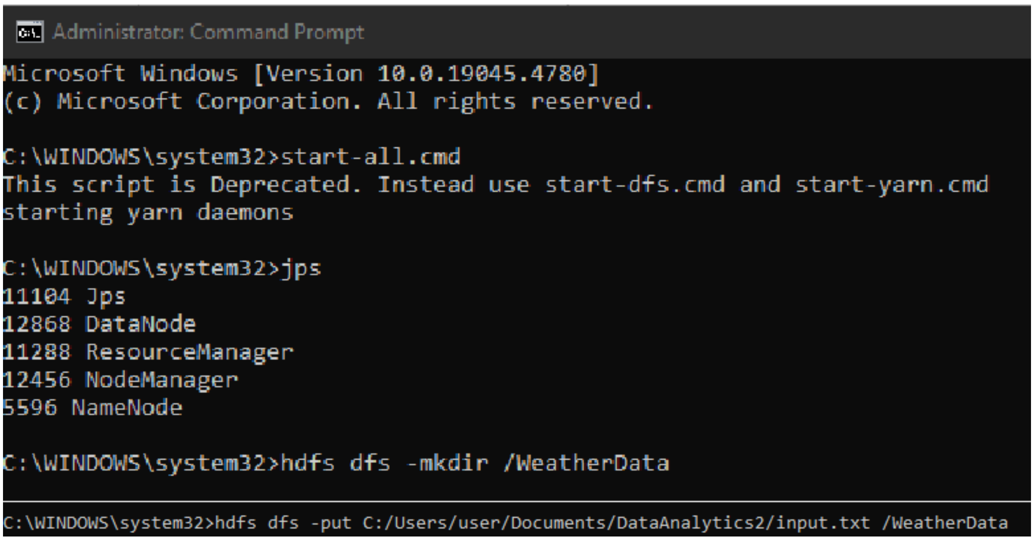
start-all.cmd
cd C:/Hadoop/sbin
hdfs dfs -mkdir /WeatherData
hdfs dfs -put C:/Users/user/Documents/DataAnalytics2/input.txt /WeatherData
hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.6.jar ^
-input /user/input/sample_weather.txt ^
-output /user/output ^
-mapper "python C:/ Users/user/Documents/DataAnalytics2/mapper.py" ^
-reducer "python C:/ Users/user/Documents/DataAnalytics2/reducer.py"

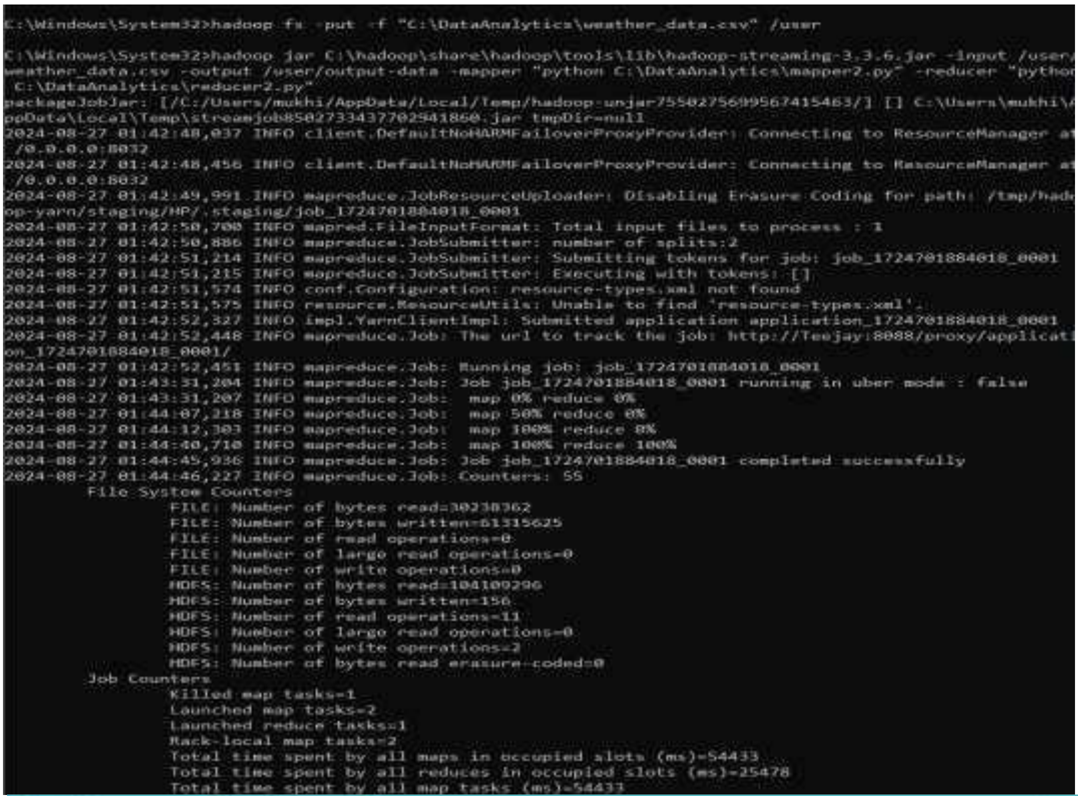
Step 5: Check Output:

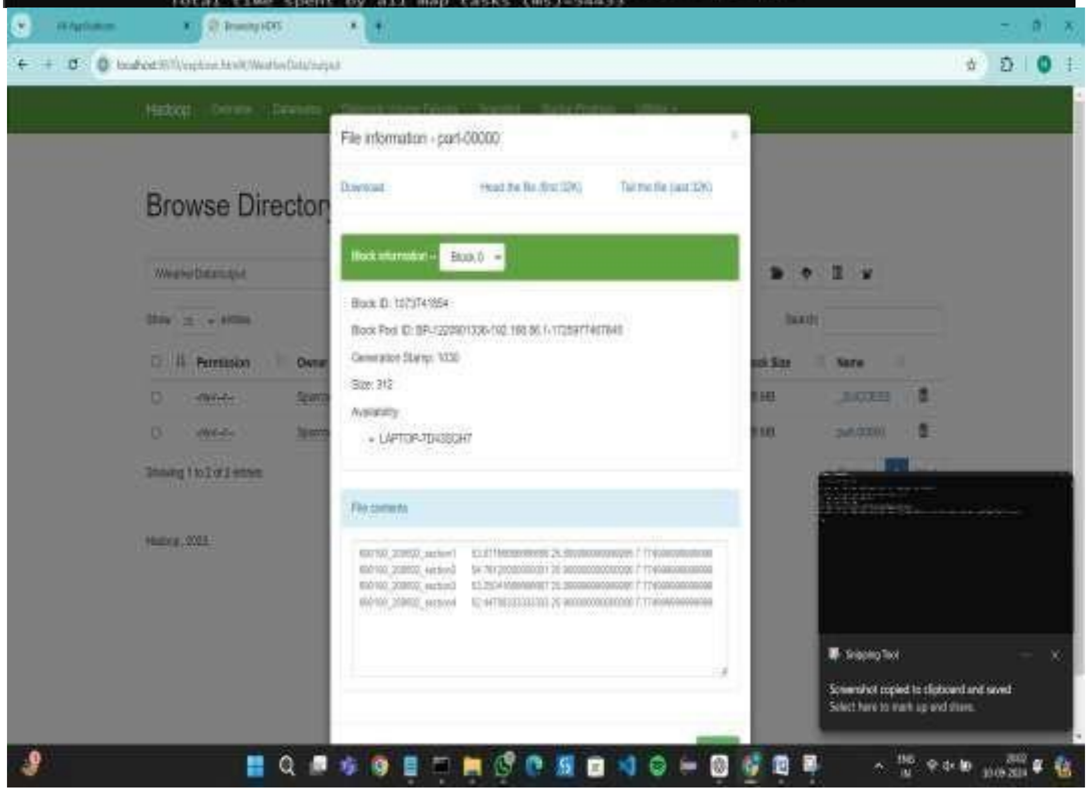
Check the output of the Word Count program in the specified HDFS output directory.

hdfs dfs -cat /WeatherData/output/part-00000

OUTPUT:







RESULT:

Thus, the Mapreduce program to identify the year wise maximum temperature from sensor has been executed successfully.