EXP 3: Map Reduce program to process a weather dataset.

AIM:

To implement MapReduce program to process a weather dataset.

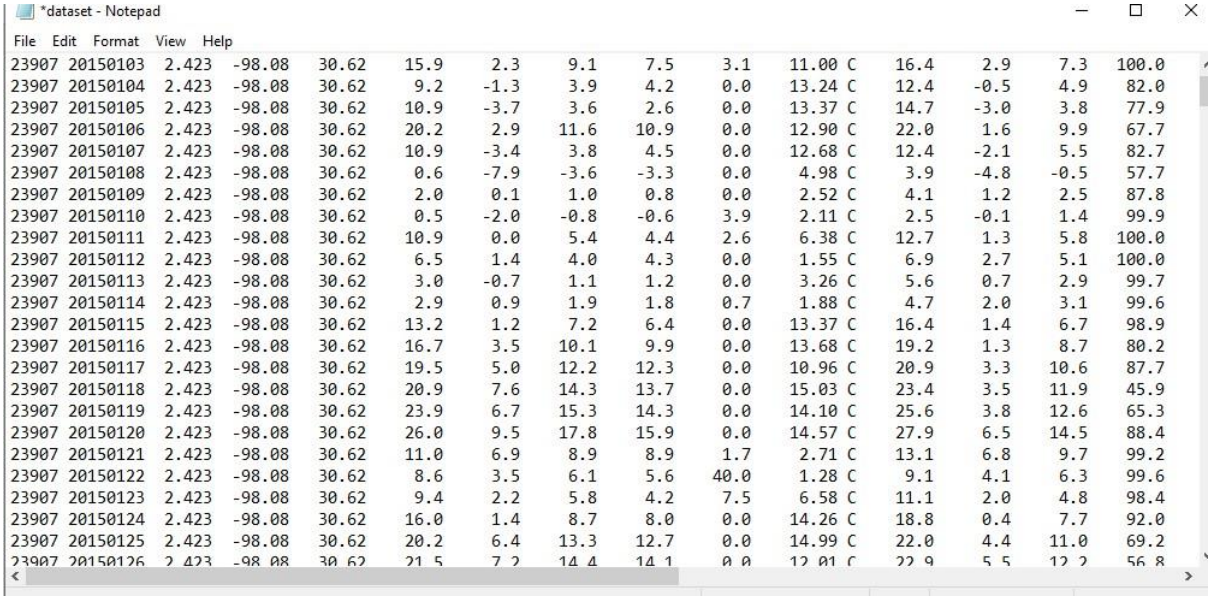
Procedure:

Step 1: Create Data File:

Create a file named "word_count_data.txt" and populate it with text data that you wish to analyse.
Login with your hadoop user.

Download the dataset (weather data)

Output:



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.

```
nano mapper.py
# Copy and paste the mapper.py code
```

```
#!/usr/bin/env python

import sys

# input comes from STDIN (standard input)
# the mapper will get daily max temperature and group it by month. so output will be (month,dailymax_temperature)

for line in sys.stdin:
```

```
    # remove leading and trailing whitespace
    line = line.strip()     #
 split the line into words
 words = line.split()
    #See the README hosted on the weather website  which help us understand how each
 position represents a column      month = line[10:12]      daily_max = line[38:45]
 daily_max = daily_max.strip()
    # increase counters
 for word in words:
        # write the results to STDOUT (standard output);
        # what we output here will be go through the shuffle proess and then
        # be the input for the Reduce step, i.e. the input for reducer.py
        #
        # tab-delimited; month and daily max temperature as output
 print ('%s\t%s' % (month ,daily_max))
```

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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.

```
nano reducer.py
# Copy and paste the reducer.py code
```

reducer.py

```
 #!/usr/bin/env python

 from operator import itemgetter import
 sys
 #reducer will get the input from stdid which will be a collection of key, value(Key=month ,
 value= daily max temperature)
 #reducer logic: will get all the daily max temperature for a month and find max temperature
 for the month
 #shuffle will ensure that key are sorted(month)
 current_month = None
 current_max = 0 month
 = None

 # input comes from STDIN for
 line in sys.stdin:
    # remove leading and trailing whitespace
 line = line.strip()
    # parse the input we got from mapper.py
 month, daily_max = line.split('\t', 1)
```

```
   # convert daily_max (currently a string) to float
try:
      daily_max = float(daily_max)
except ValueError:
      # daily_max was not a number, so silently
      # ignore/discard this line
continue

   # this IF-switch only works because Hadoop shuffle process sorts map output
   # by key (here: month) before it is passed to the reducer
if current_month == month:        if daily_max >
current_max:            current_max = daily_max     else:
if current_month:
         # write result to STDOUT
         print ('%s\t%s' % (current_month, current_max))
current_max = daily_max
      current_month = month

# output of the last month if current_month ==
month:     print ('%s\t%s' % (current_month,
current_max))
```

Step 4: Prepare Hadoop Environment:

Start the Hadoop daemons and create a directory in HDFS to store your data.

```
start-all.sh
```

Step 6: Make Python Files Executable:

Give executable permissions to your mapper.py and reducer.py files.

```
chmod 777 mapper.py reducer.py
```

Step 7: Run the program using Hadoop Streaming:

Download the latest hadoop-streaming jar file and place it in a location you can easily access.

Then run the program using Hadoop Streaming.

```
hadoop fs -mkdir -p /weatherdata

hadoop fs -copyFromLocal /home/sx/Downloads/dataset.txt /weatherdata

hdfs dfs -ls /weatherdata
```

```
hadoop jar /home/sx/hadoop-3.2.3/share/hadoop/tools/lib/hadoop-streaming-3.2.3.jar \
  -input /weatherdata/dataset.txt \
  -output /weatherdata/output \
  -file "/home/sx/Downloads/mapper.py" \
  -mapper "python3 mapper.py" \
  -file "/home/sx/Downloads/reducer.py" \
  -reducer "python3 reducer.py"

hdfs dfs -text /weatherdata/output/* > /home/sx/Downloads/outputfile.txt
```

Step 8: Check Output:

```
hadoop@ubuntu:~$ hdfs dfs -cat /weatherdata/output3/part-00000
690190_200602_section1  53.87166666666665 25.900000000000006 7.774999999999995
690190_200602_section2  54.76125 25.900000000000006 7.774999999999998
690190_200602_section3  53.25041666666666 25.900000000000006 7.774999999999998
690190_200602_section4  52.44708333333333 25.900000000000002 7.774999999999998
```

After copy and paste the above output in your local file give the below command to remove the directory from hdfs : hadoop fs -rm -r /weatherdata/output

Result:

Thus, the program for weather dataset using Map Reduce has been executed successfully.