EX: 03 **REG.NO**:210701290

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:

File Edit Form	nt View He	do											
23907 201501		-98.08	30.62	15.9	2.3	9.1	7.5	3.1	11.00 C	16.4	2.9	7.3	100.0
23907 201501		-98.08	30,62	9.2	-1.3	3.9	4.2	0.0	13.24 C	12.4	-0.5	4.9	82.0
23907 201501		-98.08	30,62	10.9	-3.7	3.6	2.6	0.0	13.37 C	14.7	-3.0	3.8	77.9
23907 201501		-98.08	30.62	20.2	2.9	11.6	10.9	0.0	12.90 C	22.0	1.6	9.9	67.7
23907 201501		-98.08	30.62	10.9	-3.4	3.8	4.5	0.0	12.68 C	12.4	-2.1	5.5	82.7
23907 201501		-98.08	30.62	0.6	-7.9	-3.6	-3.3	0.0	4.98 C	3.9	-4.8	-0.5	57.7
23907 201501	9 2,423	-98.08	30.62	2.0	0.1	1.0	0.8	0.0	2.52 C	4.1	1.2	2.5	87.8
23907 201501	10 2.423	-98.08	30.62	0.5	-2.0	-0.8	-0.6	3.9	2.11 C	2.5	-0.1	1.4	99.9
23907 201501		-98.08	30.62	10.9	0.0	5.4	4.4	2.6	6.38 C	12.7	1.3	5.8	100.0
3907 201501	2.423	-98.08	30.62	6.5	1.4	4.0	4.3	0.0	1.55 C	6.9	2.7	5.1	100.0
3907 201501	13 2.423	-98.08	30.62	3.0	-0.7	1.1	1.2	0.0	3.26 C	5.6	0.7	2.9	99.7
3907 201501	14 2.423	-98.08	30.62	2.9	0.9	1.9	1.8	0.7	1.88 C	4.7	2.0	3.1	99.6
23907 201501	15 2.423	-98.08	30.62	13.2	1.2	7.2	6.4	0.0	13.37 C	16.4	1.4	6.7	98.9
23907 201501	16 2.423	-98.08	30.62	16.7	3.5	10.1	9.9	0.0	13.68 C	19.2	1.3	8.7	80.2
23907 201501	17 2.423	-98.08	30.62	19.5	5.0	12.2	12.3	0.0	10.96 C	20.9	3.3	10.6	87.7
3907 201501	18 2.423	-98.08	30.62	20.9	7.6	14.3	13.7	0.0	15.03 C	23.4	3.5	11.9	45.9
3907 201501	19 2.423	-98.08	30.62	23.9	6.7	15.3	14.3	0.0	14.10 C	25.6	3.8	12.6	65.3
23907 201501	20 2.423	-98.08	30.62	26.0	9.5	17.8	15.9	0.0	14.57 C	27.9	6.5	14.5	88.4
23907 201501	2.423	-98.08	30.62	11.0	6.9	8.9	8.9	1.7	2.71 C	13.1	6.8	9.7	99.2
23907 201501	22 2.423	-98.08	30.62	8.6	3.5	6.1	5.6	40.0	1.28 C	9.1	4.1	6.3	99.6
23907 201501	23 2.423	-98.08	30.62	9.4	2.2	5.8	4.2	7.5	6.58 C	11.1	2.0	4.8	98.4
23907 201501	24 2.423	-98.08	30.62	16.0	1.4	8.7	8.0	0.0	14.26 C	18.8	0.4	7.7	92.0
23907 201501	25 2.423	-98.08	30.62	20.2	6.4	13.3	12.7	0.0	14.99 C	22.0	4.4	11.0	69.2
23907 201501 (6 2 423	-98 AR	30 62	21 5	7 2	14 4	14 1	a a	12 A1 C	22 9	ςς	12.2	56.8

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)
Download the dataset (weather data)
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))
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 5: Make Python Files Executable:

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

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

Step 6: 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 7: Check Output:

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

hdfs dfs -text /weatherdata/output/* > /home/sx/Downloads/output/

/part-00000

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.