Exp No 3

Map Reduce program to process a weather dataset

Aim:

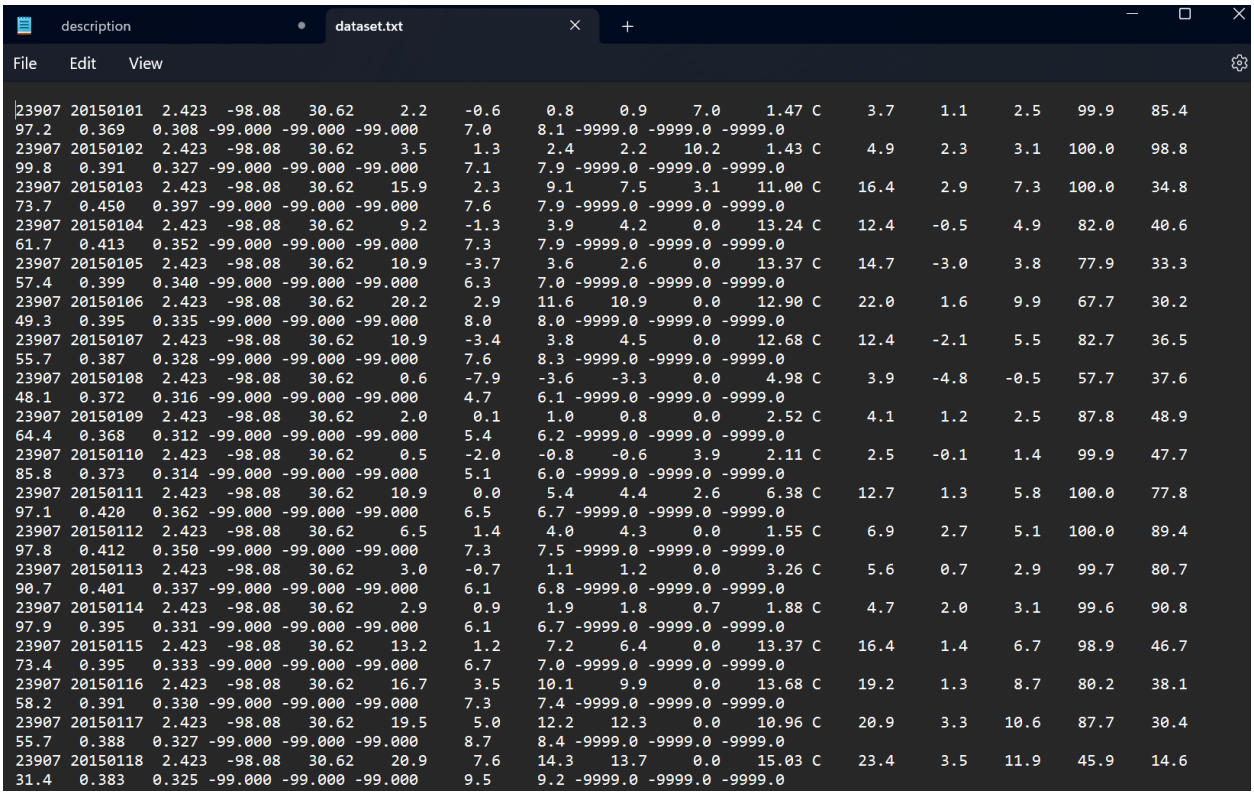
To implement MapReduce program to process a weather dataset.

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.



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))
```

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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 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

```
kvnk@kv8604:~$ hdfs dfs -cat /weatherdata/output/part-00000
2024-11-22 00:32:09,269 WARN util.NativeCodeLoader: Unable to lo
sses where applicable
01      26.5
02      26.6
03      29.1
04      30.8
05      31.1
06      33.6
07      38.5
08      40.2
09      36.5
10      36.9
11      27.6
12      25.9
```

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.