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)

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.

```
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.

```
#!/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.

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.

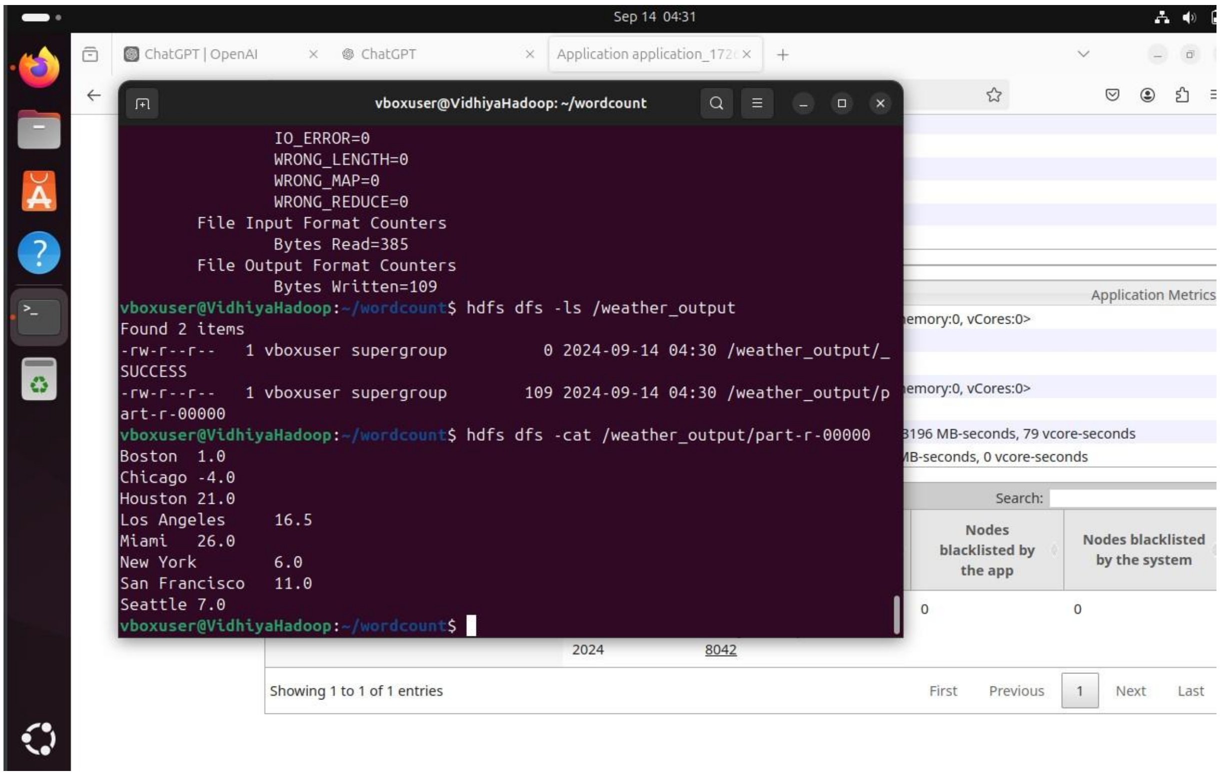
```
hadoop fs -mkdir -p /weatherdata

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:

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



```
                IO_ERROR=0
                WRONG_LENGTH=0
                WRONG_MAP=0
                WRONG_REDUCE=0
        File Input Format Counters
                Bytes Read=385
        File Output Format Counters
                Bytes Written=109
vboxuser@VidhiyaHadoop:~/wordcount$ hdfs dfs -ls /weather_output
Found 2 items
-rw-r--r--   1 vboxuser supergroup          0 2024-09-14 04:30 /weather_output/_
SUCCESS
-rw-r--r--   1 vboxuser supergroup        109 2024-09-14 04:30 /weather_output/p
art-r-00000
vboxuser@VidhiyaHadoop:~/wordcount$ hdfs dfs -cat /weather_output/part-r-00000
Boston  1.0
Chicago -4.0
Houston 21.0
Los Angeles     16.5
Miami   26.0
New York        6.0
San Francisco   11.0
Seattle 7.0
vboxuser@VidhiyaHadoop:~/wordcount$
```

Result:

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