Exp.No.: 3 Map Reduce program to process a weather dataset

AIM:

To implement MapReduce program to process a weather dataset.

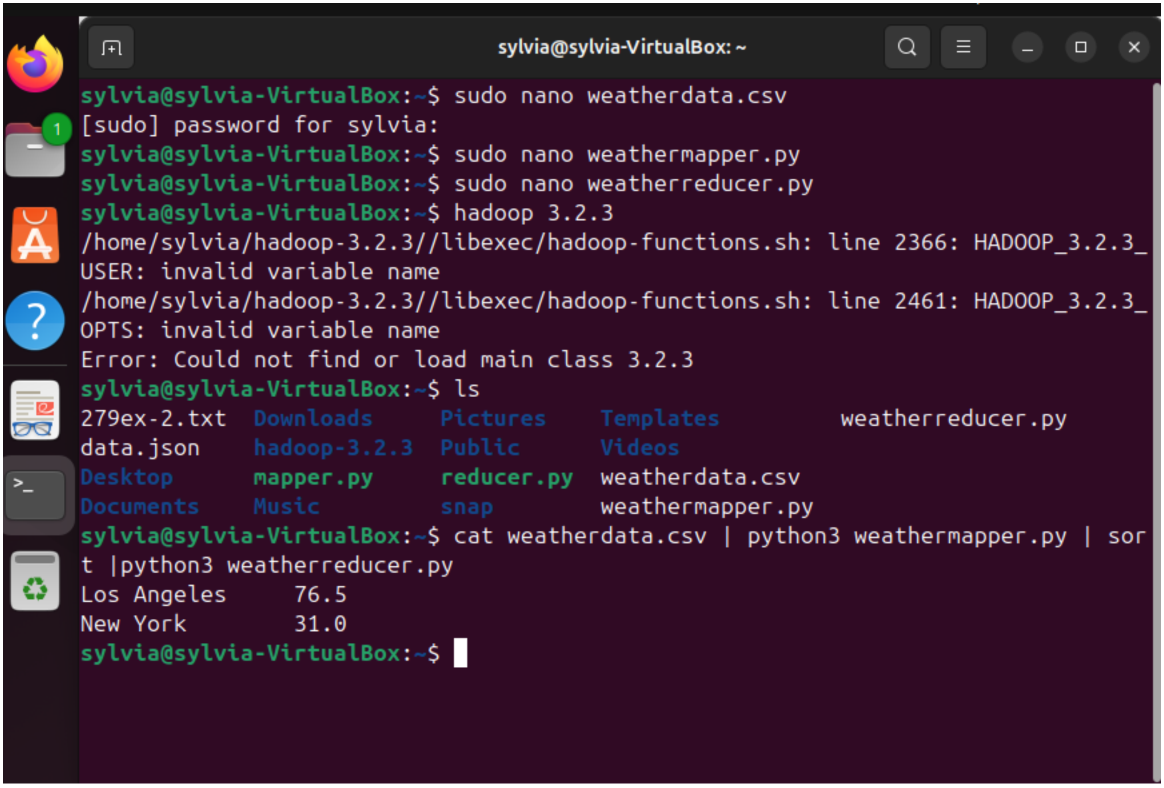
Procedure:

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.

Download the dataset (weather data)

Output:



```
sylvia@sylvia-VirtualBox:~$ sudo nano weatherdata.csv
[sudo] password for sylvia:
sylvia@sylvia-VirtualBox:~$ sudo nano weathermapper.py
sylvia@sylvia-VirtualBox:~$ sudo nano weatherreducer.py
sylvia@sylvia-VirtualBox:~$ hadoop 3.2.3
/home/sylvia/hadoop-3.2.3//libexec/hadoop-functions.sh: line 2366: HADOOP_3.2.3_
USER: invalid variable name
/home/sylvia/hadoop-3.2.3//libexec/hadoop-functions.sh: line 2461: HADOOP_3.2.3_
OPTS: invalid variable name
Error: Could not find or load main class 3.2.3
sylvia@sylvia-VirtualBox:~$ ls
279ex-2.txt  Downloads     Pictures    Templates         weatherreducer.py
data.json    hadoop-3.2.3  Public      Videos
Desktop      mapper.py     reducer.py  weatherdata.csv
Documents    Music         snap        weathermapper.py
sylvia@sylvia-VirtualBox:~$ cat weatherdata.csv | python3 weathermapper.py | sor
t |python3 weatherreducer.py
Los Angeles     76.5
New York        31.0
sylvia@sylvia-VirtualBox:~$
```

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))

        .
```

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:

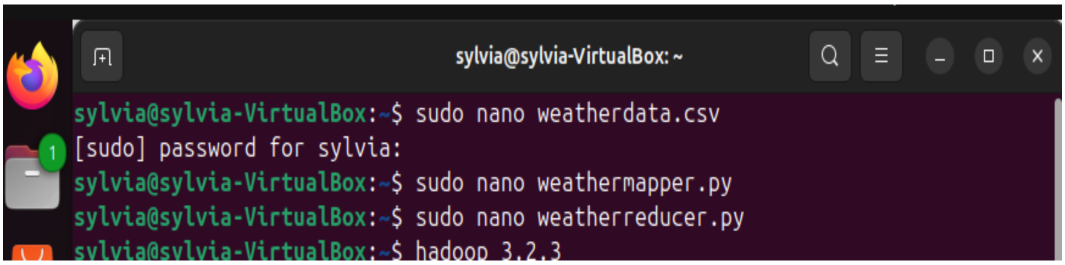
Start the Hadoop daemons and create a directory in HDFS to store your data.

```
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
```



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sylvia@sylvia-VirtualBox:~$ hadoop 3.2.3
```

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

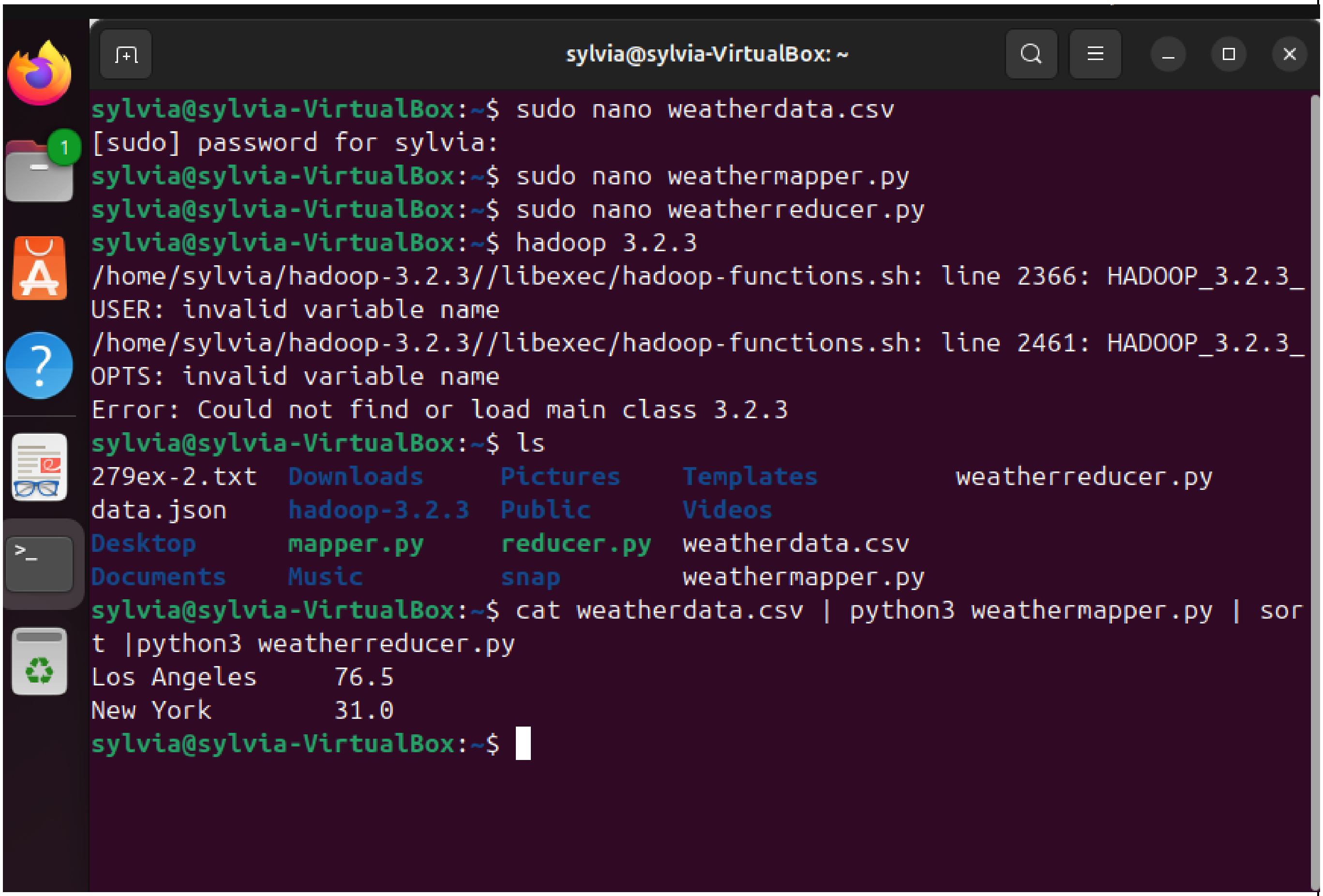
hadoop jar /home/sx/hadoop-3.2.3/share/hadoop/tools/lib/hadoop-streaming-3.2.3.jar \
  -input /weatherdata/dataset.txt \
  -output /weatherdata/output \
  -file "/home/sx/Downloads/mapper.py" \
  -mapper "python3 mapper.py" \
  -file "/home/sx/Downloads/reducer.py" \
  -reducer "python3 reducer.py"

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
```



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sylvia@sylvia-VirtualBox:~$ 
```

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.