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EX 3 IMPLEMENT A MAPREDUCE PROGRAM TO PROCESS A WEATHER DATASET **Aim:**

To implement a mapreduce program to process a weather dataset using Hadoop filesystem.

Procedure:

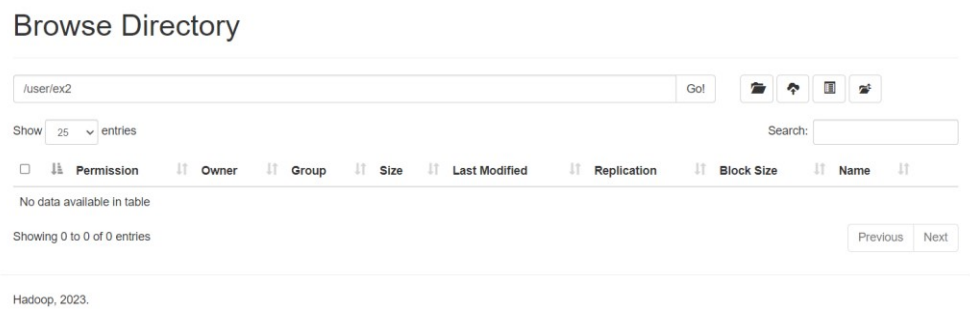
1. Start the Hadoop namenode and datanode using the command **start-dfs.cmd**

   start-yarn.cmd

2. Check if namenode and datanode are running using the command **jps**

```
C:\>jps
17248 Jps
23168 NameNode
26468 ResourceManager
22104 DataNode
16412 NodeManager
```

3. Create a directory in the Hadoop filesystem using the command **hadoop fs -mkdir /user/ex2**



Empty directory is created.

4. Insert the input file into the directory using the command **hadoop fs -put**

   C:\Users\jawah\OneDrive\Desktop\LathikaDA\weather.csv /user/ex2

//weather.csv
date,city,temperature

2024-08-01,New York,85

2024-08-01,Los Angeles,90

2024-08-01,New York,80

2024-08-02,New York,82

2024-08-02,Los Angeles,88
2024-08-03,Los Angeles,91

5. The MapReduce Program is written to process weather dataset.

```
//mapper2.py
#!/usr/bin/env python
import sys import csv
def main():

    reader = csv.reader(sys.stdin)
next(reader)  # Skip header row     for
line in reader:

        date, city, temperature = line

        try:

            temperature = float(temperature)
print(f"{city}\t{temperature}")
except ValueError:             continue

if __name__ == "__main__":

    main()
```

```
//reducer2.py
#!/usr/bin/env python
import sys def
main():

    current_city = None
total_temperature = 0
count = 0     for line in
sys.stdin:

        city, temperature = line.split('\t')
temperature = float(temperature)         if
city == current_city:

            total_temperature += temperature
            count += 1
else:            if
current_city:

                avg_temperature = total_temperature / count
print(f"{current_city}\t{avg_temperature:.2f}")
```

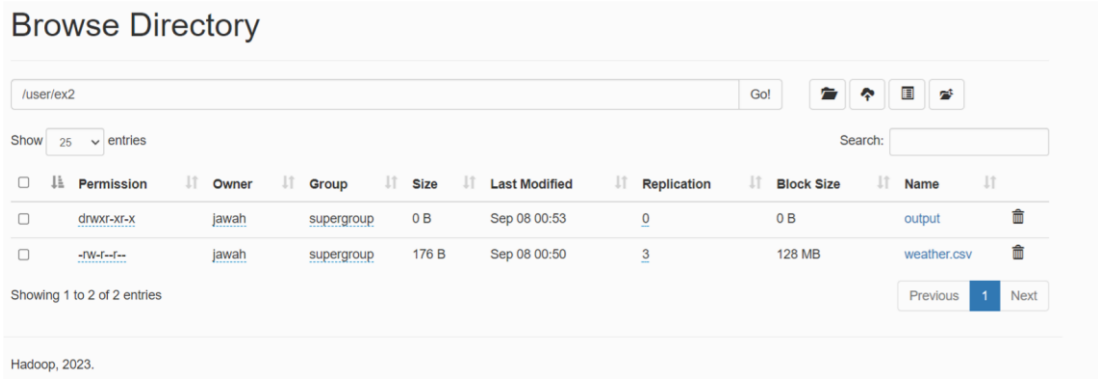
```
current_city = city            total_temperature =
temperature            count = 1     if current_city:

        avg_temperature = total_temperature / count
print(f"{current_city}\t{avg_temperature:.2f}") if
__name__ == "__main__":

    main()
```

6. The mapper reducer program is executed by the following command

hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.6.jar -input /user/ex2/weather.csv -output /user/ex2/output -mapper "python C:\Users\jawah\OneDrive\Desktop\LathikaDA\mapper2.py" -reducer "python C:\Users\jawah\OneDrive\Desktop\LathikaDA\reducer2.py"

```
C:\>hadoop jar C:\hadoop\share\hadoop\tools\lib\hadoop-streaming-3.3.6.jar -input /user/ex2/weather.csv -output /user/ex2/output -mapper "python C:\Users\jawah\OneDrive\Desktop\LathikaDA\mapper2.py" -reducer "py
thon C:\Users\jawah\OneDrive\Desktop\LathikaDA\reducer2.py"
packageJobJar: [/C:/Users/jawah/AppData/Local/Temp/hadoop-unjar7555752279657982712/] [] C:\Users\jawah\AppData\Local\Temp\streamjob3016311074982311763.jar tmpDir=null
2024-09-08 00:53:35,520 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-08 00:53:35,694 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-09-08 00:53:36,145 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/jawah/.staging/job_1725734248816_0002
2024-09-08 00:53:36,360 INFO mapred.FileInputFormat: Total input files to process : 1
2024-09-08 00:53:36,411 INFO mapreduce.JobSubmitter: number of splits:2
2024-09-08 00:53:36,514 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1725734248816_0002
2024-09-08 00:53:36,514 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-09-08 00:53:36,634 INFO conf.Configuration: resource-types.xml not found
2024-09-08 00:53:36,634 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-09-08 00:53:36,693 INFO impl.YarnClientImpl: Submitted application application_1725734248816_0002
2024-09-08 00:53:36,785 INFO mapreduce.Job: The url to track the job: http://Jawahar:8088/proxy/application_1725734248816_0002/
2024-09-08 00:53:36,787 INFO mapreduce.Job: Running job: job_1725734248816_0002
2024-09-08 00:53:42,901 INFO mapreduce.Job: Job job_1725734248816_0002 running in uber mode : false
2024-09-08 00:53:42,902 INFO mapreduce.Job:  map 0% reduce 0%
2024-09-08 00:53:47,988 INFO mapreduce.Job:  map 100% reduce 0%
2024-09-08 00:53:52,042 INFO mapreduce.Job:  map 100% reduce 100%
2024-09-08 00:53:52,046 INFO mapreduce.Job: Job job_1725734248816_0002 completed successfully
```

Thus the output directory is created.



7. To view the output files

```
C:\>hadoop fs -ls /user/ex2/output
Found 2 items
-rw-r--r--   3 jawah supergroup          0 2024-09-08 00:53 /user/ex2/output/_SUCCESS
-rw-r--r--   3 jawah supergroup         33 2024-09-08 00:53 /user/ex2/output/part-00000
```

hadoop fs -cat /user/ex2/output/part-00000

```
C:\>hadoop fs -cat /user/ex2/output/part-00000
Los Angeles     89.67
New York        82.50
```

8. Stop the Hadoop namenode and datanode **stop-all.cmd** **Result:**

Thus the mapreduce program to process a weather dataset using Hadoop filesystem is implemented successfully