

EXP NO: 3

## MAP REDUCE PROGRAM TO PROCESS A WEATHER DATASET

\$cd DA-Lab

\$mkdir exp3

\$cd exp3

\$nano dataset.txt

```
Fedora40 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

GNU nano 7.2 dataset.txt
23907 20150101 2423 -98.08 30.62 2.2 -0.6 0.8 9.9 7.8 1.47 C 3.7 1.1 2.5 97.9 224.4 97.2 0.369 0.308 -99.000 -99.000 -99.000 7.0 8.1 -9999.0 -9999.0 -9999.0
23907 20150102 2423 -98.08 30.62 3.5 1.3 2.4 2.2 10.2 1.43 C 4.9 2.3 3.1 100.0 98.8 99.8 0.391 0.327 -99.000 -99.000 -99.000 7.1 7.9 -9999.0 -9999.0 -9999.0
23907 20150103 2423 -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 34.8 73.7 0.450 0.397 -99.000 -99.000 -99.000 7.6 7.9 -9999.0 -9999.0 -9999.0
23907 20150104 2423 -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 40.6 61.7 0.413 0.352 -99.000 -99.000 -99.000 7.3 7.9 -9999.0 -9999.0 -9999.0
23907 20150105 2423 -98.08 30.62 10.9 -1.7 3.6 3.6 0.0 13.28 C 14.7 -3.0 3.8 77.9 33.1 57.4 0.390 0.340 -99.000 -99.000 -99.000 6.3 7.0 -9999.0 -9999.0 -9999.0
23907 20150106 2423 -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 30.2 49.3 0.395 0.335 -99.000 -99.000 -99.000 8.0 8.0 -9999.0 -9999.0 -9999.0
23907 20150107 2423 -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 36.5 55.7 0.387 0.328 -99.000 -99.000 -99.000 7.6 8.3 -9999.0 -9999.0 -9999.0
23907 20150108 2423 -98.08 30.62 0.6 -7.9 -3.6 -13.3 0.0 4.98 C 3.9 -4.8 -0.5 57.7 37.0 48.1 0.372 0.316 -99.000 -99.000 -99.000 4.7 6.1 -9999.0 -9999.0 -9999.0
23907 20150109 2423 -98.08 30.62 2.0 0.1 1.0 0.8 0.0 2.92 C 4.1 1.2 2.5 87.8 48.9 64.4 0.368 0.312 -99.000 -99.000 -99.000 5.4 6.2 -9999.0 -9999.0 -9999.0
23907 20150110 2423 -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 47.7 85.8 0.373 0.314 -99.000 -99.000 -99.000 5.1 6.0 -9999.0 -9999.0 -9999.0
23907 20150111 2423 -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 77.8 97.1 0.420 0.362 -99.000 -99.000 -99.000 6.5 6.7 -9999.0 -9999.0 -9999.0
23907 20150112 2423 -98.08 30.62 16.7 3.5 10.1 9.0 0.0 13.08 C 19.2 1.3 9.7 80.2 38.1 58.2 0.391 0.330 -99.000 -99.000 -99.000 7.3 7.4 -9999.0 -9999.0 -9999.0
23907 20150113 2423 -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 80.7 90.7 0.401 0.337 -99.000 -99.000 -99.000 6.1 6.8 -9999.0 -9999.0 -9999.0
23907 20150114 2423 -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 90.8 97.9 0.395 0.331 -99.000 -99.000 -99.000 6.1 6.7 -9999.0 -9999.0 -9999.0
23907 20150115 2423 -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 46.7 73.4 0.395 0.333 -99.000 -99.000 -99.000 6.7 7.0 -9999.0 -9999.0 -9999.0
23907 20150116 2423 -98.08 30.62 16.7 3.5 10.1 9.0 0.0 13.08 C 19.2 1.3 9.7 80.2 38.1 58.2 0.391 0.330 -99.000 -99.000 -99.000 7.3 7.4 -9999.0 -9999.0 -9999.0
23907 20150117 2423 -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 30.4 55.7 0.388 0.327 -99.000 -99.000 -99.000 8.7 8.4 -9999.0 -9999.0 -9999.0
23907 20150118 2423 -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 14.6 31.4 0.383 0.325 -99.000 -99.000 -99.000 9.5 9.2 -9999.0 -9999.0 -9999.0
23907 20150119 2423 -98.08 30.62 23.9 6.7 15.3 14.3 0.0 14.19 C 25.6 3.8 12.6 65.3 26.9 45.6 0.376 0.321 -99.000 -99.000 -99.000 9.9 9.5 -9999.0 -9999.0 -9999.0
23907 20150120 2423 -98.08 30.62 20.9 9.5 17.8 15.9 0.0 14.27 C 27.9 6.5 14.5 88.4 16.1 50.2 0.373 0.320 -99.000 -99.000 -99.000 10.0 10.4 -9999.0 -9999.0 -9999.0
23907 20150121 2423 -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 68.0 88.1 0.369 0.317 -99.000 -99.000 -99.000 10.7 10.6 -9999.0 -9999.0 -9999.0
23907 20150122 2423 -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 95.2 98.0 0.546 0.418 -99.000 -99.000 -99.000 9.0 9.3 -9999.0 -9999.0 -9999.0
23907 20150123 2423 -98.08 30.62 2.4 2.2 5.0 4.2 7.5 6.58 C 11.1 2.0 4.8 88.4 58.8 86.5 0.554 0.409 -99.000 -99.000 -99.000 7.6 8.1 -9999.0 -9999.0 -9999.0
23907 20150124 2423 -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 33.0 63.0 0.494 0.381 -99.000 -99.000 -99.000 7.7 7.9 -9999.0 -9999.0 -9999.0
23907 20150125 2423 -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 18.9 43.8 0.456 0.357 -99.000 -99.000 -99.000 9.1 8.9 -9999.0 -9999.0 -9999.0
23907 20150126 2423 -98.08 30.62 21.5 7.2 14.4 14.1 0.0 12.01 C 22.9 5.5 12.2 56.8 23.7 40.6 0.433 0.349 -99.000 -99.000 -99.000 10.0 9.7 -9999.0 -9999.0 -9999.0
23907 20150127 2423 -98.08 30.62 20.5 10.7 18.6 17.5 0.0 15.18 C 28.9 8.1 13.5 52.2 21.4 38.8 0.420 0.344 -99.000 -99.000 -99.000 11.4 10.8 -9999.0 -9999.0 -9999.0
23907 20150128 2423 -98.08 30.62 26.3 13.3 19.8 19.1 0.0 15.11 C 28.1 7.9 16.3 54.9 19.4 35.5 0.410 0.339 -99.000 -99.000 -99.000 12.1 11.5 -9999.0 -9999.0 -9999.0
23907 20150129 2423 -98.08 30.62 23.1 9.8 16.5 16.4 0.0 13.74 C 27.4 9.7 11.6 87.0 34.2 55.6 0.402 0.334 -99.000 -99.000 -99.000 13.1 12.4 -9999.0 -9999.0 -9999.0
23907 20150130 2423 -98.08 30.62 13.0 6.9 10.9 9.0 0.2 7.19 C 19.2 8.3 11.8 87.6 48.4 58.8 0.389 0.328 -99.000 -99.000 -99.000 11.6 11.8 -9999.0 -9999.0 -9999.0
23907 20150131 2423 -98.08 30.62 15.1 7.4 11.3 10.2 8.5 1.18 C 14.5 8.4 10.7 100.0 63.1 90.3 0.401 0.337 -99.000 -99.000 -99.000 11.2 11.3 -9999.0 -9999.0 -9999.0
23907 20150201 2423 -98.08 30.62 18.3 3.9 11.1 13.3 0.0 8.69 C 22.1 4.1 13.8 98.8 53.6 79.1 0.450 0.386 -99.000 -99.000 -99.000 12.9 12.6 -9999.0 -9999.0 -9999.0
23907 20150202 2423 -98.08 30.62 8.0 -1.9 3.1 3.3 0.0 12.48 C 15.2 -0.6 5.8 69.4 34.8 54.2 0.420 0.354 -99.000 -99.000 -99.000 9.3 10.1 -9999.0 -9999.0 -9999.0
23907 20150203 2423 -98.08 30.62 5.3 2.3 3.0 3.8 0.0 2.69 C 9.3 3.9 5.7 100.0 65.1 82.6 0.409 0.343 -99.000 -99.000 -99.000 8.7 9.3 -9999.0 -9999.0 -9999.0
23907 20150204 2423 -98.08 30.62 11.8 4.3 8.1 7.9 0.3 4.41 C 13.8 5.5 8.8 100.0 80.6 94.1 0.410 0.344 -99.000 -99.000 -99.000 9.6 9.8 -9999.0 -9999.0 -9999.0
23907 20150205 2423 -98.08 30.62 9.4 0.7 5.0 3.1 0.0 4.90 C 9.3 2.8 5.6 97.3 68.8 81.4 0.402 0.336 -99.000 -99.000 -99.000 8.6 9.3 -9999.0 -9999.0 -9999.0
23907 20150206 2423 -98.08 30.62 15.3 8.0 8.0 7.4 0.0 14.67 C 20.9 1.8 9.3 95.9 50.7 75.9 0.396 0.331 -99.000 -99.000 -99.000 9.1 9.2 -9999.0 -9999.0 -9999.0
23907 20150207 2423 -98.08 30.62 10.8 5.9 12.8 12.0 0.0 16.75 C 23.8 4.8 12.0 96.8 48.6 76.2 0.393 0.329 -99.000 -99.000 -99.000 10.5 10.2 -9999.0 -9999.0 -9999.0
23907 20150208 2423 -98.08 30.62 26.3 12.3 19.3 17.7 0.0 16.54 C 29.8 10.8 17.3 96.6 25.4 65.2 0.393 0.332 -99.000 -99.000 -99.000 13.0 12.2 -9999.0 -9999.0 -9999.0
23907 20150209 2423 -98.08 30.62 26.6 13.6 20.1 19.3 0.0 16.90 C 31.1 10.3 17.8 64.6 19.7 40.0 0.388 0.329 -99.000 -99.000 -99.000 13.5 12.9 -9999.0 -9999.0 -9999.0
23907 20150210 2423 -98.08 30.62 26.0 12.7 19.4 18.7 0.0 17.09 C 30.3 9.5 17.6 81.3 26.5 40.1 0.381 0.325 -99.000 -99.000 -99.000 13.6 13.0 -9999.0 -9999.0 -9999.0
23907 20150211 2423 -98.08 30.62 23.0 10.6 16.8 16.3 0.0 16.50 C 29.2 8.1 16.8 77.6 29.9 55.8 0.375 0.323 -99.000 -99.000 -99.000 14.0 13.5 -9999.0 -9999.0 -9999.0
23907 20150212 2423 -98.08 30.62 14.8 5.6 10.2 9.4 0.0 12.60 C 22.8 6.8 11.9 71.2 32.3 52.2 0.363 0.317 -99.000 -99.000 -99.000 12.3 12.7 -9999.0 -9999.0 -9999.0
23907 20150213 2423 -98.08 30.62 18.9 4.7 11.8 11.5 0.0 12.25 C 26.3 4.5 12.3 65.6 37.7 50.7 0.355 0.310 -99.000 -99.000 -99.000 11.4 11.7 -9999.0 -9999.0 -9999.0
23907 20150214 2423 -98.08 30.62 24.3 10.8 17.5 16.7 0.0 16.94 C 31.3 8.0 17.1 77.8 29.3 56.9 0.354 0.310 -99.000 -99.000 -99.000 13.3 12.6 -9999.0 -9999.0 -9999.0
23907 20150215 2423 -98.08 30.62 20.2 13.3 16.8 15.9 0.0 5.79 C 23.9 12.8 16.2 96.0 65.3 83.9 0.353 0.312 -99.000 -99.000 -99.000 14.5 13.9 -9999.0 -9999.0 -9999.0
23907 20150216 2423 -98.08 30.62 17.6 0.0 8.8 5.0 1.0 4.87 C 17.1 2.5 7.4 98.3 66.4 83.8 0.345 0.306 -99.000 -99.000 -99.000 11.9 12.8 -9999.0 -9999.0 -9999.0
23907 20150217 2423 -98.08 30.62 11.2 -0.4 5.4 4.3 0.0 13.36 C 18.6 1.1 6.8 80.6 36.6 57.9 0.337 0.298 -99.000 -99.000 -99.000 9.3 10.3 -9999.0 -9999.0 -9999.0
23907 20150218 2423 -98.08 30.62 17.2 -0.4 8.4 9.1 0.0 18.48 C 25.1 0.5 10.1 80.9 21.1 46.1 0.324 0.294 -99.000 -99.000 -99.000 9.5 10.0 -9999.0 -9999.0 -9999.0
23907 20150219 2423 -98.08 30.62 19.2 5.7 12.4 12.3 0.0 17.70 C 26.0 4.1 13.2 79.1 35.7 50.9 0.333 0.295 -99.000 -99.000 -99.000 11.1 11.0 -9999.0 -9999.0 -9999.0
23907 20150220 2423 -98.08 30.62 22.0 11.9 16.9 16.7 0.0 8.41 C 25.9 10.7 16.7 85.5 55.7 76.5 0.336 0.298 -99.000 -99.000 -99.000 13.6 12.9 -9999.0 -9999.0 -9999.0
23907 20150221 2423 -98.08 30.62 22.9 9.3 16.1 17.2 0.0 11.83 C 31.1 10.6 16.9 86.5 51.1 74.3 0.336 0.302 -99.000 -99.000 -99.000 15.6 14.7 -9999.0 -9999.0 -9999.0
```

\$nano mapper.py

```
Fedora40 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

GNU nano 7.2 mapper.py
#!/usr/bin/env python
import sys

for line in sys.stdin:
    line = line.strip()
    words = line.split()
    month = line[0:12]
    daily_max = line[30:45]
    daily_max = daily_max.strip()
    for word in words:
        print('%s\t%s' % (month, daily_max))
```

\$nano reducer.py

```
Fedora40 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

GNU nano 7.2 reducer.py
#!/usr/bin/env python
from operator import itemgetter
import sys

current_month = None
current_max = 0
month = None

for line in sys.stdin:
    line = line.strip()
    month, daily_max = line.split('\t', 1)

    try:
        daily_max = float(daily_max)
    except ValueError:
        continue

    if current_month == month:
        if daily_max > current_max:
            current_max = daily_max
    else:
        if current_month:
            print('%s\t%s' % (current_month, current_max))
            current_max = daily_max
            current_month = month
        else:
            print('%s\t%s' % (current_month, current_max))
```

**\$start-all.sh**

```

karthickragav@fedora:~$ start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as karthickragav in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [fedora]
Starting resourcemanager
Starting nodemanagers

```

**\$ jps**

```

karthickragav@fedora:~$ jps
4916 jps
4487 NodeManager
3889 NameNode
4889 SecondaryNameNode
4347 ResourceManager
3775 DataNode

```

**\$hdfs dfs -mkdir /exp3****\$hdfs dfs -copyFromLocal ~/DA-Lab/exp3/dataset.txt /exp2**

```

karthickragav@fedora:~/daLab/exp3$ hdfs dfs -ls /weatherdata
Found 2 items
-rw-r--r-- 1 karthickragav supergroup 79568 2024-09-02 10:36 /weatherdata/dataset.txt
drwxr-xr-x - karthickragav supergroup 0 2024-09-02 11:03 /weatherdata/output

```

**\$chmod 777 mapper.py reducer.py**
**\$hadoop jar \$HADOOP\_STREAMING -input /exp3/dataset.txt -output /exp3/output -mapper  
~/DA-Lab/exp3/mapper.py -reducer ~/DA-Lab/exp3/reducer.py**

```

2024-09-01 21:14:26,332 INFO mapreduce.Job: Job job_local307751264_0001 completed successfully
2024-09-01 21:14:27,224 INFO mapreduce.Job: Counters: 36
File System Counters
  FILE: Number of bytes read=282134
  FILE: Number of bytes written=1594029
  FILE: Number of read operations=0
  FILE: Number of large read operations=0
  FILE: Number of write operations=0
  HDFS: Number of bytes read=166
  HDFS: Number of bytes written=92
  HDFS: Number of read operations=15
  HDFS: Number of large read operations=0
  HDFS: Number of write operations=4
  HDFS: Number of bytes read erasure-coded=0
Map-Reduce Framework
  Map input records=3
  Map output records=11
  Map output bytes=105
  Map output materialized bytes=133
  Input split bytes=100
  Combine input records=0
  Combine output records=0
  Reduce input groups=10
  Reduce shuffle bytes=133
  Reduce input records=11
  Reduce output records=10
  Spilled Records=22
  Shuffled Maps =1
  Failed Shuffles=0
  Merged Map outputs=1
  GC time elapsed (ms)=206
  Total committed heap usage (bytes)=421527552
Shuffle Errors
  BAD_ID=0
  CONNECTION=0
  IO_ERROR=0
  WRONG_LENGTH=0
  WRONG_MAP=0
  WRONG_REDUCE=0
File Input Format Counters
  Bytes Read=83
File Output Format Counters
  Bytes Written=92
2024-09-01 21:14:27,224 INFO streaming.StreamJob: Output directory: /word_count_in_py/new_output
karthickragav@fedora:~$ hdfs dfs -cat /word_count_in_py/new_output/part-00000
1 1
2 1
DA 1
experiment 1
experiments 1
hadoop 1
installation 1
lab 1
program 1
wordcount 1
karthickragav@fedora:~$

```

**\$hdfs dfs -cat /exp3/output/\***

```
karthickragav@fedora:~/dalab/exp3$ hdfs dfs -cat /weatherdata/output/*
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
```