

Exp. No : 2

Word Count Map Reduce program

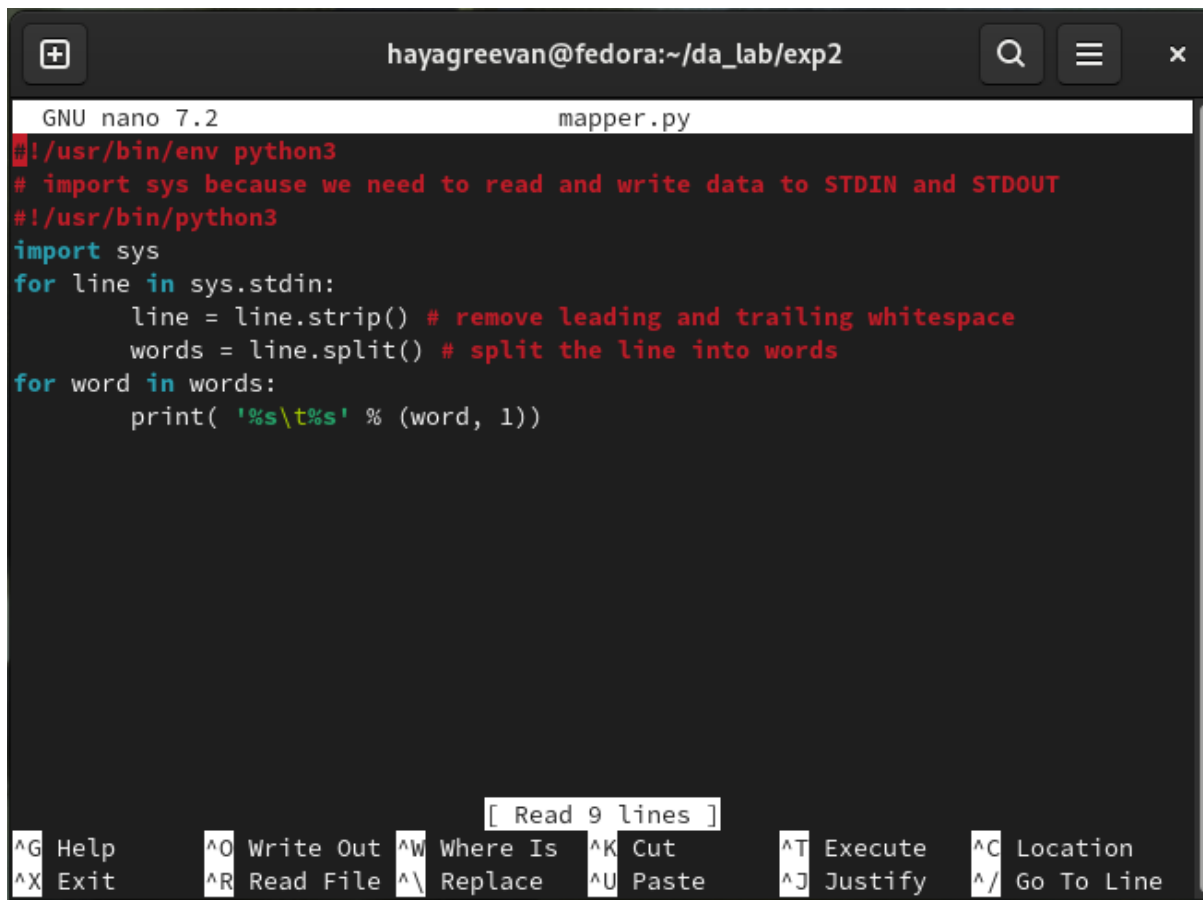
1. Create word_count.txt file



```
hayagreevan@fedora:~/da_lab/exp2
GNU nano 7.2 word_count.txt
Made it to LA yeah
Finally in LA yeah
Lookin for the weed though
Trynna make my own dough
Callin for Maria
Lost without Maria
Might dive in the marina

[ Read 7 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

2. Create mapper.py program

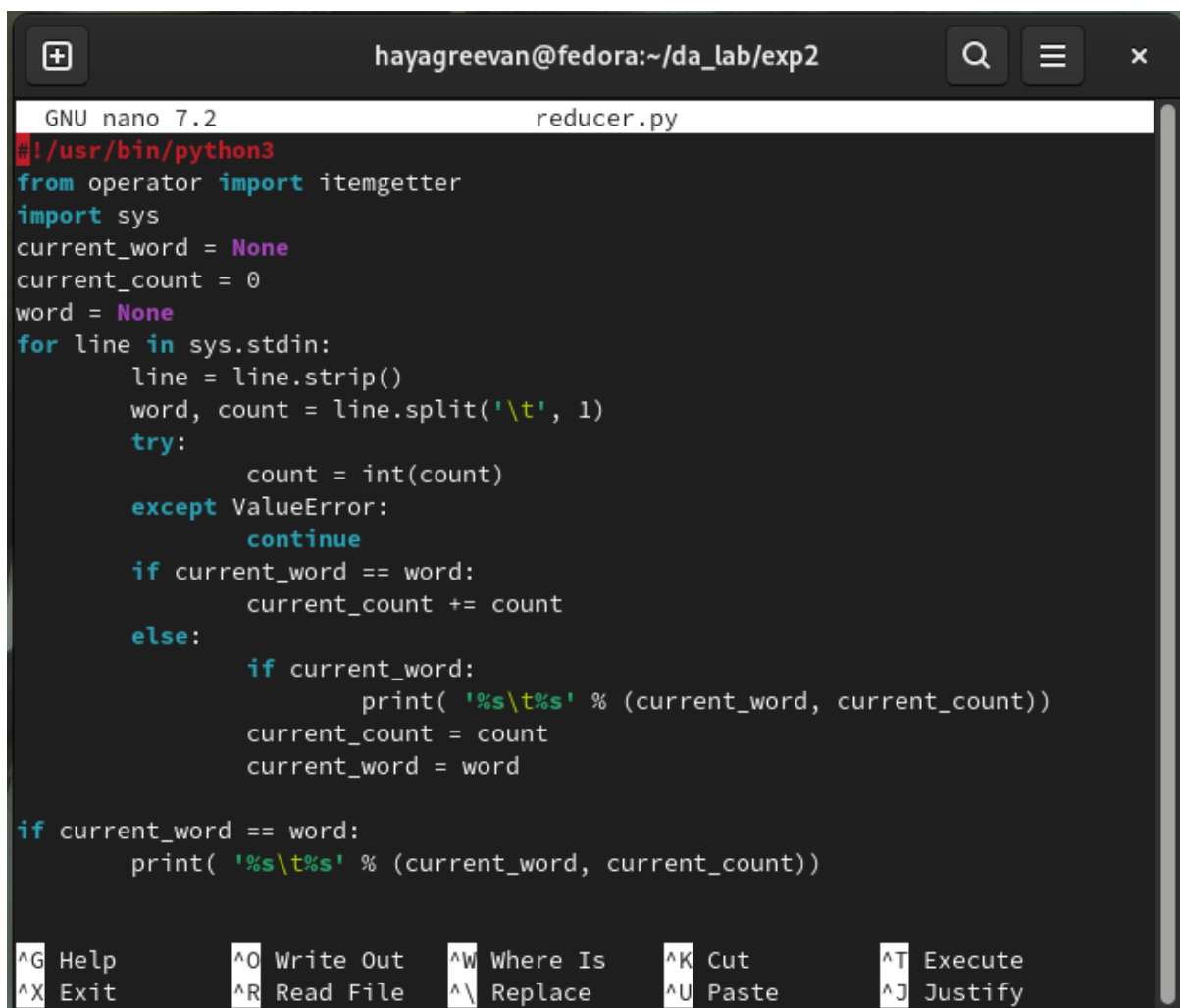


```
GNU nano 7.2 mapper.py
#!/usr/bin/env python3
# import sys because we need to read and write data to STDIN and STDOUT
#!/usr/bin/python3
import sys
for line in sys.stdin:
    line = line.strip() # remove leading and trailing whitespace
    words = line.split() # split the line into words
for word in words:
    print( '%s\t%s' % (word, 1))
```

[Read 9 lines]

^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^/ Go To Line

3. Create reducer.py program.



```
GNU nano 7.2 reducer.py
#!/usr/bin/python3
from operator import itemgetter
import sys
current_word = None
current_count = 0
word = None
for line in sys.stdin:
    line = line.strip()
    word, count = line.split('\t', 1)
    try:
        count = int(count)
    except ValueError:
        continue
    if current_word == word:
        current_count += count
    else:
        if current_word:
            print( '%s\t%s' % (current_word, current_count))
        current_count = count
        current_word = word

if current_word == word:
    print( '%s\t%s' % (current_word, current_count))
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify

4. Storing the word_count.txt in HDFS Storage.

```
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -ls /
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -mkdir exp2
mkdir: `hdfs://localhost:9000/user/hayagreevan': No such file or directory
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -mkdir /exp2
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -ls /
Found 1 items
drwxr-xr-x  - hayagreevan supergroup          0 2024-08-26 19:05 /exp2
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -copyFromLocal word_count.txt /exp2/
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -ls /exp2/
Found 1 items
drwxr-xr-x  - hayagreevan supergroup          0 2024-08-26 19:06 /exp2
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -ls /exp2/
Found 1 items
-rw-r--r--  1 hayagreevan supergroup        152 2024-08-26 19:06 /exp2/word_co
unt.txt
hayagreevan@fedora:~/da_lab/exp2$ chmod 777 mapper.py reducer.py
hayagreevan@fedora:~/da_lab/exp2$
```

5. Running the Word Count program using Hadoop Streaming.

```
hayagreevan@fedora:~/da_lab/exp2$ hadoop jar ~/da_lab/hadoop-streaming-3.3.6.jar -input /exp2/word_count.txt -output /exp2/output -mapper ~/da_lab/exp2/mapper.py -reducer ~/da_lab/exp2/reducer.py
packageJobJar: [/tmp/hadoop-unjar8322114130128640096/] [] /tmp/streamjob2571884115447734530.jar tmpDir=null
2024-08-26 19:12:12,668 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-08-26 19:12:16,497 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-08-26 19:12:22,174 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hayagreevan/.staging/job_1724678733414_0001
2024-08-26 19:12:26,328 INFO mapred.FileInputFormat: Total input files to process : 1
2024-08-26 19:12:29,238 INFO mapreduce.JobSubmitter: number of splits:2
2024-08-26 19:12:33,233 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1724678733414_0001
2024-08-26 19:12:33,234 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-08-26 19:12:34,662 INFO conf.Configuration: resource-types.xml not found
2024-08-26 19:12:34,663 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-08-26 19:12:38,815 INFO impl.YarnClientImpl: Submitted application application_1724678733414_0001
2024-08-26 19:12:39,058 INFO mapreduce.Job: The url to track the job: http://fedora:8088/proxy/application_1724678733414_0001/
2024-08-26 19:12:39,062 INFO mapreduce.Job: Running job: job_1724678733414_0001
2024-08-26 19:13:20,918 INFO mapreduce.Job: Job job_1724678733414_0001 running in uber mode : false
```

```
hayagreevan@fedora:~/da_lab/exp2
in uber mode : false
2024-08-26 19:13:20,920 INFO mapreduce.Job: map 0% reduce 0%
2024-08-26 19:13:35,602 INFO mapreduce.Job: map 100% reduce 0%
2024-08-26 19:13:51,310 INFO mapreduce.Job: map 100% reduce 100%
2024-08-26 19:13:56,305 INFO mapreduce.Job: Job job_1724678733414_0001 complete
d successfully
2024-08-26 19:13:56,572 INFO mapreduce.Job: Counters: 54
    File System Counters
        FILE: Number of bytes read=97
        FILE: Number of bytes written=837208
        FILE: Number of read operations=0
        FILE: Number of large read operations=0
        FILE: Number of write operations=0
        HDFS: Number of bytes read=414
        HDFS: Number of bytes written=71
        HDFS: Number of read operations=11
        HDFS: Number of large read operations=0
        HDFS: Number of write operations=2
        HDFS: Number of bytes read erasure-coded=0
    Job Counters
        Launched map tasks=2
        Launched reduce tasks=1
        Data-local map tasks=2
        Total time spent by all maps in occupied slots (ms)=23927
        Total time spent by all reduces in occupied slots (ms)=12078
        Total time spent by all map tasks (ms)=23927
        Total time spent by all reduce tasks (ms)=12078
        Total vcore-milliseconds taken by all map tasks=23927
```

```
hayagreevan@fedora:~/da_lab/exp2

Total vcore-milliseconds taken by all map tasks=23927
Total vcore-milliseconds taken by all reduce tasks=12078
Total megabyte-milliseconds taken by all map tasks=24501248
Total megabyte-milliseconds taken by all reduce tasks=12367872
Map-Reduce Framework
  Map input records=7
  Map output records=10
  Map output bytes=71
  Map output materialized bytes=103
  Input split bytes=186
  Combine input records=0
  Combine output records=0
  Reduce input groups=10
  Reduce shuffle bytes=103
  Reduce input records=10
  Reduce output records=10
  Spilled Records=20
  Shuffled Maps =2
  Failed Shuffles=0
  Merged Map outputs=2
  GC time elapsed (ms)=1759
  CPU time spent (ms)=8290
  Physical memory (bytes) snapshot=892342272
  Virtual memory (bytes) snapshot=7763681280
  Total committed heap usage (bytes)=687865856
  Peak Map Physical memory (bytes)=326397952
  Peak Map Virtual memory (bytes)=2586062848
  Peak Reduce Physical memory (bytes)=240001024
```

```
hayagreevan@fedora:~/da_lab/exp2

Reduce output records=10
Spilled Records=20
Shuffled Maps =2
Failed Shuffles=0
Merged Map outputs=2
GC time elapsed (ms)=1759
CPU time spent (ms)=8290
Physical memory (bytes) snapshot=892342272
Virtual memory (bytes) snapshot=7763681280
Total committed heap usage (bytes)=687865856
Peak Map Physical memory (bytes)=326397952
Peak Map Virtual memory (bytes)=2586062848
Peak Reduce Physical memory (bytes)=240001024
Peak Reduce Virtual memory (bytes)=2593050624

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=228
File Output Format Counters
  Bytes Written=71
2024-08-26 19:13:56,574 INFO streaming.StreamJob: Output directory: /exp2/output
hayagreevan@fedora:~/da_lab/exp2$
```


Output :

```
hayagreevan@fedora:~/da_lab/exp2$  
hayagreevan@fedora:~/da_lab/exp2$ hdfs dfs -cat /exp2/output/part-00000  
Callin 1  
Finally 1  
LA 2  
Lookin 1  
Lost 1  
Made 1  
Maria 2  
Might 1  
Trynnna 1  
dive 1  
dough 1  
for 2  
in 2  
it 1  
make 1  
marina 1  
my 1  
own 1  
the 2  
though 1  
to 1  
weed 1  
without 1  
yeah 2  
hayagreevan@fedora:~/da_lab/exp2$
```