

EXP NO: 2 RUN A BASIC WORD COUNT MAP REDUCE PROGRAM TO UNDERSTAND MAP REDUCE PARADIGM

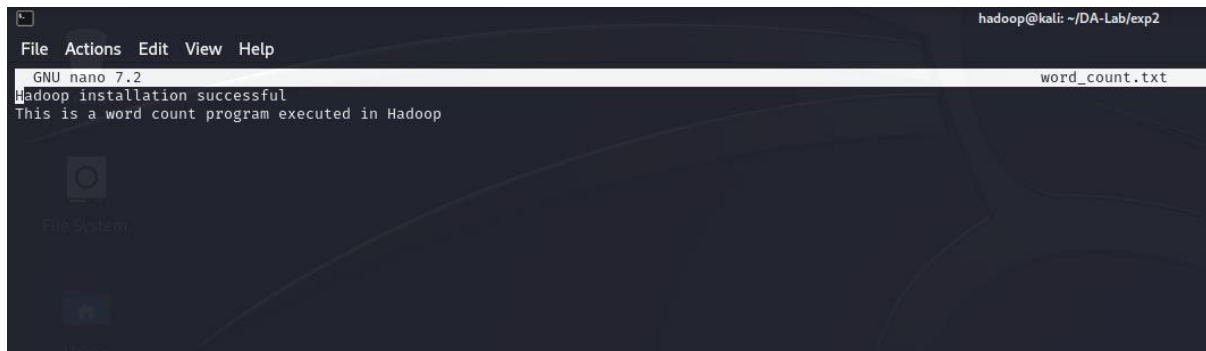
\$mkdir DA-Lab

\$cd DA-Lab

\$mkdir exp2

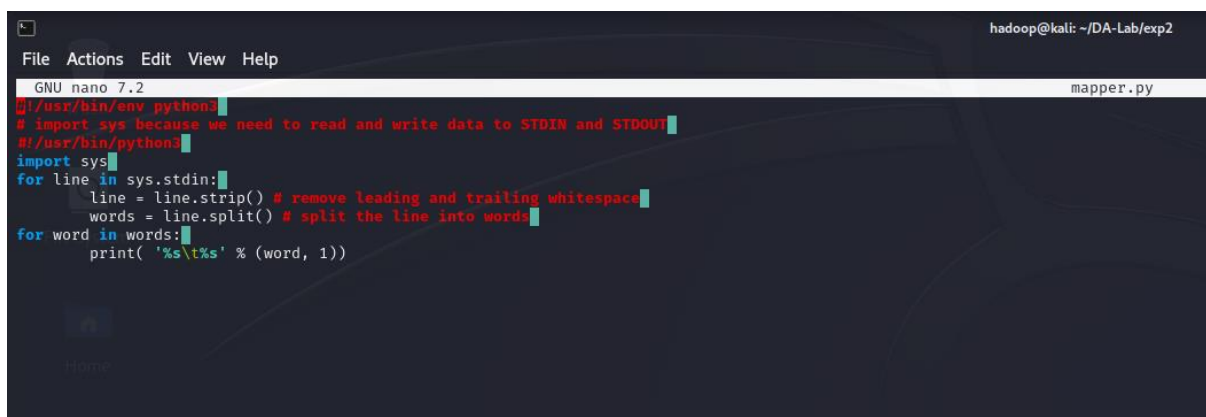
\$cd exp2

\$nano word_count.txt

A screenshot of a terminal window showing the nano text editor. The editor is open to a file named 'word_count.txt'. The text inside the file reads: 'Hadoop installation successful' followed by 'This is a word count program executed in Hadoop' on the next line. The terminal title bar shows 'hadoop@kali: ~/DA-Lab/exp2'.

```
hadoop@kali: ~/DA-Lab/exp2
GNU nano 7.2 word_count.txt
Hadoop installation successful
This is a word count program executed in Hadoop
```

\$nano mapper.py

A screenshot of a terminal window showing the nano text editor. The editor is open to a file named 'mapper.py'. The code is a Python script that reads from standard input, strips whitespace, splits the line into words, and prints each word followed by a tab and the number 1. The terminal title bar shows 'hadoop@kali: ~/DA-Lab/exp2'.

```
hadoop@kali: ~/DA-Lab/exp2
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))
```

\$nano reducer.py

A screenshot of a terminal window showing the nano text editor. The editor is open to a file named 'reducer.py'. The code is a Python script that reads from standard input, splits the line by tab, increments a counter for the current word, and prints the word and its total count when a new word is encountered or at the end of the input. The terminal title bar shows 'hadoop@kali: ~/DA-Lab/exp2'.

```
hadoop@kali: ~/DA-Lab/exp2
GNU nano 7.2 reducer.py
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))
```

\$start-all.sh

```
hadoop@kali: ~  
File Actions Edit View Help  
  
hadoop@kali: [~]  
$ start-all.sh  
WARNING: Attempting to start all Apache Hadoop daemons as hadoop 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 [kali]  
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true  
2024-09-11 04:59:16,429 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
Starting resourcemanager  
Starting nodemanagers
```

\$ jps

```

(hadoop@kali)-[~]
└─$ jps
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
14436 NodeManager
14772 Jps
13830 SecondaryNameNode
14311 ResourceManager
13597 DataNode
13471 NameNode
(hadoop@kali)-[~]
└─$

```

```
$hdfs dfs -mkdir /exp2
```

```
$hdfs dfs -copyFromLocal ~/DA-Lab/exp2/word_count.txt /exp2
```

```
(hadoop@kali) [~/hadoop/bin]
$ ./hdfs dfs -ls /exp2
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
2024-09-21 00:05:07,404 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
drwxr-xr-x - hadoop supergroup 0 2024-09-13 01:05 /exp2/output
-rw-r--r-- 1 hadoop supergroup 80 2024-09-13 01:02 /exp2/word_count.txt
```

\$chmod 777 mapper.py reducer.py

```
$hadoop jar $HADOOP_STREAMING -input /exp2/word_count.txt -output /exp2/output -  
mapper ~/DA-Lab/exp2/mapper.py -reducer ~/DA-Lab/exp2/reducer.py
```

```
kali-linux-20234-mwrm4 - VMware Workstation 17 Player (non-commercial use only)
Player | [Icons] | 1 2 3 4 | [System Icons] | 3:28 |
File Actions Edit View Help
getmerge SOURCE DEST
put SOURCE DEST
df [-h]
truncate SIZE FILE

[hadoop@kali ~]$
$ hadoop jar $HADOOP_STREAMING -input /exp1/word_count.txt -output /exp1/new_output -mapper ~/DA-Lab/mapper.py -reducer ~/DA-Lab/reducer.py
2024-08-28 03:10:55,958 MAIN main info.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
package job.jar (/tmp/hadoop-unix-kali-qkxvzysy3n7/1)/tmp/streamjob139e1f55c1378/kali.jar tmpdir=null
2024-08-28 03:10:56,598 INFO client.DefaultHadoopFileSystemProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-08-28 03:10:56,549 INFO client.DefaultHadoopFileSystemProvider: Connecting to ResourceManager at /0.0.0.0:8032
2024-08-28 03:10:56,547 INFO mapreduce.JobResourceCounter: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hadoop/.staging/job_1724827394647_0002
2024-08-28 03:10:56,182 INFO mapred.FileInputFormat: Total input files to process : 1
2024-08-28 03:10:56,179 INFO mapreduce.JobSubmitter: number of splits=2
2024-08-28 03:10:56,083 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1724827394647_0002
2024-08-28 03:10:56,064 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-08-28 03:10:57,394 INFO conf.Configuration: resource-types.xml not found
2024-08-28 03:10:57,392 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2024-08-28 03:10:57,671 INFO mapreduce.TaskLogValidationTask2: Submitted application http://localhost:8042/job_1724827394647_0002/
2024-08-28 03:10:57,979 INFO mapreduce.Job: The url to track the job: http://kali:8888/proxy/application_1724827394647_0002/
2024-08-28 03:10:58,115 INFO mapreduce.Job: Running job: job_1724827394647_0002
2024-08-28 03:10:57,787 INFO mapreduce.Job: Job job_1724827394647_0002 running in uber mode : false
2024-08-28 03:10:57,794 INFO mapreduce.Job: map 0% reduce 0%
2024-08-28 03:12:27,334 INFO mapreduce.Job: map 100% reduce 0%
2024-08-28 03:12:36,144 INFO mapreduce.Job: map 100% reduce 100%
2024-08-28 03:12:52,239 INFO mapreduce.Job: Job job_1724827394647_0002 completed successfully
2024-08-28 03:12:52,974 INFO mapreduce.Job: Counters: 54

file System Counters
FILE: Number of bytes read=0
FILE: Number of bytes written=916334
FILE: Number of read operations=0
FILE: Number of large read operations=0
FILE: Number of write operations=0
HDFS: Number of bytes read=366
HDFS: Number of bytes written=0
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)=51128
Total time spent by all reducers in occupied slots (ms)=19553
Total time spent by all map tasks (ms)=51128
Total time spent by all reduce tasks (ms)=19553
Total vcore-milliseconds taken by all map tasks=51128
Total vcore-milliseconds taken by all reduce tasks=19553
Total megabyte-milliseconds taken by all map tasks=52355872
Total megabyte-milliseconds taken by all reduce tasks=248022272

Map-Reduce Framework
```

\$hdfs dfs -cat /exp2/output/*

```
(hadoop@kali)-[~/hadoop/bin]
$ ./hdfs dfs -cat /exp2/output/*
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
2024-09-21 00:07:24,178 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform...
Hadoop 1
This 1
a 1
count 1
executed 1
in 1
is 1
program 1
word 1
```