

1) Hadoop Map Reduce for Mutual Friends on Facebook

Terminal screenshots

```

Cloudera (fresh install of cloudera) [Running]
Applications Places System
cloudera@quickstart:~/Downloads
File Edit View Search Terminal Help
16/02/17 18:56:27 INFO mapreduce.Job: Job job_1455761826871_0001 running in uber mode : false
16/02/17 18:56:27 INFO mapreduce.Job: map 0% reduce 0%
16/02/17 18:56:42 INFO mapreduce.Job: map 100% reduce 0%
16/02/17 18:56:52 INFO mapreduce.Job: map 100% reduce 100%
16/02/17 18:56:53 INFO mapreduce.Job: Job job_1455761826871_0001 completed successfully
16/02/17 18:56:53 INFO mapreduce.Job: Counters: 49
  File System Counters
    FILE: Number of bytes read=180
    FILE: Number of bytes written=220691
    FILE: Number of read operations=0
    FILE: Number of large read operations=0
    FILE: Number of write operations=0
    HDFS: Number of bytes read=168
    HDFS: Number of bytes written=57
    HDFS: Number of read operations=6
    HDFS: Number of large read operations=0
    HDFS: Number of write operations=2
  Job Counters
    Launched map tasks=1
    Launched reduce tasks=1
    Data-local map tasks=1
    Total time spent by all maps in occupied slots (ms)=11570
    Total time spent by all reduces in occupied slots (ms)=6830
    Total time spent by all map tasks (ms)=11570
    Total time spent by all reduce tasks (ms)=6830
[jar file - dheeraj... cloudera@quicks... cloudera Downloads MutualFriendsMa...

```

```

File Edit View Search Terminal Help
[cloudera@quickstart ~]$ cd downloads
bash: cd: downloads: No such file or directory
[cloudera@quickstart ~]$ cd Downloads
[cloudera@quickstart Downloads]$ hadoop fs -put INPUT hadoopinput
[cloudera@quickstart Downloads]$ hadoop fs -ls
Found 1 items
-rw-r--r-- 1 cloudera cloudera 46 2016-02-17 18:51 hadoopinput
[cloudera@quickstart Downloads]$ hadoop jar MutualFriendsMapReduce-1.0-SNAPSHOT.
jar MutualFriends hadoopinput output
16/02/17 18:55:41 INFO client.RMProxy: Connecting to ResourceManager at /0.0.0.0
:8032
16/02/17 18:55:43 WARN mapreduce.JobSubmitter: Hadoop command-line option parsin
g not performed. Implement the Tool interface and execute your application with
ToolRunner to remedy this.
16/02/17 18:55:44 INFO input.FileInputFormat: Total input paths to process : 1
16/02/17 18:55:44 INFO mapreduce.JobSubmitter: number of splits:1
16/02/17 18:55:45 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_14
55761826871_0001
16/02/17 18:55:47 INFO impl.YarnClientImpl: Submitted application application_14
55761826871_0001
16/02/17 18:55:47 INFO mapreduce.Job: The url to track the job: http://quickstar
t.cloudera:8088/proxy/application_1455761826871_0001/
16/02/17 18:55:47 INFO mapreduce.Job: Running job: job_1455761826871_0001
16/02/17 18:56:27 INFO mapreduce.Job: Job job_1455761826871_0001 running in uber mode : false
16/02/17 18:56:27 INFO mapreduce.Job: map 0% reduce 0%
[jar file - dheeraj... cloudera@quicks... cloudera Downloads MutualFriendsMa...

```

Result Screenshot

The screenshot shows a terminal window titled "cloudera@quickstart:~/Downloads". The terminal displays the output of a Hadoop command and a list of files.

```

Virtual memory (bytes) snapshot=3123081216
Total committed heap usage (bytes)=288882688

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=46
File Output Format Counters
Bytes Written=57

[cloudera@quickstart Downloads]$ hadoop fs -cat output/*
AB      CD
AC      BD
AD      BC
BC      ADE
BD      ACE
BE      CD
CD      ABE
CE      BD
DE      BC
[cloudera@quickstart Downloads]$

```

Code

The screenshot shows an IDE window titled "MutualFriends.java - MutualFriendsMapReduce - [~/Desktop/MutualFriendsHadoopMapReduce-master]". The code is as follows:

```

import ...

public class MutualFriends {

    public static class FriendsMapper
        extends Mapper<Object, Text, Text, Text> {
        private Text m_id = new Text();
        private Text m_others = new Text();

        public void map(Object key, Text value, Context context)
            throws IOException, InterruptedException {
            // In our case, the key is null and the value is one line of our input file.
            // Split by space to separate the user and its friends list.
            String line = value.toString();
            String[] split = line.split(" ");
            String subject = split[0];
            String[] friends = Arrays.copyOfRange(split, 1, split.length);

            // For each friend in the list, output the (UserFriend, ListOfFriends) pair
            for(String friend : friends) {
                String others = line.replace(subject, "").replace(" ", "");
                String id = subject.compareTo(friend) < 0 ? subject+friend : friend+subject;
                m_id.set(id);
                m_others.set(others);
                context.write(m_id, m_others);
            }
        }
    }

    public static class FriendsReducer
        extends Reducer<Text, Text, Text, Text> {
        private Text m_result = new Text();

        // Calculates intersection of two given Strings, i.e. friends lists
        private String intersection(String s1, String s2) {
            HashSet<Character> h1 = new HashSet<>();
            HashSet<Character> h2 = new HashSet<>();

            for(int i = 0; i < s1.length(); i++) {
                h1.add(s1.charAt(i));
            }
            for(int i = 0; i < s2.length(); i++) {
                h2.add(s2.charAt(i));
            }
        }
    }
}

```

2) Face Detector using Face Plus Plus API

