# Session 4: MR –INTRODUCTION

## Task 1:

**There are some invalid records which contain 'NA' in either Company Name or Product Name.**

**Write a mapper program to get these types of records**

Driver Class.

- The driver class which communicates with the Hadoop framework and specifies the configuration elements required to run a MapReduce job. This involves aspects such as telling Hadoop which Mapper and Reducer classes to use, where to find the input data and in what format, and where to place the output data and how to format it. There is an additional variety of other configuration options that can be set here.
- There is no default parent Driver class as a subclass; the driver logic usually exists in the main method of the class written to encapsulate a MapReduce job.
- Getting the configuration from hadoop configuration
-

```
//set configuration
Configuration conf = new Configuration();
//create a new job with the above configuration
Job job  = new Job(conf);
```

-
- Set the path for putput and input files from argument passed.

```
//check for input argument
FileInputFormat.setInputPaths(job, new Path(args[0]));
Path outputPath = new Path(args[1]);
FileOutputFormat.setOutputPath(job, outputPath);
```

- Set jar class as below
- This is to make sure which jar should get sent to nodes to excute mapper and reducer code.
- There are chances of having more than one driver class (jar class) in .jar file. This can be seen in the hadoop-mapreduce-examples 2.6.5.jar which has wordcount, wordmean, wordmedian etc. jars.

```
job.setJarByClass(InValidTVSet.class);
```

-
- As the task is to get invalid entries Redcuer was not needed. So added below code to set reducer tasks number to ZERO

```
//set the mapper and reducer class : as we have
//set reducer task to ZERO
job.setNumReduceTasks(0);
```

-

- when no reducer will execute and no aggregation will take place. In such case, we will prefer “Map-only job” in Hadoop.
- No need to set reducer class
- identity Reducer is the default reducer in Hadoop old API. When no reducer class is set by job.setReducerClass() method in Driver class, Identity reducer is used as the default reducer.
- Set the mapper class

```
//setting the mapper class
job.setMapperClass(InValidTVSetsMapper.class);

//setting the input format class
job.setInputFormatClass(TextInputFormat.class);
//setting output format class
job.setOutputFormatClass(TextOutputFormat.class);

  //set up the output key and value classes
job.setOutputKeyClass(Text.class);
job.setOutputValueClass(Text.class);

//execute the job
System.exit(job.waitForCompletion(true) ? 0 : 1);
```

- Set the InputFormat
    - InputFormat is the first component in Map-Reduce, it is responsible for creating the input splits and dividing them into records.
    - We have set input format type as - TextInputformat
    - It is the default InputFormat of MapReduce. TextInputFormat treats each line of each input file as a separate record and performs no parsing. This is useful for unformatted data or line-based records like log files.
    - Key – It is the byte offset of the beginning of the line within the file (not whole file just one split), so it will be unique if combined with the file name.
    - Value – It is the contents of the line, excluding line terminators.
- Set the OutputFormat
    - MapReduce default Hadoop reducer Output Format is **TextOutputFormat**, which writes (key, value) pairs on individual lines of text files
- Kept input file television.txt to assignment4_inputfolder using put command

```
[acadgild@localhost ~]$ hadoop fs -ls /assignment4_input
18/03/24 14:28:04 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r--   1 acadgild supergroup        733 2018-03-24 13:09 /assignment4_input/television.txt
[acadgild@localhost ~]$
```

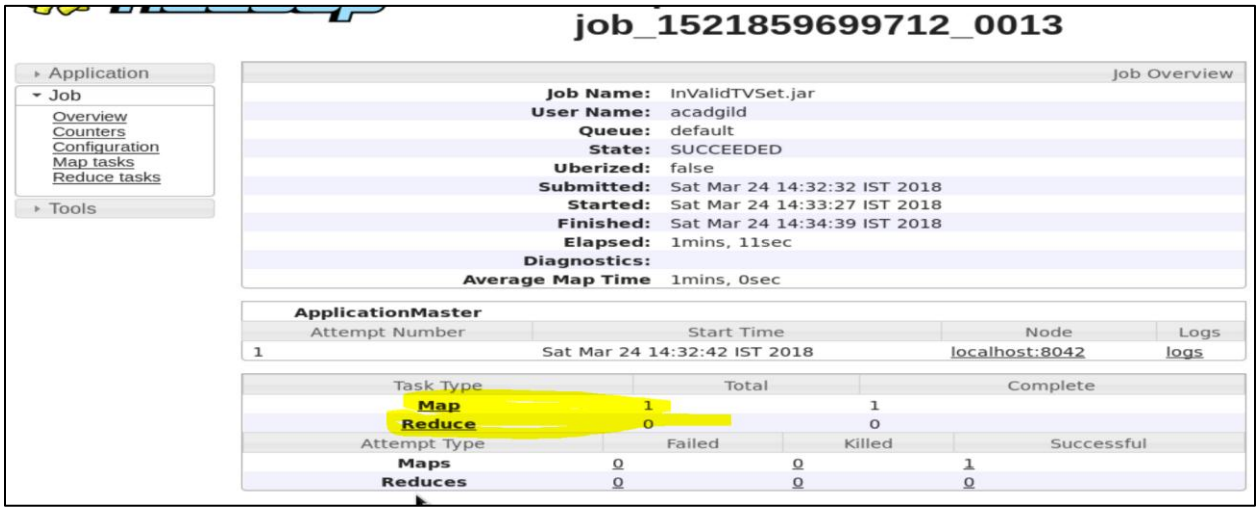
- Executed the job to get invalid entries

```
[acadgild@localhost ~]$ hadoop jar /home/acadgild/Desktop/Prachi/InValidTVSet.jar InValidTVSet /assignment4_input /assignment4_output1[A
18/03/24 14:29:04 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
18/03/24 14:29:06 INFO client.RMProxy: Connecting to ResourceManager at localhost/127.0.0.1:8032
18/03/24 14:29:09 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to rem
edy this.
18/03/24 14:29:10 INFO input.FileInputFormat: Total input paths to process : 1
18/03/24 14:29:10 INFO mapreduce.JobSubmitter: number of splits:1
18/03/24 14:29:11 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1521859699712_0012
18/03/24 14:29:11 INFO impl.YarnClientImpl: Submitted application application_1521859699712_0012
18/03/24 14:29:12 INFO mapreduce.Job: The url to track the job: http://localhost:8088/proxy/application_1521859699712_0012/
18/03/24 14:29:12 INFO mapreduce.Job: Running job: job_1521859699712_0012
18/03/24 14:29:29 INFO mapreduce.Job: Job job_1521859699712_0012 running in uber mode : false
18/03/24 14:29:29 INFO mapreduce.Job:  map 0% reduce 0%
18/03/24 14:29:45 INFO mapreduce.Job:  map 100% reduce 0%
18/03/24 14:29:47 INFO mapreduce.Job: Job job_1521859699712_0012 completed successfully
18/03/24 14:29:47 INFO mapreduce.Job: Counters: 30
        File System Counters
                FILE: Number of bytes read=0
                FILE: Number of bytes written=107503
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=852
                HDFS: Number of bytes written=26
                HDFS: Number of read operations=5
                HDFS: Number of large read operations=0
                HDFS: Number of write operations=2
        Job Counters
                Launched map tasks=1
                Data-local map tasks=1
                Total time spent by all maps in occupied slots (ms)=13703
                Total time spent by all reduces in occupied slots (ms)=0
                Total time spent by all map tasks (ms)=13703
                Total vcore-milliseconds taken by all map tasks=13703
                Total megabyte-milliseconds taken by all map tasks=14031872
        Map-Reduce Framework
                Map input records=18
                Map output records=1
                Input split bytes=119
                Spilled Records=0
                Failed Shuffles=0
                Merged Map outputs=0
                GC time elapsed (ms)=171
                CPU time spent (ms)=1120
                Physical memory (bytes) snapshot=92450816
                Virtual memory (bytes) snapshot=2056757248
                Total committed heap usage (bytes)=32571392
```

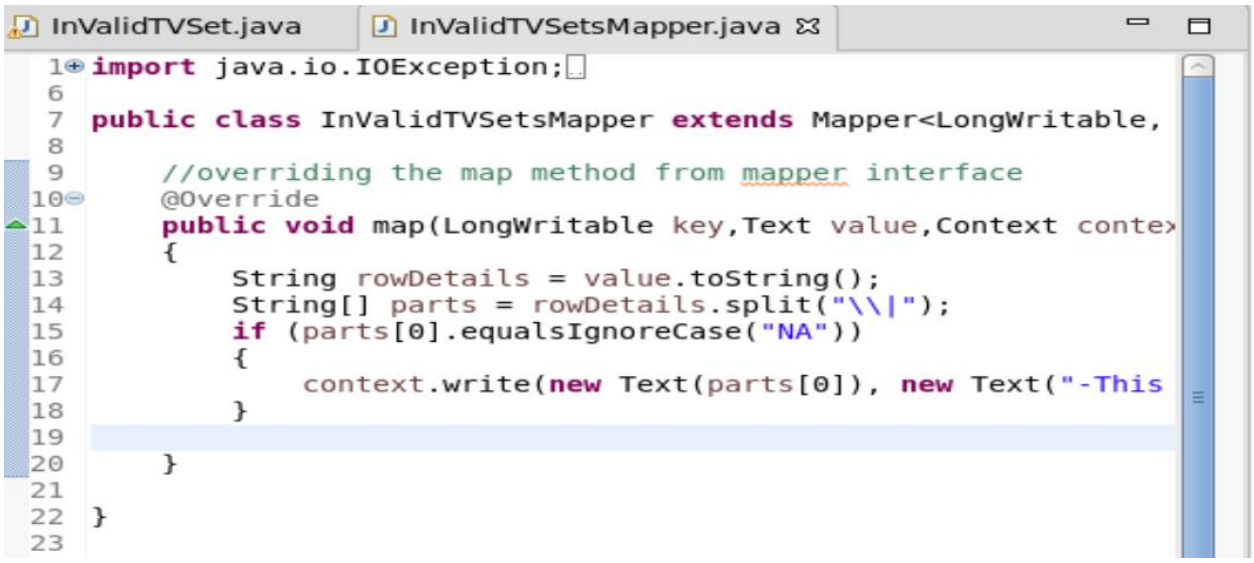
```
                Total committed heap usage (bytes)=32571392
        File Input Format Counters
                Bytes Read=733
        File Output Format Counters
                Bytes Written=26
You have new mail in /var/spool/mail/acadgild
[acadgild@localhost ~]$
```

- No of splits are 1 as input file block size is less than 128 MB i.e. one block, so only one mapper will be executed
- Output folder is created as assignment4_output1

```
[acadgild@localhost ~]$ hadoop fs -ls /assignment4_output1
18/03/24 14:34:53 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 acadgild supergroup          0 2018-03-24 14:34 /assignment4_output1/_SUCCESS
-rw-r--r--   1 acadgild supergroup         26 2018-03-24 14:34 /assignment4_output1/part-m-00000
[acadgild@localhost ~]$ hadoop fs -cat /assignment4_output1/part-m-00000
18/03/24 14:35:06 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
NA      -This is invalid entry
[acadgild@localhost ~]$
```




- Below is the mapper code




## Task 2:

## Write a Map Reduce program to calculate the total units sold for each Company.

- Created new Driver class for Task named as TotalUnitsSold.java
- As mentioned above driver class is written to –
    - Get configuration Details
    - Create a new job with those configuration details
    - Set the number of reducer tasks
    - Set mapper and reducer class
    - Get the inputs from arguments and set the input and output path
    - Set the input and output class format
    - Set the output value and key class format

(Please refer TotalUnitsSold.java placed in .git Repo - )

- **Mapper Class**
- Created mapper class named as 'UnitsSoldMapper' to
    - Get the line as input format from file and map the key to a value
- As per ask in the program created key value pair for name for television brand and sold unit as '1'.
- task processes each input record and it generates a new <key, value> pairs. The <key, value> pairs can be completely different from the input pair. In mapper task, the output is the full collection of all these <key, value> pairs.
- No of splits are 1 as input file block size is less than 128 MB i.e. one block, so only one mapper will be executed

  How Mapper works
- Mapper process each input record and converts it into key value pair with the help of
    - InputSplits
    - RecordReader
- InputSplits
    - It is logical representation of data.

- One input split = one block
- It is Unit of work contains single map task

- Record Reader
- It communicates with InputSplits and converts data into key value pair which is suitable for reading by mapper

UnitsSoldMapper.java

```
import java.io.IOException;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class UnitsSoldMapper extends Mapper<LongWritable, Text, Text, IntWritable> {

        @Override
        public void map(LongWritable key, Text value, Context context) throws IOException , InterruptedException
        {
                String rowDetails = value.toString();
                String[] parts = rowDetails.split("\\|");

                if(!parts[0].equalsIgnoreCase("NA"))
                {
                        context.write(new Text(parts[0]), new IntWritable(1));
                }
        }

}
```

- **Reducer Class**
- It reads the output generated by different mappers.
- The output of reducer is final output in HDFS
- Reducers run in parallel since they are independent of one another. The user decides the number of reducers. By default number of reducers is 1.
- Phases of Reducer
  - Shuffle
  - Sort
  - Reduce

UnitsSoldMapper.java | UnitsSoldReducer.java

```
import java.io.IOException;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class UnitsSoldReducer extends Reducer<Text, IntWritable, Text, IntWritable> {
        @Override
        public void reduce(Text key,Iterable<IntWritable> values,Context context) throws IOException, InterruptedException
        {
                int unitssold = 0;
                for (IntWritable value : values) {
                        unitssold+=value.get();
                }
                context.write(key, new IntWritable(unitssold));
        }

}
```

```
[acadgild@localhost ~]$ hadoop jar /home/acadgild/Desktop/Prachi/InValidTVSet.jar TotalUnitsSold /assignment4_input /assignment4_output2
18/03/30 12:47:46 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
18/03/30 12:47:51 INFO client.RMProxy: Connecting to ResourceManager at localhost/127.0.0.1:8032
18/03/30 12:48:08 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
18/03/30 12:48:19 INFO input.FileInputFormat: Total input paths to process : 1
18/03/30 12:48:20 INFO mapreduce.JobSubmitter: number of splits:1
18/03/30 12:48:22 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1522393135360_0001
18/03/30 12:48:26 INFO impl.YarnClientImpl: Submitted application application_1522393135360_0001
18/03/30 12:48:26 INFO mapreduce.Job: The url to track the job: http://localhost:8088/proxy/application_1522393135360_0001/
18/03/30 12:48:26 INFO mapreduce.Job: Running job: job_1522393135360_0001
18/03/30 12:49:20 INFO mapreduce.Job: Job job_1522393135360_0001 running in uber mode : false
18/03/30 12:49:20 INFO mapreduce.Job:  map 0% reduce 0%
18/03/30 12:49:53 INFO mapreduce.Job:  map 100% reduce 0%
18/03/30 12:50:29 INFO mapreduce.Job:  map 100% reduce 100%
18/03/30 12:50:30 INFO mapreduce.Job: Job job_1522393135360_0001 completed successfully
18/03/30 12:50:30 INFO mapreduce.Job: Counters: 49
        File System Counters
                FILE: Number of bytes read=216
                FILE: Number of bytes written=216009
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=852
                HDFS: Number of bytes written=38
                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)=29189
                Total time spent by all reduces in occupied slots (ms)=32127
                Total time spent by all map tasks (ms)=29189
                Total time spent by all reduce tasks (ms)=32127
                Total vcore-milliseconds taken by all map tasks=29189
                Total vcore-milliseconds taken by all reduce tasks=32127
                Total megabyte-milliseconds taken by all map tasks=29889536
                Total megabyte-milliseconds taken by all reduce tasks=32898048
        Map-Reduce Framework
```

```
                Map input records=18
                Map output records=17
                Map output bytes=176
                Map output materialized bytes=216
                Input split bytes=119
                Combine input records=0
                Combine output records=0
                Reduce input groups=5
                Reduce shuffle bytes=216
                Reduce input records=17
                Reduce output records=5
                Spilled Records=34
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=515
                CPU time spent (ms)=3460
                Physical memory (bytes) snapshot=288018432
                Virtual memory (bytes) snapshot=4117905408
                Total committed heap usage (bytes)=170004480
        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=733
        File Output Format Counters
                Bytes Written=38
You have new mail in /var/spool/mail/acadgild
[acadgild@localhost ~]$
```

```
[acadgild@localhost ~]$ hadoop fs -ls /
18/03/30 12:54:34 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 15 items
drwxr-xr-x   - acadgild supergroup          0 2018-03-04 22:22 /Prachi
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 13:09 /assignment4_input
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 14:34 /assignment4_output1
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 14:29 /assignment4_output1[A
drwxr-xr-x   - acadgild supergroup          0 2018-03-30 12:50 /assignment4_output2
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 09:38 /hadoopdata
drwxr-xr-x   - acadgild supergroup          0 2018-03-04 19:15 /input
drwxr-xr-x   - acadgild supergroup          0 2018-03-05 09:06 /output
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:22 /output1
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:32 /output2
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:37 /output3
drwxr-xr-x   - acadgild supergroup          0 2018-03-17 09:59 /sqoopout
drwxr-xr-x   - acadgild supergroup          0 2018-02-02 12:49 /sqoopout111
drwxrwx---   - acadgild supergroup          0 2018-03-05 08:40 /tmp
drwxr-xr-x   - acadgild supergroup          0 2018-03-18 07:10 /user
You have new mail in /var/spool/mail/acadgild
[acadgild@localhost ~]$ hadoop fs -ls /assignment4_output2
18/03/30 12:54:48 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 acadgild supergroup          0 2018-03-30 12:50 /assignment4_output2/_SUCCESS
-rw-r--r--   1 acadgild supergroup         38 2018-03-30 12:50 /assignment4_output2/part-r-00000
[acadgild@localhost ~]$ hadoop fs -cat /assignment4_output2/part-r-00000
18/03/30 12:55:24 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Akai    1
Lava    3
Onida   4
Samsung 7
Zen     2
[acadgild@localhost ~]$
```

**Task 3:**

**Write a Map Reduce program to calculate the total units sold in each state for Onida company.**

- Created new Driver class for Task named as TotalUnitsSoldforOnida.java
- Created new mapper class named as UnitsSoldMapperOnida

```
1  import java.io.IOException;
2
3  import org.apache.hadoop.io.IntWritable;
4  import org.apache.hadoop.io.LongWritable;
5  import org.apache.hadoop.io.Text;
6  import org.apache.hadoop.mapreduce.Mapper;
7  import org.apache.hadoop.mapreduce.Mapper.Context;
8
9  public class UnitsSoldMapperOnida extends Mapper<LongWritable, Text, Text, IntWri
10
11     @Override
12     public void map(LongWritable key, Text value, Context context) throws IOExcep
13     {
14         String rowDetails = value.toString();
15         String[] parts = rowDetails.split("\\|");
16
17         if(!parts[0].equalsIgnoreCase("NA"))
18         {
19             if(parts[0].equalsIgnoreCase("ONIDA"))
20             {
21                 context.write(new Text(parts[3]), new IntWritable(1));
22             }
23         }
24     }
25 }
26
```

- Created new mapper class named as UnitsSoldReducerOnida

```java
import java.io.IOException;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.Reducer.Context;

public class UnitsSoldReducerOnida extends Reducer<Text, IntWritable, Text, IntWr
    @Override
    public void reduce(Text key,Iterable<IntWritable> values,Context context) thr
    {
        int unitssold = 0;
        for (IntWritable value : values) {
            unitssold+=value.get();
        }
        context.write(key, new IntWritable(unitssold));
    }

}
```

```
[acadgild@localhost ~]$ hadoop jar /home/acadgild/Desktop/Prachi/InValidTVSet.jar TotalUnitsSoldforOnida /assignment4_input /assignment4_output3
18/03/30 13:11:00 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
18/03/30 13:11:04 INFO client.RMProxy: Connecting to ResourceManager at localhost/127.0.0.1:8032
18/03/30 13:11:08 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application wit
h ToolRunner to remedy this.
18/03/30 13:11:09 INFO input.FileInputFormat: Total input paths to process : 1
18/03/30 13:11:10 INFO mapreduce.JobSubmitter: number of splits:1
18/03/30 13:11:11 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1522393135360_0003
18/03/30 13:11:12 INFO impl.YarnClientImpl: Submitted application application_1522393135360_0003
18/03/30 13:11:13 INFO mapreduce.Job: The url to track the job: http://localhost:8088/proxy/application_1522393135360_0003/
18/03/30 13:11:13 INFO mapreduce.Job: Running job: job_1522393135360_0003
18/03/30 13:11:39 INFO mapreduce.Job: Job job_1522393135360_0003 running in uber mode : false
18/03/30 13:11:39 INFO mapreduce.Job:  map 0% reduce 0%
18/03/30 13:12:04 INFO mapreduce.Job:  map 100% reduce 0%
18/03/30 13:12:26 INFO mapreduce.Job:  map 100% reduce 100%
18/03/30 13:12:27 INFO mapreduce.Job: Job job_1522393135360_0003 completed successfully
18/03/30 13:12:27 INFO mapreduce.Job: Counters: 49
        File System Counters
                FILE: Number of bytes read=79
                FILE: Number of bytes written=215755
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=852
                HDFS: Number of bytes written=25
                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)=21926
                Total time spent by all reduces in occupied slots (ms)=16748
                Total time spent by all map tasks (ms)=21926
                Total time spent by all reduce tasks (ms)=16748
                Total vcore-milliseconds taken by all map tasks=21926
                Total vcore-milliseconds taken by all reduce tasks=16748
                Total megabyte-milliseconds taken by all map tasks=22452224
                Total megabyte-milliseconds taken by all reduce tasks=17149952
        Map-Reduce Framework
                Map input records=18
                Map output records=4
                Map output bytes=65
                Map output materialized bytes=79
```

```
        Map-Reduce Framework
                Map input records=18
                Map output records=4
                Map output bytes=65
                Map output materialized bytes=79
                Input split bytes=119
                Combine input records=0
                Combine output records=0
                Reduce input groups=2
                Reduce shuffle bytes=79
                Reduce input records=4
                Reduce output records=2
                Spilled Records=8
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=291
                CPU time spent (ms)=3340
                Physical memory (bytes) snapshot=285343744
                Virtual memory (bytes) snapshot=4118204416
                Total committed heap usage (bytes)=170004480
        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=733
        File Output Format Counters
                Bytes Written=25
You have new mail in /var/spool/mail/acadgild
[acadgild@localhost ~]$ hadoop fs -ls /
```

```
[acadgild@localhost ~]$ hadoop fs -ls /
18/03/30 13:12:38 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 16 items
drwxr-xr-x   - acadgild supergroup          0 2018-03-04 22:22 /Prachi
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 13:09 /assignment4_input
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 14:34 /assignment4_output1
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 14:29 /assignment4_output1[A
drwxr-xr-x   - acadgild supergroup          0 2018-03-30 12:50 /assignment4_output2
drwxr-xr-x   - acadgild supergroup          0 2018-03-30 13:12 /assignment4_output3
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 09:38 /hadoopdata
drwxr-xr-x   - acadgild supergroup          0 2018-03-04 19:15 /input
drwxr-xr-x   - acadgild supergroup          0 2018-03-05 09:06 /output
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:22 /output1
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:32 /output2
drwxr-xr-x   - acadgild supergroup          0 2018-03-24 12:37 /output3
drwxr-xr-x   - acadgild supergroup          0 2018-03-17 09:59 /sqoopout
drwxr-xr-x   - acadgild supergroup          0 2018-02-02 12:49 /sqoopout111
drwxrwx---   - acadgild supergroup          0 2018-03-05 08:40 /tmp
drwxr-xr-x   - acadgild supergroup          0 2018-03-18 07:10 /user
[acadgild@localhost ~]$ hadoop fs -ls /assignment4_output3
18/03/30 13:12:49 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 acadgild supergroup          0 2018-03-30 13:12 /assignment4_output3/_SUCCESS
-rw-r--r--   1 acadgild supergroup         25 2018-03-30 13:12 /assignment4_output3/part-r-00000
[acadgild@localhost ~]$ hadoop fs -cat /assignment4_output3/part-r-00000
18/03/30 13:12:59 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Kerala  1
Uttar Pradesh   3
[acadgild@localhost ~]$
```