LABORATORY PROGRAM – 6

Implement Weather program on Hadoop framework

Questions:

From the following link extract the weather data
https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all
a) Create a MapReduce program to find average temperature for each year from NCDC data set.
b) find the mean max temperature for every month.

OBSERVATION

CODE, COMMAND WITH OUTPUT – A

Driver Code

```
package temp;

import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Job;

import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class AverageDriver {

   public static void main(String[] args) throws Exception {

      if (args.length != 2) {
         System.err.println("Please enter both input and output parameters.");
         System.exit(-1);
      }

      // Creating a configuration and job instance
      Configuration conf = new Configuration();
      Job job = Job.getInstance(conf, "Average Calculation");

      job.setJarByClass(AverageDriver.class);

      // Input and output paths
      FileInputFormat.addInputPath(job, new Path(args[0]));
      FileOutputFormat.setOutputPath(job, new Path(args[1]));

      // Setting mapper and reducer classes
      job.setMapperClass(AverageMapper.class);
      job.setReducerClass(AverageReducer.class);

      // Output key and value types
      job.setOutputKeyClass(Text.class);
      job.setOutputValueClass(IntWritable.class);

      // Submitting the job and waiting for it to complete
      System.exit(job.waitForCompletion(true) ? 0 : 1);
   }
}
```

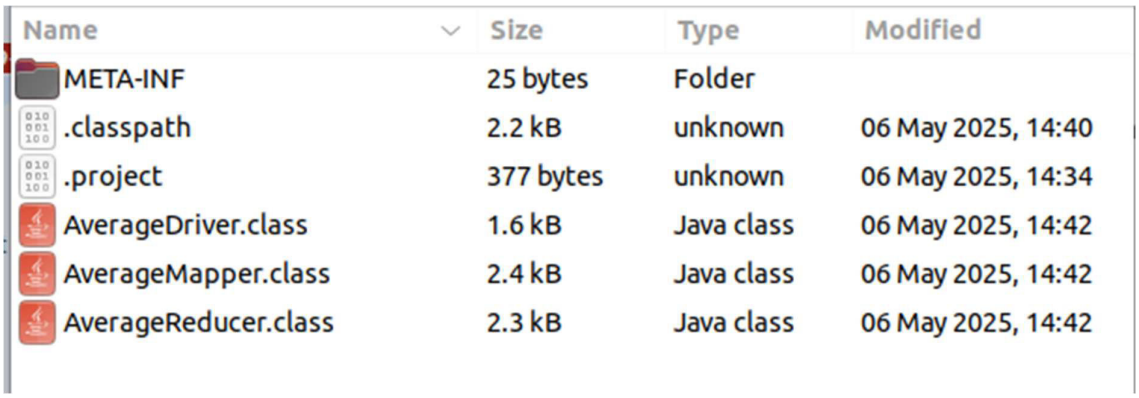
Mapper Code

```
package temp;

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 AverageMapper extends Mapper<LongWritable, Text, Text, IntWritable> {

   public static final int MISSING = 9999;

   @Override
   public void map(LongWritable key, Text value, Context context)
         throws IOException, InterruptedException {

      String line = value.toString();

      // Extract year from fixed position
      String year = line.substring(15, 19);
      int temperature;

      // Determine if there's a '+' sign
      if (line.charAt(87) == '+') {
         temperature = Integer.parseInt(line.substring(88, 92));
      } else {
         temperature = Integer.parseInt(line.substring(87, 92));
      }

      // Quality check character
      String quality = line.substring(92, 93);

      // Only emit if data is valid
      if (temperature != MISSING && quality.matches("[01459]")) {
         context.write(new Text(year), new IntWritable(temperature));
      }
   }
}
```

Reducer Code

```
package temp;

import java.io.IOException;

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

public class AverageReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

   @Override
   public void reduce(Text key, Iterable<IntWritable> values,
                  Context context) throws IOException, InterruptedException {

      int sumTemp = 0;
      int count = 0;

      for (IntWritable value : values) {
         sumTemp += value.get();
         count++;
      }

      if (count > 0) {
         int average = sumTemp / count;
         context.write(key, new IntWritable(average));
```

```
    }
  }
}
```



Name	Size	Type	Modified
META-INF	25 bytes	Folder	
.classpath	2.2 kB	unknown	06 May 2025, 14:40
.project	377 bytes	unknown	06 May 2025, 14:34
AverageDriver.class	1.6 kB	Java class	06 May 2025, 14:42
AverageMapper.class	2.4 kB	Java class	06 May 2025, 14:42
AverageReducer.class	2.3 kB	Java class	06 May 2025, 14:42

```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ 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 [bmscecse-HP-Elite-Tower-800-G9-Desktop-PC]
Starting resourcemanager
Starting nodemanagers
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ jps
7056 DataNode
7332 SecondaryNameNode
7638 ResourceManager
8231 Jps
5883 org.eclipse.equinox.launcher_1.6.1000.v20250227-1734.jar
7804 NodeManager
6877 NameNode
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -ls /\
> ^C
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -ls /
Found 4 items
drwxr-xr-x   - hadoop supergroup          0 2025-04-15 15:00 /FFF
drwxr-xr-x   - hadoop supergroup          0 2025-04-15 15:34 /LLL
drwxr-xr-x   - hadoop supergroup          0 2024-05-13 14:46 /file
drwxr-xr-x   - hadoop supergroup          0 2024-05-13 15:18 /newDataFlair
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -ls /weather
ls: `/weather': No such file or directory
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -mkdir /weather
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -copyFromLocal /home/hadoop/Desktop/1901.txt /weather/test.txt
```

```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC: $ hadoop jar /home/hadoop/Desktop/AverageTemperature.jar AverageDriver /weather/test.txt /weather/output
2025-05-06 14:59:23,239 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-06 14:59:23,279 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-06 14:59:23,279 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-06 14:59:23,340 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-06 14:59:23,393 INFO input.FileInputFormat: Total input files to process : 1
2025-05-06 14:59:23,422 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-06 14:59:23,487 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local91822813_0001
2025-05-06 14:59:23,488 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-06 14:59:23,560 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-06 14:59:23,560 INFO mapreduce.Job: Running job: job_local91822813_0001
2025-05-06 14:59:23,561 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-06 14:59:23,564 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-06 14:59:23,565 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-06 14:59:23,565 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-06 14:59:23,565 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
2025-05-06 14:59:23,602 INFO mapred.LocalJobRunner: Waiting for map tasks
2025-05-06 14:59:23,603 INFO mapred.LocalJobRunner: Starting task: attempt_local91822813_0001_m_000000_0
2025-05-06 14:59:23,615 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-06 14:59:23,615 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-06 14:59:23,615 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-06 14:59:23,622 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
2025-05-06 14:59:23,624 INFO mapred.MapTask: Processing split: hdfs://localhost:9000/weather/test.txt:0+888190
2025-05-06 14:59:23,658 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
2025-05-06 14:59:23,658 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
2025-05-06 14:59:23,658 INFO mapred.MapTask: soft limit at 83886080
2025-05-06 14:59:23,658 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
2025-05-06 14:59:23,658 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
2025-05-06 14:59:23,660 INFO mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuffer
```

```
2025-05-06 14:59:24,581 INFO mapreduce.Job: Counters: 36
        File System Counters
                FILE: Number of bytes read=153118
                FILE: Number of bytes written=1493804
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=1776380
                HDFS: Number of bytes written=8
                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=6565
                Map output records=6564
                Map output bytes=59076
                Map output materialized bytes=72210
                Input split bytes=103
                Combine input records=0
                Combine output records=0
                Reduce input groups=1
                Reduce shuffle bytes=72210
                Reduce input records=6564
                Reduce output records=1
                Spilled Records=13128
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=0
                Total committed heap usage (bytes)=1266679808
        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=888190
        File Output Format Counters
                Bytes Written=8
```

```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -ls /weather
Found 2 items
drwxr-xr-x   - hadoop supergroup          0 2025-05-06 14:59 /weather/output
-rw-r--r--   1 hadoop supergroup     888190 2025-05-06 14:50 /weather/test.txt
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -ls /weather/output
Found 2 items
-rw-r--r--   1 hadoop supergroup          0 2025-05-06 14:59 /weather/output/_SUCCESS
-rw-r--r--   1 hadoop supergroup          8 2025-05-06 14:59 /weather/output/part-r-00000
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop fs -cat /weather/output/part-r-00000
1901    46
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$
```

OBSERVATION

CODE, COMMAND WITH OUTPUT – B

Driver Code

```
package meanmax;

import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Job;

import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class MeanMaxDriver {

   public static void main(String[] args) throws Exception {

      if (args.length != 2) {
         System.err.println("Please enter both input and output parameters.");
         System.exit(-1);
      }

      Configuration conf = new Configuration();
      Job job = Job.getInstance(conf, "Mean and Max Temperature");

      job.setJarByClass(MeanMaxDriver.class);

      FileInputFormat.addInputPath(job, new Path(args[0]));
      FileOutputFormat.setOutputPath(job, new Path(args[1]));

      job.setMapperClass(MeanMaxMapper.class);
      job.setReducerClass(MeanMaxReducer.class);

      job.setOutputKeyClass(Text.class);
      job.setOutputValueClass(IntWritable.class);

      System.exit(job.waitForCompletion(true) ? 0 : 1);
   }
}
```

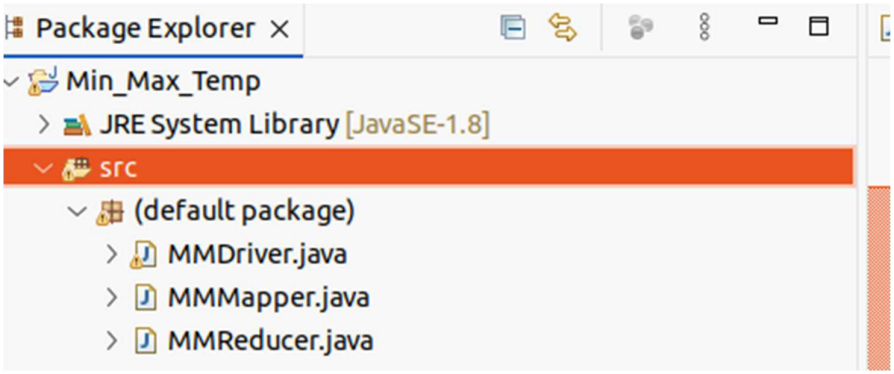
Mapper Code

```
package meanmax;

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 MeanMaxMapper extends Mapper<LongWritable, Text, Text, IntWritable> {

   public static final int MISSING = 9999;

   @Override
   public void map(LongWritable key, Text value, Context context)
         throws IOException, InterruptedException {

      String line = value.toString();
```

```
        // Extract month from positions 19-20
        String month = line.substring(19, 21);
        int temperature;

        // Extract temperature considering optional '+'
        if (line.charAt(87) == '+') {
            temperature = Integer.parseInt(line.substring(88, 92));
        } else {
            temperature = Integer.parseInt(line.substring(87, 92));
        }

        // Quality check
        String quality = line.substring(92, 93);

        if (temperature != MISSING && quality.matches("[01459]")) {
            context.write(new Text(month), new IntWritable(temperature));
        }
    }
}
```

Reducer Code

```
package meanmax;

import java.io.IOException;

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

public class MeanMaxReducer extends Reducer<Text, IntWritable, Text, Text> {

    @Override
    public void reduce(Text key, Iterable<IntWritable> values,
                       Context context) throws IOException, InterruptedException {

        int sumTemp = 0;
        int count = 0;
        int maxTemp = Integer.MIN_VALUE;

        for (IntWritable value : values) {
            int temp = value.get();
            sumTemp += temp;
            count++;

            if (temp > maxTemp) {
                maxTemp = temp;
            }
        }

        if (count > 0) {
            int avgTemp = sumTemp / count;
            String result = "mean=" + avgTemp + " max=" + maxTemp;
            context.write(key, new Text(result));
        }
    }
}
```




```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ 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]
localhost: namenode is running as process 5478.  Stop it first and ensure /tmp/hadoop-hadoop-namenode.pid file is empty before retry.
Starting datanodes
localhost: datanode is running as process 5644.  Stop it first and ensure /tmp/hadoop-hadoop-datanode.pid file is empty before retry.
Starting secondary namenodes [bmscecse-HP-Elite-Tower-800-G9-Desktop-PC]
bmscecse-HP-Elite-Tower-800-G9-Desktop-PC: secondarynamenode is running as process 5931.  Stop it first and ensure /tmp/hadoop-hadoop-secondarynamenode.pid file is empty before retry.
Starting resourcemanager
resourcemanager is running as process 6214.  Stop it first and ensure /tmp/hadoop-hadoop-resourcemanager.pid file is empty before retry.
Starting nodemanagers
localhost: nodemanager is running as process 6375.  Stop it first and ensure /tmp/hadoop-hadoop-nodemanager.pid file is empty before retry.
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Desktop/1901 /rgs/temp
copyFromLocal: `/rgs/temp': File exists
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hdfs dfs -mkdir -p /rgs
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Desktop/1901 /rgs/1903
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop jar /home/hduser/Downloads/Mean_Max_Temp.jar MMDriver /rgs/avtemp.txt /out8
JAR does not exist or is not a normal file: /home/hduser/Downloads/Mean_Max_Temp.jar
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop jar /home/hduser/Downloads/Min_Max_Temp.jar MMDriver /rgs/avtemp.txt /out8
JAR does not exist or is not a normal file: /home/hduser/Downloads/Min_Max_Temp.jar
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/Min_Max_Temp.jar MMDriver /rgs/avtemp.txt /out8
2025-05-06 15:23:05,430 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-06 15:23:05,471 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-06 15:23:05,471 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-06 15:23:05,531 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-06 15:23:05,575 INFO mapreduce.JobSubmitter: Cleaning up the staging area file:/tmp/hadoop/mapred/staging/hadoop1762005270/.staging/job_local1762005270_0001
Exception in thread "main" org.apache.hadoop.mapreduce.lib.input.InvalidInputException: Input path does not exist: hdfs://localhost:9000/rgs/avtemp.txt
        at org.apache.hadoop.mapreduce.lib.input.FileInputFormat.singleThreadedListStatus(FileInputFormat.java:340)
        at org.apache.hadoop.mapreduce.lib.input.FileInputFormat.listStatus(FileInputFormat.java:279)
        at org.apache.hadoop.mapreduce.lib.input.FileInputFormat.getSplits(FileInputFormat.java:404)
        at org.apache.hadoop.mapreduce.JobSubmitter.writeNewSplits(JobSubmitter.java:310)
        at org.apache.hadoop.mapreduce.JobSubmitter.writeSplits(JobSubmitter.java:327)
        at org.apache.hadoop.mapreduce.JobSubmitter.submitJobInternal(JobSubmitter.java:200)
        at org.apache.hadoop.mapreduce.Job$11.run(Job.java:1678)
        at org.apache.hadoop.mapreduce.Job$11.run(Job.java:1675)
        at java.base/java.security.AccessController.doPrivileged(Native Method)
        at java.base/javax.security.auth.Subject.doAs(Subject.java:423)
        at org.apache.hadoop.security.UserGroupInformation.doAs(UserGroupInformation.java:1899)
        at org.apache.hadoop.mapreduce.Job.submit(Job.java:1675)
        at org.apache.hadoop.mapreduce.Job.waitForCompletion(Job.java:1696)
        at MMDriver.main(MMDriver.java:40)
        at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
        at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
        at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
        at java.base/java.lang.reflect.Method.invoke(Method.java:566)
        at org.apache.hadoop.util.RunJar.run(RunJar.java:328)
        at org.apache.hadoop.util.RunJar.main(RunJar.java:241)
Caused by: java.io.IOException: Input path does not exist: hdfs://localhost:9000/rgs/avtemp.txt
        at org.apache.hadoop.mapreduce.lib.input.FileInputFormat.singleThreadedListStatus(FileInputFormat.java:313)
        ... 19 more
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hdfs dfs -cat /out8/*
cat: `/out8/*': No such file or directory
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ ^C
```

```
Caused by: java.io.IOException: Input path does not exist: hdfs://localhost:9000/rgs/avtemp.txt
        at org.apache.hadoop.mapreduce.lib.input.FileInputFormat.singleThreadedListStatus(FileInputFormat.java:313)
        ... 19 more
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/Min_Max_Temp.jar MMDriver /rgs/1903 /out8
2025-05-06 15:26:34,876 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-06 15:26:34,916 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-06 15:26:34,916 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-06 15:26:34,976 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-06 15:26:35,029 INFO input.FileInputFormat: Total input files to process : 1
2025-05-06 15:26:35,081 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-06 15:26:35,148 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local1063792118_0001
2025-05-06 15:26:35,148 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-06 15:26:35,215 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-06 15:26:35,216 INFO mapreduce.Job: Running job: job_local1063792118_0001
2025-05-06 15:26:35,216 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-06 15:26:35,220 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-06 15:26:35,221 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-06 15:26:35,221 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-06 15:26:35,221 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
2025-05-06 15:26:35,267 INFO mapred.LocalJobRunner: Waiting for map tasks
2025-05-06 15:26:35,268 INFO mapred.LocalJobRunner: Starting task: attempt_local1063792118_0001_m_000000_0
2025-05-06 15:26:35,278 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-06 15:26:35,278 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-06 15:26:35,279 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-06 15:26:35,286 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
2025-05-06 15:26:35,287 INFO mapred.MapTask: Processing split: hdfs://localhost:9000/rgs/1903:0+888190
2025-05-06 15:26:35,322 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
2025-05-06 15:26:35,322 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
2025-05-06 15:26:35,322 INFO mapred.MapTask: soft limit at 83886080
2025-05-06 15:26:35,322 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
2025-05-06 15:26:35,322 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
2025-05-06 15:26:35,325 INFO mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuffer
2025-05-06 15:26:35,440 INFO mapred.LocalJobRunner:
2025-05-06 15:26:35,441 INFO mapred.MapTask: Starting flush of map output
2025-05-06 15:26:35,441 INFO mapred.MapTask: Spilling map output
2025-05-06 15:26:35,441 INFO mapred.MapTask: bufstart = 0; bufend = 45948; bufvoid = 104857600
2025-05-06 15:26:35,441 INFO mapred.MapTask: kvstart = 26214396(104857584); kvend = 26188144(104752576); length = 26253/6553600
2025-05-06 15:26:35,451 INFO mapred.MapTask: Finished spill 0
2025-05-06 15:26:35,456 INFO mapred.Task: Task:attempt_local1063792118_0001_m_000000_0 is done. And is in the process of committing
2025-05-06 15:26:35,458 INFO mapred.LocalJobRunner: map
2025-05-06 15:26:35,458 INFO mapred.Task: Task 'attempt_local1063792118_0001_m_000000_0' done.
2025-05-06 15:26:35,461 INFO mapred.Task: Final Counters for attempt_local1063792118_0001_m_000000_0: Counters: 23
        File System Counters
                FILE: Number of bytes read=4359
                FILE: Number of bytes written=703803
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=888190
                HDFS: Number of bytes written=0
                HDFS: Number of read operations=5
                HDFS: Number of large read operations=0
                HDFS: Number of write operations=1
                HDFS: Number of bytes read erasure-coded=0
        Map-Reduce Framework
                Map input records=6565
```

```
2025-05-06 15:26:36,233 INFO mapreduce.Job: Counters: 36
        File System Counters
                FILE: Number of bytes read=126914
                FILE: Number of bytes written=1466688
                FILE: Number of read operations=0
                FILE: Number of large read operations=0
                FILE: Number of write operations=0
                HDFS: Number of bytes read=1776380
                HDFS: Number of bytes written=74
                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=6565
                Map output records=6564
                Map output bytes=45948
                Map output materialized bytes=59082
                Input split bytes=95
                Combine input records=0
                Combine output records=0
                Reduce input groups=12
                Reduce shuffle bytes=59082
                Reduce input records=6564
                Reduce output records=12
                Spilled Records=13128
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=0
                Total committed heap usage (bytes)=1052770304
        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=888190
        File Output Format Counters
                Bytes Written=74
```

```
hadoop@bmscecse-HP-Elite-Tower-800-G9-Desktop-PC:~$ hdfs dfs -cat /out8/*
01      4
02      0
03      7
04      44
05      100
06      168
07      219
08      198
09      141
10      100
11      19
12      3
```