Code:

```
import java.io.IOException;

import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.FloatWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.lib.input.TextInputFormat;
import org.apache.hadoop.mapreduce.lib.output.TextOutputFormat;

public class WeatherDataAverage {

   public static class TokenizerMapper extends Mapper<Object, Text, Text, FloatWritable> {

      private Text category = new Text();
      private FloatWritable temperature = new FloatWritable();
      private FloatWritable windSpeed = new FloatWritable();
      private FloatWritable dewPoint = new FloatWritable();

      public void map(Object key, Text value, Context context) throws IOException,
InterruptedException {
         String[] cols = value.toString().split(" ");
         float temp = Float.parseFloat(cols[0]);
         float wind = Float.parseFloat(cols[1]);
         float dew = Float.parseFloat(cols[2]);

         category.set("Temperature");
         temperature.set(temp);
         context.write(category, temperature);

         category.set("WindSpeed");
         windSpeed.set(wind);
         context.write(category, windSpeed);

         category.set("DewPoint");
         dewPoint.set(dew);
         context.write(category, dewPoint);
      }
   }

   public static class FloatAverageReducer extends Reducer<Text, FloatWritable, Text,
FloatWritable> {
      private FloatWritable result = new FloatWritable();

      public void reduce(Text key, Iterable<FloatWritable> values, Context context)
```

```
        throws IOException, InterruptedException {
      float sum = 0;
      int count = 0;
      for (FloatWritable a : values){sum += a.get();count++;}
      float avg = sum / count;
      result.set(avg);
      context.write(key, result);
    }
  }

  public static void main(String[] args) throws Exception {
    Configuration conf = new Configuration();
    Job job = Job.getInstance(conf, "weather data average");
    job.setJarByClass(WeatherDataAverage.class);
    job.setMapperClass(TokenizerMapper.class);
    job.setReducerClass(FloatAverageReducer.class);
    job.setMapOutputKeyClass(Text.class);
    job.setMapOutputValueClass(FloatWritable.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(FloatWritable.class);
    job.setInputFormatClass(TextInputFormat.class);
    job.setOutputFormatClass(TextOutputFormat.class);
    TextInputFormat.addInputPath(job, new Path(args[0]));
    TextOutputFormat.setOutputPath(job, new Path(args[1]));
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

Output:

```
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ start-all.sh WARNING: Attempting to
start all Apache Hadoop daemons as hdoop 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 [Pranav-Lenovo-IdeaPad-S145-15IKB]
2024-05-01 02:12:54,554 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
Starting resourcemanager
Starting nodemanagers
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ hadoop fs -mkdir weathery
2024-05-01 02:13:45,448 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ hadoop fs -mkdir weathery/input
2024-05-01 02:13:55,685 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ export HADOOP_CLASSPATH=$(hadoop
classpath)
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ echo ${HADOOP_CLASSPATH}
```

```
/home/hdoop/hadoop-3.3.6/etc/hadoop:/home/hdoop/hadoop-3.3.6/share/hadoop/
common/lib/*:/home/hdoop/hadoop-
3.3.6/share/hadoop/common/*:/home/hdoop/hadoop3.3.6/share/hadoop/hdfs:/home/hdoo
p/hadoop-3.3.6/share/hadoop/hdfs/lib/*:/home/ hdoop/hadoop-
3.3.6/share/hadoop/hdfs/*:/home/hdoop/hadoop-3.3.6/share/hadoop/
mapreduce/*:/home/hdoop/hadoop-
3.3.6/share/hadoop/yarn:/home/hdoop/hadoop3.3.6/share/hadoop/yarn/lib/*:/home/hd
oop/hadoop-3.3.6/share/hadoop/yarn/*:/ usr/lib/jvm/java-8-openjdk-
amd64/lib/tools.jar
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ hadoop fs -put
&apos;/home/hdoop/sample_weather.txt&apos; weathery/input
2024-05-01 02:15:12,274 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ javac -classpath ${HADOOP_CLASSPATH}
-d weather &apos;/home/hdoop/WeatherDataAverage.java&apos;
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~$ cd weather
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~/weather$ jar -cvf weather.jar -C
/home/hdoop/weather .
added manifest
adding: WeatherDataAverage.class(in = 1685) (out= 870)(deflated 48%)
adding: WeatherDataAverage$TokenizerMapper.class(in = 2022) (out= 867)(deflated
57%)
adding: WeatherDataAverage$FloatAverageReducer.class(in = 1807) (out= 767)
(deflated 57%)
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~/weather$ hadoop jar
&apos;/home/hdoop/weather/weather.jar&apos; WeatherDataAverage weathery/input
weathery/output
2024-05-01 02:20:12,730 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable 2024-
05-01 02:20:14,575 INFO client.DefaultNoHARMFailoverProxyProvider:
Connecting to ResourceManager at /127.0.0.1:8032
2024-05-01 02:20:15,844 WARN mapreduce.JobResourceUploader: Hadoop command-line
option parsing not performed. Implement the Tool interface and execute your
application with ToolRunner to remedy this.
2024-05-01 02:20:16,029 INFO mapreduce.JobResourceUploader: Disabling Erasure
Coding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1714509788964_0001
2024-05-01 02:20:17,917 INFO input.FileInputFormat: Total input files to process
: 1
2024-05-01 02:20:18,600 INFO mapreduce.JobSubmitter: number of splits:1
2024-05-01 02:20:19,785 INFO mapreduce.JobSubmitter: Submitting tokens for job:
job_1714509788964_0001
2024-05-01 02:20:19,786 INFO mapreduce.JobSubmitter: Executing with tokens: []
2024-05-01 02:20:20,963 INFO conf.Configuration: resource-types.xml not found
2024-05-01 02:20:20,963 INFO resource.ResourceUtils: Unable to find
&apos;resource-types.xml&apos;.
2024-05-01 02:20:21,594 INFO impl.YarnClientImpl: Submitted application
application_1714509788964_0001
2024-05-01 02:20:21,703 INFO mapreduce.Job: The url to track the job:
http://Pranav-Lenovo-IdeaPad-S145-15IKB:8088/proxy/application_1714509788964_0
001/
2024-05-01 02:20:21,705 INFO mapreduce.Job: Running job: job_1714509788964_0001
2024-05-01 02:20:54,368 INFO mapreduce.Job: Job job_1714509788964_0001 running
in uber mode : false
2024-05-01 02:20:54,371 INFO mapreduce.Job:  map 0% reduce 0%
2024-05-01 02:21:03,543 INFO mapreduce.Job:  map 100% reduce 0%
2024-05-01 02:21:10,617 INFO mapreduce.Job:  map 100% reduce 100%
2024-05-01 02:21:15,698 INFO mapreduce.Job: Job job_1714509788964_0001 completed
successfully
2024-05-01 02:21:15,859 INFO mapreduce.Job: Counters: 54
        File System Counters
```

```
        FILE: Number of bytes read=4710
        FILE: Number of bytes written=562199
        FILE: Number of read operations=0
        FILE: Number of large read operations=0
        FILE: Number of write operations=0
        HDFS: Number of bytes read=1901
        HDFS: Number of bytes written=60
        HDFS: Number of read operations=8
        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=1
        Launched reduce tasks=1
        Data-local map tasks=1
        Total time spent by all maps in occupied slots (ms)=6177
        Total time spent by all reduces in occupied slots (ms)=4547
        Total time spent by all map tasks (ms)=6177
        Total time spent by all reduce tasks (ms)=4547
        Total vcore-milliseconds taken by all map tasks=6177
        Total vcore-milliseconds taken by all reduce tasks=4547
        Total megabyte-milliseconds taken by all map tasks=6325248
        Total megabyte-milliseconds taken by all reduce tasks=4656128
Map-Reduce Framework
        Map input records=96
        Map output records=288
        Map output bytes=4128
        Map output materialized bytes=4710
        Input split bytes=131
        Combine input records=0
        Combine output records=0
        Reduce input groups=3
        Reduce shuffle bytes=4710
        Reduce input records=288
        Reduce output records=3
        Spilled Records=576
        Shuffled Maps =1
        Failed Shuffles=0
        Merged Map outputs=1
        GC time elapsed (ms)=161
        CPU time spent (ms)=2110
        Physical memory (bytes) snapshot=551534592
        Virtual memory (bytes) snapshot=5102338048
        Total committed heap usage (bytes)=406323200
        Peak Map Physical memory (bytes)=338092032
        Peak Map Virtual memory (bytes)=2551881728
        Peak Reduce Physical memory (bytes)=213442560
        Peak Reduce Virtual memory (bytes)=2550456320
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=1770
File Output Format Counters
        Bytes Written=60
```

```
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~/weather$ hadoop fs -cat
weathery/output/*
2024-05-01 02:21:51,206 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
DewPoint        59.99005
Temperature     53.58261
WindSpeed       1009.55023
hdoop@Pranav-Lenovo-IdeaPad-S145-15IKB:~/weather$
```