1. MapReduce Application to Find Maximum Temperature in Weather Dataset

Sample Weather Data (weather\_data.txt)

1950 30

1950 32

1951 25

1951 28

1951 35

1952 31

1952 29

1952 33

Note:

The **first column** represents the **year**.  
 The **second column** represents the **temperature (°C)**.

**Implementing the MapReduce Program**

**import java.io.IOException;**

**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.Mapper;**

**import org.apache.hadoop.mapreduce.Reducer;**

**import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;**

**import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;**

**public class MaxTemperature {**

**// Mapper Class**

**public static class MaxTempMapper extends Mapper<Object, Text, Text, IntWritable> {**

**private Text year = new Text();**

**private IntWritable temperature = new IntWritable();**

**public void map(Object key, Text value, Context context) throws IOException, InterruptedException {**

**String[] fields = value.toString().split("\\s+");**

**if (fields.length == 2) {**

**year.set(fields[0]); // Extract year**

**temperature.set(Integer.parseInt(fields[1])); // Extract temperature**

**context.write(year, temperature);**

**}**

**}**

**}**

**// Reducer Class**

**public static class MaxTempReducer extends Reducer<Text, IntWritable, Text, IntWritable> {**

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

**int maxTemp = Integer.MIN\_VALUE;**

**for (IntWritable val : values) {**

**maxTemp = Math.max(maxTemp, val.get());**

**}**

**context.write(key, new IntWritable(maxTemp));**

**}**

**}**

**// Driver Program**

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

**Configuration conf = new Configuration();**

**Job job = Job.getInstance(conf, "Max Temperature");**

**job.setJarByClass(MaxTemperature.class);**

**job.setMapperClass(MaxTempMapper.class);**

**job.setReducerClass(MaxTempReducer.class);**

**job.setOutputKeyClass(Text.class);**

**job.setOutputValueClass(IntWritable.class);**

**FileInputFormat.addInputPath(job, new Path(args[0]));**

**FileOutputFormat.setOutputPath(job, new Path(args[1]));**

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

**}**

**}**