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1  package equake;
2
3  import java.io.IOException;
4  import java.util.ArrayList;
5  import java.util.Collections;
6
7  import org.apache.hadoop.conf.Configuration;
8  import org.apache.hadoop.fs.Path;
9  import org.apache.hadoop.io.FloatWritable;
10 import org.apache.hadoop.io.LongWritable;
11 import org.apache.hadoop.io.Text;
12 import org.apache.hadoop.mapreduce.Job;
13 import org.apache.hadoop.mapreduce.Mapper;
14 import org.apache.hadoop.mapreduce.Mapper.Context;
15 import org.apache.hadoop.mapreduce.Reducer;
16 import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
17 import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
18 import org.apache.hadoop.util.GenericOptionsParser;
19
20 /**
21  * This class is a Map reduce program to analyze the seismic data and to
22  * tabulate the maximum magnitude value based on region
23  *
24  * @author Arun Kumar P
25  *
26  */
27 public class SeismicAnalysis {
28
29     public static void main(String[] args) throws Exception {
30         Configuration c = new Configuration();
31         String[] files = new GenericOptionsParser(c, args).getRemainingArgs();
32         Path input = new Path(files[0]);
33         Path output = new Path(files[1]);
34         Job j = new Job(c, "eqdata");
35         j.setJarByClass(SeismicAnalysis.class);
36         j.setMapperClass(SeismicMapper.class);
37         j.setReducerClass(SeismicReducer.class);
38         j.setOutputKeyClass(Text.class);
39         j.setOutputValueClass(FloatWritable.class);
40         FileInputFormat.addInputPath(j, input);
41         FileOutputFormat.setOutputPath(j, output);
42         System.exit(j.waitForCompletion(true) ? 0 : 1);
43     }
44
45     /**
46     * SeismicMap represents the mapper class.
47     * Input Key and Input value - Seismic data from csv
48     * Output Key - region (Ex -Northern California)
49     * Output Value - magnitude (1.5,1.2,1.9)
50     *
51     * @author Arun Kumar P
52     *
53     */
54     public static class SeismicMapper extends
55         Mapper<LongWritable, Text, Text, FloatWritable> {
56         /* (non-Javadoc)
57         * @see org.apache.hadoop.mapreduce.Mapper#map(KEYIN, VALUEIN,
58         org.apache.hadoop.mapreduce.Mapper.Context)
59         */
60         public void map(LongWritable key, Text value, Context con)
61             throws IOException, InterruptedException {
62             String line = value.toString();
63             String[] data = line.split(",");
64             float magnitude = Float.parseFloat(data[8]);
65             String region = data[11];
66             Text outputKey = new Text(region.toUpperCase().trim());
67             FloatWritable outputValue = new FloatWritable(magnitude);
68             con.write(outputKey, outputValue);
69         }
70     }

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69     }
70
71     /**
72     * SeismicReducer represents the reducer class
73     * Input Key      -    region (Ex - Northern California)
74     * Input value    -    magnitude (Ex - 1.5,1.2,1.9)
75     * Output Key     -    region (Ex - Northern California)
76     * Output Value   -    maximum magnitude (Ex - 3.3)
77     *
78     * @author Arun Kumar P
79     *
80     */
81     public static class SeismicReducer extends
82         Reducer<Text, FloatWritable, Text, FloatWritable> {
83         /* (non-Javadoc)
84         * @see org.apache.hadoop.mapreduce.Reducer#reduce(KEYIN, java.lang.Iterable,
85         org.apache.hadoop.mapreduce.Reducer.Context)
86         */
87         public void reduce(Text region, Iterable<FloatWritable> values,
88             Context con) throws IOException, InterruptedException {
89             ArrayList<Float> mag = new ArrayList<Float>();
90             for (FloatWritable value : values) {
91                 float val = Float.valueOf(value.get());
92                 mag.add(val);
93             }
94             float maxMag = Collections.max(mag);
95             con.write(region, new FloatWritable(maxMag));
96         }
97     }
98 }
99

```