```
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
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;
import java.io.IOException;

public class StudentGrades {

    // Mapper Class
    public static class GradesMapper extends Mapper<Object, Text, Text, Text> {
        private Text studentName = new Text();
        private Text letterGrade = new Text();

        public void map(Object key, Text value, Context context) throws IOException,
InterruptedException {
            String[] tokens = value.toString().split("\\s+"); // Split by whitespace
            studentName.set(tokens[0]); // First value is student name

            for (int i = 1; i < tokens.length; i++) {  // Process grades
                int grade = Integer.parseInt(tokens[i]);

                if (grade >= 90) {
                    letterGrade.set("O");
                } else if (grade >= 80) {
                    letterGrade.set("A+");
                } else if (grade >= 70) {
                    letterGrade.set("A");
                } else if (grade >= 60) {
                    letterGrade.set("B+");
                } else if (grade >= 50) {
                    letterGrade.set("B");
                } else if (grade >= 40) {
                    letterGrade.set("C");
                } else {
                    letterGrade.set("Fail");
                }

                context.write(studentName, letterGrade); // Emit (name, grade)
            }
        }
```

```
    }

    // Reducer Class
    public static class GradesReducer extends Reducer<Text, Text, Text, Text> {
        public void reduce(Text key, Iterable<Text> values, Context context) throws IOException,
InterruptedException {
            StringBuilder letterGrades = new StringBuilder();

            for (Text val : values) {
                letterGrades.append(val.toString()).append(" ");
            }

            context.write(new Text(String.format("| %-15s | %-20s |", key.toString(),
letterGrades.toString().trim())), null);
        }
    }

    // Driver Class
    public static void main(String[] args) throws Exception {
        Configuration conf = new Configuration();
        Job job = Job.getInstance(conf, "Student Grades");

        job.setJarByClass(StudentGrades.class);
        job.setMapperClass(GradesMapper.class);
        job.setReducerClass(GradesReducer.class);

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

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

        System.exit(job.waitForCompletion(true) ? 0 : 1);  // Run the job
    }
}

mkdir usn_prog3
 cd usn_prog3
gedit StudentGrades.java
start-all.sh
 Jps
 export HADOOP_CLASSPATH=$(hadoop classpath)
mkdir Input
cd Input
```

```
gedit grades.txt
Anusha 85 92 78
 Alice 90 88 95
 Bob 40 72 60
David 30 35 50
cd ..
 hadoop fs -mkdir /grades_usn
hadoop fs -mkdir /grades_usn/Input
 hadoop fs -put ./Input/grades.txt/ /grades_usn/Input
 export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
export PATH=$JAVA_HOME/bin:$PATH
 javac -classpath $(hadoop classpath) -d . StudentGrades.java
jar -cvf grades.jar -C . .
 hadoop jar grades.jar StudentGrades /grades_usn/Input /grades_usn/Input/output
hadoop fs -cat /grades_usn/Input/output/part-r-00000
```