

CS526 O2 – Spring 2020
Homework Assignment 1

This assignment is practice of writing simple Java programs, which involves using basic Java features and basic Java data structures. This assignment has three parts.

Part 1 (30 points). An incomplete java program named *Hw1_part1.java* is posted on the course website. Your task is to complete the program by implementing the following requirements.

The incomplete code has two methods. The first method, named *determineGrade*, receives the grades of all grading components of a student and calculates the weighted average, determines the letter grade of the student, and prints on the screen the weighted average and the letter grade. The grading components and their weights are:

Homework: 30%
Project: 10%
Midterm: 25%
Final: 35%

The letter grade is determined as follows:

$90 \leq \text{average} < 94$: A-	$94 \leq \text{average}$: A,	
$80 \leq \text{average} < 83$: B-	$83 \leq \text{average} < 87$: B	$87 \leq \text{average} < 90$: B+
$70 \leq \text{average} < 73$: C-	$73 \leq \text{average} < 77$: C	$77 \leq \text{average} < 80$: C+
$60 \leq \text{average} < 70$: D		

The signature of the method is:

```
public static void determineGrade(int homework, int project, int midterm, int finalExam)
```

The second method is the *main* method, which is used to test the *determineGrade* method. If you run your program with:

```
public static void main(String[] args) {  
    grade(100, 90, 85, 95);  
}
```

Your output should be: Average is 93.5, Grade is A-

If you run your program with:

```
public static void main(String[] args) {  
    grade(100, 100, 90, 75);  
}
```

Your output should be: Average is 88.75, Grade is B+

Part 2 (30 points). An incomplete Java program named *Hw1_part2.java* is posted on the course website. You are required to complete the program by implementing the following requirements.

This program has two methods. The first method receives an array of integers and calculates the average, the minimum, and the maximum of the integers and prints them on the screen.

The signature of this method is:

```
public static void stats(int[ ] numbers)
```

The second method is a main method. If you run this program with the following main method:

```
public static void main(String[] args) {  
    int[] a = {10, 20, 30, 40, 50};  
    int[] b = {5, 15, 25, 10, 65, 30, 55};  
    stats(a);  
    stats(b);  
}
```

Your output should be:

```
Average = 30.0, min = 10, max = 50  
Average = 29.285714285714285, min = 5, max = 65
```

Part 3 (40 points). This part is a practice of:

- Reading from a text file
- Defining a class
- Creating objects
- Using Java's *LinkedList*.

In Part 1, you wrote a program that determines the course grade of a student. In that assignment, grades of grading components were hardcoded in the main method.

For this part, you are required to write a program named *Hw1_part3.java*, which reads grades of grading components from a text file. You may want to study *SimpleIOTest3.java* and *ArrayListDemo2.java* files for reading from a text file. Note that the *ArrayListDemo2* program stores car information in *ArrayList*. For this assignment, you need to store students' grade information in *LinkedList*. Follow the instructions given below.

An input file, named *student_grades.txt*, contains grades of grading components of a number of students. The format of the input file is:

```
John, 90, 100, 70, 96  
Susan, 85, 90, 100, 100  
Molly, 93, 90, 95, 92  
Lindsey, 80, 100, 92, 100
```

Jake, 75, 80, 82, 70
Gabe, 95, 100, 100, 88

Each line has grades of one student. Note that tokens are separated by “a comma and a space.” You need this information when you parse the line (or separate the tokens). The first token is the name of a student and the four numbers that follow are homework grade, project grade, midterm grade, and the final exam grade, in that order.

You must define a class named *CourseGrade* in a separate *CourseGrade.java* file. The class definition must include at least the following:

- A constructor, which receives homework grade, project grade, midterm grade, and the final exam grade as arguments.
- The following instance variables

```
private String name;  
private int homework;  
private int project;  
private int midterm;  
private int finalExam;
```

- All necessary *getter* and *setter* methods.

Then, your program must (within the *main* method of *Hw1_part3.java*):

- Read the input file, one line at a time
- Parse a line (or separate tokens)
- Create an object of *CourseGrade* class
- Add the object to a *LinkedList*
- Repeat the above until all lines in the input file are read
- Print all students' grades in the following format:

```
Number of students is: 6  
Name = John, Average = 88.1, Letter grade = B+  
Name = Susan, Average = 94.5, Letter grade = A  
Name = Molly, Average = 92.85, Letter grade = A-  
Name = Lindsey, Average = 92.0, Letter grade = A-  
Name = Jake, Average = 75.5, Letter grade = C  
Name = Gabe, Average = 94.3, Letter grade = A
```

Note that your program must determine the average and the letter grade of each student.

Documentation

No separate documentation is needed. However, you must include sufficient inline comments within your program.

Deliverables

You must submit *Hw1_part1.java*, *Hw1_part2.java*, and *Hw1_part3.java* files. Combine the three files (and other additional files, if any) into a single archive file, name it *LastName_FirstName_hw1.EXT*, where *EXT* is an appropriate file extension, such as *zip* or *rar*, and upload it to Blackboard.

Grading

Part 1: Your program will be tested with two inputs (two sets of grading components) and up to 7 points will be deducted for each wrong output.

Part 2: Your program will be tested with two inputs (two arrays) and up to 7 points will be deducted for each wrong output.

Part 3: Your program will be tested with two input files and up to 10 points will be deducted for each input file, for which your program issues wrong output.

Up to 20 points will be deducted if your program does not have sufficient inline comments.