University of Colorado at Colorado Springs

Home Work Assignment 6

Out 11/18/2019, Due 12/2/2019

Methods and arrays (85 pts code + 5 pts pseudocode = 90 pts)

A Computer Science course has **6 students** in total. Write a program `CalculateGrades.java` that reads the 6 students' scores, gets the best score, and assigns a letter grade based on the following:

- Grade is A if score is $\geq$ best score - 10
- Grade is B if score is $\geq$ best score - 20
- Grade is C if score is $\geq$ best score - 30
- Grade is D if score is $\geq$ best score - 40
- Grade is F otherwise

The program prompts the user to enter all 6 students' scores and concludes by displaying the letter grades. Write code that uses two arrarys: `int[] grades` for the numeric grades, and `char[] letterGrades` for the letter grades. The first element in `grades` is the first student's numeric grade, the second element is for the second student, etc.; the first element in `letterGrades` is the first student's letter grade, the second element is for the second student, etc. `grades` stores the user input (numeric grades), and `letterGrades` stores the calculated letter grades.

Handle invalid user input for numeric grades by allowing the user to **repeatedly enter** grade until a valid grade (an integer between 0 and 100, both inclusive) is entered. We can assume the user input is always integer(s), but may not between 0 and 100. Design your program using the following methods:

```
// Get and store the grade for each student
public static void getGrades (int[] grades, Scanner input)

// Finds the best (highest) grade among all grades in the array
public static int findBestGrade (int[] grades)

// Determine each student's letter grade
public static void computeLetterGrades (int[] grades, char[] letterGrades, int bestGrade)
```

```
// Display a table with grade and letter grade information for each student
public static void displayGrades (int[] grades, char[] letterGrades)
```

Use tabs to separate each column in `displayGrades`. The output may look similar to the following:

```
Please enter the grades for all six students:
Enter grade for student 1: 40
Enter grade for student 2: 55
Enter grade for student 3: 70
Enter grade for student 4: 58
Enter grade for student 5: 88
Enter grade for student 6: 80

Student           Grade        Letter Grade
1                 40                F
2                 55                D
3                 70                B
4                 58                C
5                 88                A
6                 80                A
```

Error handling output:

```
Please enter the grades for all six students:
Enter grade for student 1: 40
Enter grade for student 2: 155
  Error! Numeric grade must be between 0 and 100, enter grade again: 105
  Error! Numeric grade must be between 0 and 100, enter grade again: 55
Enter grade for student 3: 70
Enter grade for student 4: -5
  Error! Numeric grade must be between 0 and 100, enter grade again: 58
Enter grade for student 5: 88
Enter grade for student 6: 80

Student           Grade        Letter Grade
1                 40                F
2                 55                D
3                 70                B
4                 58                C
5                 88                A
6                 80                A
```

Tips: you may write the method `getGrades()` first without the validation. Get it working for obtaining the grades, then go back and add the validation. Write code incrementally: test each method to make sure it produces the correct results. Please do not change any method's argument (type, order) and return value.

Submission

Please save your programs in a Java file, containing **pseudocode**. You may include your pseudocode in a block comment using `/* ... */`. **10 pts are given to your coding style** (comments – header and in-code comments: up to 4 pts, naming conventions: up to 3 pts, proper indentation/spacing: up to 3 pts). We will run each program several times with our input and verify that the results are correct.

Please place your file in a folder called **hw6-firstname-lastname** and zip it. The zipped file should be named **hw6-firstname-lastname.zip**. Please submit the zipped file to Canvas by the due date.