Classwork 8: Class Grades Simulator

In-class Date: Wednesday 17 April
Due Date: Wednesday 24 April

Objectives

Practice writing a program that uses a `switch` statement, the `+=` assignment operator, and a `for` loop.

Assignment

Write a program to simulate class letter grades (A, B, C, D, or F) and output the count of each letter grade to the screen. To do this, you will utilize a for loop that calculates a random letter grade each time through the loop, then utilizes a switch statement to update the appropriate counter variable using the += assignment operator. Make sure the default case warns the user of invalid letter grade. Outside the loop, you will print the final results.

Example Compilation and Execution

```
[arsenaul@linux1 cw8]$ gcc -Wall grades.c
[arsenaul@linux1 cw8]$ ./a.out
Out of 36 students, here is the class grade breakdown:
A: 10
B: 8
C: 10
D: 3
F: 5
[arsenaul@linux1 cw8]$
```

Starter Code

Use this code to help you get started.

```
/*************************************
** File:  grades.c
** Author: <myName>
** Date:  <todaysDate>
** Section: CMSC104 Section 02
** E-mail: <myEmailAddress>
**
** This file contains the main program for Classwork 8.
** The program randomly generates letter grades (ABCDF),
** counts how many of each there are,
** and prints the results to the screen.
*************************************/

#include<stdio.h>
```

```
#include<stdlib.h>
#include<time.h>

#define TOTAL_GRADES 36

int main() {
   // Letter grade counter variables
   // TODO: Initialize each variable appropriately.
   int numA;
   int numB;
   int numC;
   int numD;
   int numF;

   // Variables used in grades loop
   int gradeCounter;
   int totalGrades = TOTAL_GRADES;

   // Variable used to simulate each letter grade
   char letterGrade;

   // Seed the random number generator
   srandom(time(0));

   // Counter-controlled loop to simulate class letter grades
   for (gradeCounter = 0; gradeCounter < totalGrades; gradeCounter++) {
      // Randomly generate a letter grade from ABCDF
      letterGrade = "ABCDF" [random() % 5];

      // TODO: Create a switch statement on letterGrade
      // to update num variables using += assignment operator.
      // NOTE: Don't forget the default case for invalid letterGrade.
   }

   // Print out the final results
   printf("Out of %d grades, here is the class grade breakdown:\n", totalGrades);
   printf("A: %d\n", numA);
   printf("B: %d\n", numB);
   printf("C: %d\n", numC);
   printf("D: %d\n", numD);
   printf("F: %d\n", numF);

   return 0;
}
```

Notes

Notice how the `for` loop in the program is provided for you, it terminates after the correct number of grades have been simulated, and for the basic assignment, there is no user input.

Notice how the starting point file uses `#define` to define a constant `TOTAL_GRADES` that holds the number of grades to simulate. That way, if you want/need to change the total number, you only have to change it in one place.

Extra Credit

Try to do the following embellishments:

Option 1: After the printout of results, add an if-else block that tells the user if First-Year Intervention (FYI) notifications need to be sent, and if so, how many. To determine if any need to be sent, count how many Ds and Fs there are.

Option 2: Ask the user for how many grades to simulate. Warn the user if they enter something less than 0. If the user enters 0, print the following to the screen: "Sorry to see you don't want to use my simulator" with a newline at the end for proper display on screen.

Option 3: Change the provided for loop to a while loop.

Grading Rubric

- Header comment: 2 points
- Body comments: 3 points
- Compiles: 30 points
- Proper logic: 55 points
- typescript: 10 points
- EC1: +5 points
- EC2: +5 points
- EC3: +5 points

What to Submit

Use the `script` command to record yourself compiling and running your program 3 times. (Do not record yourself editing your program!) Exit from script. Submit your program and the typescript file.

```
[arsenaul@linux1 cw8]$ submit cmsc104_arsenaul cw8 grades.c typescript
```

Verify

Make sure you submitted the assignment correctly.

```
[arsenaul@linux1 cw8]$ submitls cmsc104_arsenaul cw8
```