

UNIVERSITY *of* MARYLAND  
UNIVERSITY COLLEGE - *Asian Division*

## Project 1: Grade Distribution Program

### Objective:

In this lab you will write a C++ programming language program that utilizes input, output, conditional statements, a loop, functions, and writing to a file. The program is due the second week of classes at the beginning of the last class.

### Program Requirements:

Write a program that will accept a series of test scores between 100 and 0. The program will calculate the grade distribution for a class, based on the grading scale 100 to 90 = A; 89 to 80 = B; 79 to 70 = C; 69 to 60 = D; 59 and below = F. When a negative number is entered, it is to signal that all scores have been entered and to calculate the results. The computer will calculate the average for all entered scores, display the average, and grade distribution. Along with the grade distribution the program should also display a bar graph with an '=' sign representing a score within that range. A possible display of the final output is shown below, but feel free to be creative on this.

```
A's = 5 |=====
B's = 16 |=====
C's = 12 |=====
D's = 2  |==
F's = 5  |=====
Average = 82% for the 40 Scores
```

An integral part of writing a program is the flow chart. By constructing a flow chart you can conceptualize and fix the sequencing of instructions before you waste time writing code that can't work. Program submissions without flow charts will not be accepted.

Variables must be named using "Hungarian Notation" as described in class. Points will be deducted if they are not. All control statements must be properly indented using the layout conventions as shown in either the class or the text. It is far easier to debug programs that have common code conventions and good programming structure. Often by redrawing the flowchart and reviewing your source code you will discover your own "bug". Programming requires mental discipline and disciplined coding practices. You are required to create at least one function for this program.

### PROJECT REPORT:

Submit; on or before the due date the following for grading: A cover sheet with your name and project name. Program specifications document that describes the analysis involved during the problem solving phase. This must include a flow chart labeling major processing sections and test data. Include a source code listing for your program and a printout of both your output window and the output file. Note as specified on the Syllabus a grade of 80% will be awarded for fulfilling all program specifications in a minimal way. To exceed an 80% grade you must exceed the requirements and neatness does count. Creating two user defined functions would certainly increase your score.