If Statement Programming Example

Problem Description:

Many universities send warning notices to freshmen who are in danger of failing a class. This program should calculate the average of three test grades and print out a students ID number, average and whether or not the student is passing. Passing is a 60-point average or better. If the student is passing with less than a 70 average, the program should indicate that he or she is marginal.

Discussion:

To calculate the average, the three test scores must be read, added and divided by 3. To print out the appropriate message, the average is tested to see if it is less than 60, and if it is at least 60 then it must be tested to see if it is less than 70.

All test scores must be tested for being positive. Use a Boolean variable to indicate the status of the test scores.

Assumptions:

That test scores are numbers and that student id is a valid number that does not exceed the value for a long integer. (solution just uses long, but in all reality it should be an unsigned long)

Functional Decomposition:

Notices Program

Obtain Data
Prompt for input of ID number and three test scores
Read in the ID number and the test scores
Print out the ID number and scores read

Verify that test scores are positive
If all test scores are greater than or equal to zero, then set dataOK to true
Otherwise set dataOK to false.

If dataOK is true
Calculate average: average = (sum of test scores)/3.0 (avoid integer division)
Print status message
   If average greater than or equal to 60 print out “passing”
   Then if average is less than 70 print out “but marginal”
   Otherwise print out “Failing”.

Else dataOK is false
Print out message indicating that one or more test scores are negative
Enter a Student ID number and three test scores:
12345 45 65 66
Student number: 12345  Test Scores: 45, 65, 66
Average score is 58.67--Failing.

Enter a Student ID number and three test scores:
12345 56 67 65
Student number: 12345  Test Scores: 56, 67, 65
Average score is 62.67--Passing but marginal.

Enter a Student ID number and three test scores:
12345 77 87 97
Student number: 12345  Test Scores: 77, 87, 97
Average score is 87.00—Passing.

Enter a Student ID number and three test scores:
12345  12  -75  87
Student number: 12345  Test Scores: 12, -75, 87
Invalid Data: One or more score is less than zero.