Lab 4 Calculations

Introduction to Computer Science I

# Objectives:

After performing this lab, the students should be able to

* write C++ programs that involve arithmetic expressions

# Names of Lab Group Members:

## Activity

Directions: For each programming exercise, provide your C++ source code and screenshot of your program output.

**Part I - Expressions**

1. **Evaluate the following expressions by hand:**

Assume the following variable declarations:

int x = 12, y = 3, z = 8, result = 3;

double u = 2.0, v = 0.5;

|  |  |
| --- | --- |
| Question | Answer |
| result \* 5; |  |
| u / v + x; |  |
| z % y; |  |
| z \* y / x; |  |

1. **Modify the program below so that it allows the user enters two numbers for hours and minutes, and the program outputs total minutes.**

|  |  |
| --- | --- |
| #include <iostream>  **using** **namespace** std;  **int** main() {  **int** min; // User input: Minutes  **int** hrs, minRem; // Hours, & min remaining  cout << "Enter minutes: ";  cin >> min;  hrs = min / 60;  minRem = min % 60;  cout << min << " minutes is ";  cout << hrs << " hours and ";  cout << minRem << " minutes.\n";  **return** 0;  } | Enter minutes: 367  367 minutes is 6 hours and 7 minutes.  ...  Enter minutes: 180  180 minutes is 3 hours and 0 minutes. |

### Part II. Grading Calculator

The following program calculates an overall grade in a course based on three equally weighted exams:

**Grade calculator: Average score on three exams.**

|  |  |
| --- | --- |
| #include <iostream>  **using** **namespace** std;  **int** main() {  **double** exam1Grade, exam2Grade, exam3Grade;  **double** overallGrade;    cout << "Enter score on Exam 1 (out of 100): ";  cin >> exam1Grade;    cout << "Enter score on Exam 2 (out of 100): ";  cin >> exam2Grade;  cout << "Enter score on Exam 3 (out of 100): ";  cin >> exam3Grade;    overallGrade = (exam1Grade + exam2Grade + exam3Grade)/3.0;    cout << "Your overall grade is: " << overallGrade << endl;    **return** 0;  } | Enter score on Exam 1 (out of 100): 92.4  Enter score on Exam 2 (out of 100): 89.5  Enter score on Exam 3 (out of 100): 95.4  Your overall grade is: 92.4333  ...  Enter score on Exam 1 (out of 100): 85.3  Enter score on Exam 2 (out of 100): 88.4  Enter score on Exam 3 (out of 100): 96.3  Your overall grade is: 90 |

Write a different version of this program that calculates the overall grade for a course with three equally weighted exams (graded out of 100) that account for 60% of the overall grade and four equally weighted programming assignments (graded out of 50) that account for 40% of the overall graded. Hint: The overall grade can be calculated as 0.6 \* averageExamScore + 0.4 \* averageProgScore.

Display your outputs in the following formats (you do *not* need to format the floating-point numbers to a specific number of decimal places):

Enter score on Exam 1 (out of 100): 98

Enter score on Exam 2 (out of 100): 89.5

Enter score on Exam 3 (out of 100): 95

Your overall exam grade is: 94.1667%

Enter score on Programming Assignment 1 (out of 50): 45

Enter score on Programming Assignment 2 (out of 50): 50

Enter score on Programming Assignment 3 (out of 50): 38

Enter score on Programming Assignment 4 (out of 50): 44

Your overall programming assignment grade is: 88.5%

Your overall grade is 91.9%

When you are done, check with the instructor to make sure all exercises look good before you submit your report.