EE3093 Tutorial: C++ week 4

Instructions to users

This tutorial can be completed up to 3 degrees of complexity (one for each section); make sure you have understood and completed a section (i.e. code implemented and tested successfully) before moving on to the next one.

Part 1: Basic

Follow the instructions given in the second Tutorial and create (in a new directory) a new project (e.g. TUT4).

Copy to the TUT4 folder any header/cpp file (supplied or created by you for/during any past tutorial or lab) relative to the class rectangle object; then "Add each item to the current Project" (as per instructions in TUT2).

Modify class "rectangle" **AS SHOWN IN LECTURES THIS WEEK**, so that it supports the following **operator**:

"**=**" used for **copy constructor** AND for **assignment**; example:

rectangle testobj0, testobj1;
testobj0.inputSides(10,1);
testobj1 = testobj0; // testobj1 is initialized with values for sideA and sideB equal to those testobj0;

Test your implementation: write & run a routine analogous to the ones shown in lectures this week.

Part 2: Intermediate

Modify class "rectangle" **ALONG THE LINES OF THE CONCEPTS SHOWN IN LECTURES THIS WEEK**, so that it supports the following **operators**:

"**+=**" used to increment a rectangle; example:

rectangle testobj0, testobj1;
testobj0.inputSides(5,5); // Area of testobj0 is A0 = sideA0 * sideB0 = 5 * 5
testobj1.inputSides(10,2); // Area of testobj1 is A1 = sideA1 * sideB1 = 10 * 2
testobj1 += testobj0;
// the operator must increment sideA1 as: sideA1 = sideA1 + X; (sideB1 remains as is).
// the value of X is determined so that testobj1 area after the increment equals: A0 + (A1 before the increment);

"**+**" used to add to rectangles, following the same rules (on the total area) outlined above for +=; example:

rectangle testobj0, testobj1;
testobj0.inputSides(5,5);
testobj1.inputSides(10,2);
rectangle testobj2 = testobj0 + testobj1;
// the sides of testobj2 must be such that: Area of testobj2 = (Area of testobj0) + (Area of testobj1)

Test your implementation: write & run a routine analogous to the ones shown in lectures this week.

Part 3: Advanced

Modify the implementation of the class "rectangle" obtained above so that the "**+=**"**operator** behaves as follows:

testobj1 += testobj0;

// the operator must increment sideA1 and sideB1 by an amount X: sideA1 = sideA1 + X; sideB1 = sideB1 + X ;
// write a member function to determine the value of X that yields $A_1' = A_1 + A_0$, where:
// A_1' is the area of testobj1 area after the increment (i.e. when its sides are set to: sideA1 + X; sideB1 + X);
// A_1 is the area of testobj1 before the increment; A_0 is the area of testobj0.

Note: $ax^2 + bx + c = 0 \Rightarrow x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$; for this problem, only the positive solution (x > 0) is acceptable.

// Again: "**+**" should follow the same rules on the total area as outlined above. Check this is the case.

Test your implementation: write & run a routine analogous to the ones shown in lectures this week to test your implementation of the operator "+=".