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| Computer Programming Language |

【Fall, 2015】

Homework 1

**Program A： Output to the console screen (25%)**

Write a program that output a text drawing to the console screen as follows. You may also design your own drawing.

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`>>x<<´

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**Program B： Simple calculation (25%)**

Study section 2.5 in our textbook and study the Program 2.7. Modify Program 2.7 to calculate the average of three numbers. Compile and run your program.

**Program C： Simple calculation (25%)**

Study section 2.6 in our textbook and study the Program 2.11. Modify Program 2.11 to calculate the speed of a car whose received radar frequency is 2.00000035 × 1010 sec-1. Compile and run your program.

**Program D： Programming a mathematical formula (25%)**

1. The increase in length of a rectangular slab of metal that’s fixed at one end and pulled by a force at its other end is given by this formula:

*I* = *F* × *k* × *l* / ( *w* × *d* × *ε* )

*I* is the increase in length (mm).

*F* is the applied force (N = kg-m/s2).

*k* is 1000 (conversion of *F* to millimeter units).

*l* is the slab’s length (mm).

*w* is the slab’s width (mm).

*d* is the slab’s depth (mm).

*ε* is the metal’s modulus of elasticity (N/mm2).

Given this information, design, write, compile, and run a C++ program to calsulate the increase in length when a slab of aluminum that is 3 meters long, 4 cm wide, and 2 mm deep is subjected to a force of 4 Newtons. Aluminum’s modulus of elasticity is 68,950 N/mm2. (Hint: Make sure to convert the length and width to mm dimensions.) Verify the result produced by your program with a hand calculation.

1. After verifying that your program is working correctly, use it to determine the increase in length for a slab of copper having the same dimensions as the aluminum slab described above. Copper’s modulus of elasticity is 110,000 N/mm2.

**Notes:**

1. Please submit your programs (source codes and execution files) to the CEIBA course website before **Oct. 1**. Hand in the hardcopies of your program codes in the class of **Oct. 1 (3:30PM)**.
2. File naming convention for your programs should be as follows:

HW01A001.CPP

HW01A001.EXE

where HW01A represents the homework number (01, 02, 03, etc.) and which program (A, B, C, etc.) of that homework. The 001 code represents your student ID assigned to you in our course.

1. Make sure to provide header comments at the beginning of your program. The header should look like this:

//================================================================

// PROGRAMMER : Your name here

// DATE : 2015-09-31

// FILENAME : HW01B001.CPP

// DESCRIPTION : This is a program to compute the average of three integers

//================================================================

1. Late submission will have a penalty of 10% discount per day of your grade toward a minimum score of 60. No late submission over a week will be accepted.
2. Criteria of grading include: (1) Program functionality; (2) User interface; (3) Structure of the program; (4) Suitable comments; (5) Programming style; (6) Creativity.