CISC 1110 (CIS 1.5)
Introduction to Programming Using C++

Spring 2012

Instructor : K. Auyeung

Email Address: kenny@sci.brooklyn.cuny.edu

Course Page: http://www.sci.brooklyn.cuny.edu/~kenny/cisc1110

Class Hours: MW 2:40 – 4:45PM 4428N

Agenda

- Introduction to Course
- What is Programming
- A little bit about you…
- Lab #1

Introduction to Programming

- Introduction to computer programming using the C++ language.

- Uses robotics as a context (i.e., the basis for examples and some of the lab exercises).

- Announcement: Students cannot take both CIS 1110 and CORC 1312 (the CIS component of the Core) at the same time; if they do, they will not receive credit for both courses. Students who are currently registered for both should drop one of them. It is allowed to take first CORC 1312 and then CIS 1110 but not vice versa. It is also allowed to take CORC 1311 (the math component of the Core) and CIS 1110 at the same time.

- **Final Exam : Wednesday, May 23rd, 10:30AM-12:30PM**

Topics

The following topics will be covered in 9 units:

1. Introduction; output
2. Simple data types
3. Less simple data types (arrays and strings)
4. Input using variables
5. Control structures
6. Functions
7. Input and output using files
8. Basic algorithms (finding min/max, sorting, searching)
9. Simple classes

Course Structure

- Lecture & Lab

- The labs will be hands-on sessions using laptops in the classroom.

Textbook & Supplies

- "Problem Solving With C++" 2nd Edition by Jones, J. A. & Harrow, K.
  (ISBN: 978-0-558-20651-2)

- Flash drive

- Code::Blocks, free C++ IDE from www.codeblocks.org

Learning how to program...

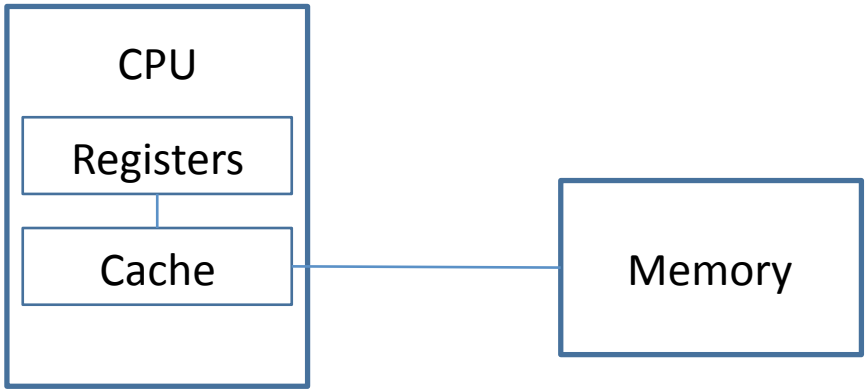
- YOU are responsible for your own learning!
- YOU must PRACTICE, PRACTICE, PRACTICE… and PRACTICE some more!
- If you don't understand, then ASK for HELP
    - Tutors
    - Web Tutorials
    - Books
    - The Instructor
    - Your peers

Programming

- There are currently hundreds of programming languages, dating back to the 1950s
  - Fortran
  - COBOL
  - LISP
  - ALGOL 58
  - AutoCode
  - Ruby
  - Pearl
  - Java
  - C/C++
  - Python

Computer Components

•A computer is NOTHING without software



– I/O Devices
– Memory
– Arithmetic and Logic Unit (ALU)
– Central Processing Unit (CPU)

Computer Instructions

•What is a program?

A program is a set of instructions that a computer can execute.

•Evolution of programming languages
    Machine Code
    Assemblers
    Higher-level languages

•A Program is compiled into machine language before it can be run

Machine Language

- Lowest level
  What computers (hardware) actually understand

- A computer is comprised of billions of switches
  Switches = ON or OFF

- Hardware state is abstracted into software as 1's and 0's
  1's and 0's ! base 2, or binary

Assembly Language

- Medium level, but still pretty low. Hard to read or understand
- Some ”English” words and abbreviates

High-Level Language

- Examples: C, FORTRAN, C++, Java, Scheme, C#, Python

- Even more like ”English”

- High-level languages are

    1. compiled into machine language or object code
    2. linked into executable code
    3. Executed or ran as programs

Language Comparison

•Machine language:

000000 00001 00010 00110 00000 100000

•Assembly language:

LOAD BASEPAY
ADD OVERPAY
STORE GROSSPAY

• High-level language:

grossPay = basePay + overTimePay;

Compilers

- There are lots of C++ compilers and programming environments
- In class, we'll use a free, open source integrated development environment called "Code::Blocks" which uses GCC; **www.codeblocks.org**
- With an IDE, you can edit your computer program's source code and then compile the source code into an executable application; and then you can run the application
- However, you can use any IDE (Integrated Development Environment) you would like...
- Other IDEs "BloodShed Dev C++", "Eclipse" & "Xcode" (Mac)

C++

• C++ is an object-oriented language: it is structured around objects and methods, where a method is an action or something you do with the object

• C++ programs are divided into entities called classes

• Some C++ class are native but you can also write classes yourself

• CISC 1110 covers C++ syntax and general programming concepts.

Our First C++ program

- ”Hello World!”
  - Normally the first program in any language or platform
  - Very basic, but Classic
  - Output only (no input, just print)

Source Code

```
/*
* helloWorld.cpp
*
* This program demonstrates output from a C++
* application.
*
*/

#include <iostream>

using namespace std;

int main() {

   cout << "Hello world!\n";

   return 0;
}
```

To Do

- Order your textbook:
  "Problem Solving With C++" 2nd Edition by Jones, J. A. & Harrow, K.
  (ISBN: 978-0-558-20651-2)

- Flash drive

- Download Code::Blocks, free C++ IDE from **www.codeblocks.org**

- Complete survey and give it to me before you leave

- Complete Lab #1