Computer Programming
Lecture 1

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Some Materials

- Textbook
  - P. Deitel and H. Deitel, "C++ How to Program: Late Objects Version", 7th Edition, 2010
    - http://www.deitel.com/Books/C/CHowtoProgramLateObjectsVersion7e/tabid/3608/Default.aspx
    - Download Code Examples and Other Premium Content for Registered Users
- Reference: C++ Tutorial
  - http://www.cplusplus.com/doc/tutorial/program_structure/

C++ Compiler

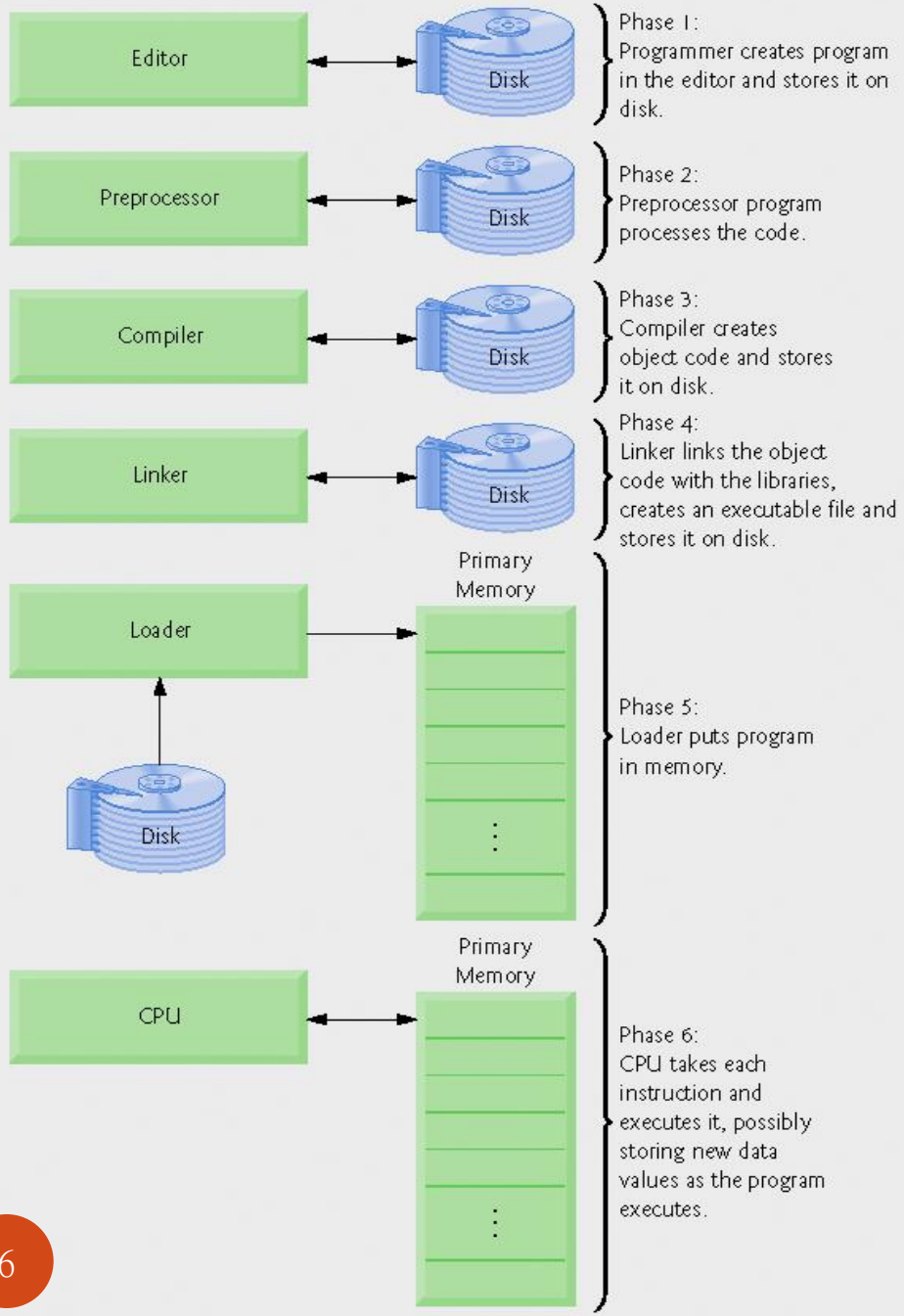
- What is a compiler
  - Computer program that translates a high-level language into machine language
  - Computer only understand machine language

Other (free) compilers

- Dev C++
  - http://www.bloodshed.net/devcpp.html
- Code Block
  - http://www.codeblocks.org/
- GNU C++ compiler
  - g++
  - Platform
    - Linux
    - Cygwin: Linux-link environment in Windows
- Editor
  - emac / vi / or any other editors
- Debugging
  - gdb

Brief history of C/C++

- C
  - Evolve from B
  - Dennis Ritchie, Bell Labs, early 1973
  - Structured programming
    - functions/procedures
- C++
  - Bjarne Stroustrup, Bell Labs, 1983
  - Object-oriented programming language
- Why C++?
  - It is fast
  - It is widely used (portable to other computers)
  - Object-oriented



Run a C++ Program

- Editor
  - Write a program
- Preprocessor
  - Check the program
- Compiler
  - Create object code
- Linker
  - Link object code with libraries
- Loader
  - Load program into memory
- execution

Syntax and syntax error

- Syntax
  - Grammar of a programming language
- Syntax error
  - Wrong grammar!
  - Computer does not understand it

Your first C++ program

```
1  // Fig. 2.1: fig02_01.cpp
2  // Text-printing program.
3  #include <iostream> // allows program to output data to the screen
4
5  // function main begins program execution
6  int main()
7  {
8     std::cout << "Welcome to C++!\n"; // display message
9
10    return 0; // indicate that program ended successfully
11
12 } // end function main
```

Comments (Line 1 & 2)

- At the beginning of a program
  - Comments to describe the program
    - Author
    - Date/time
    - Copyright information
    - Descriptions of the program
      - Purpose
      - How to use this program

Add an 1-line comment

- //
  - One-line comment
  - Syntax

    // your comments here
  - Example

    // Fig. 2.1: fig02_01.cpp

    // Text-printing program.

Add multiple lines of comments

- /* */
  - Multiple-line comment
  - Syntax

    /* first line of your comments
        second line of your comments
        third line of your comments */
  - Example

```
/* Fig. 2.1: fig02_01.cpp
   Text-printing program. */
```

Include a header file (Line 3)

- #
  - Notify the “preprocessor” before compiling
- Header file
  - C++ has some built-in library
  - We need to “*include*” the library before using it
- #include <iostream>
  - <iostream> is used to input data or output data
  - Always include <iostream> if you want to input data or output data in a program

Beginning of the main function (Line 6)

- int main
  - Main program in **every** C++ program
  - int
    - Integer
    - Main program returns an interger
- {
  - Begin of a function

Display on the screen (Line 8)

- std::cout << “Welcome to C++!\n”;
  - Display “Welcome to C++!” on screen
- std:: cout
  - Output text on screen
  - From <iostream>
- “ ”
  - “ this is a string”
- \n
  - Change a line
- ;
  - Every statement ends with “;”

Output a *special* character

std::cout << “Welcome to C++!\n”;

Escape sequence	Description
\n	Newline. Position the screen cursor to the beginning of the next line.
\t	Horizontal tab. Move the screen cursor to the next tab stop.
\r	Carriage return. Position the screen cursor to the beginning of the current line; do not advance to the next line.
\a	Alert. Sound the system bell.
\\	Backslash. Used to print a backslash character.
\'	Single quote. Use to print a single quote character.
\"	Double quote. Used to print a double quote character.

Return (Line 10)

- Return 0;
  - Indicate the main program ended successfully
  - Include this line in every main program

End of the main function (Line 12)

- }
  - End of the main function
- Syntax of the main function

```
int main()
{
    this is your program


}
```

```
1  // Fig. 2.1: fig02_01.cpp
2  // Text-printing program.
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Programming with a style

- Use comments
  - Other people cannot understand your codes without comments
  - You may forget what you wrote before ☹
- Use *space* between lines
- Use *tab* between sections