CSE 102: Computer Programming

Lecture 1

Introduction

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Course Information

- Course Code: CSE-102
- Course Name: Computer Programming
- Course Credit Hours: 3
- Course Group Address:

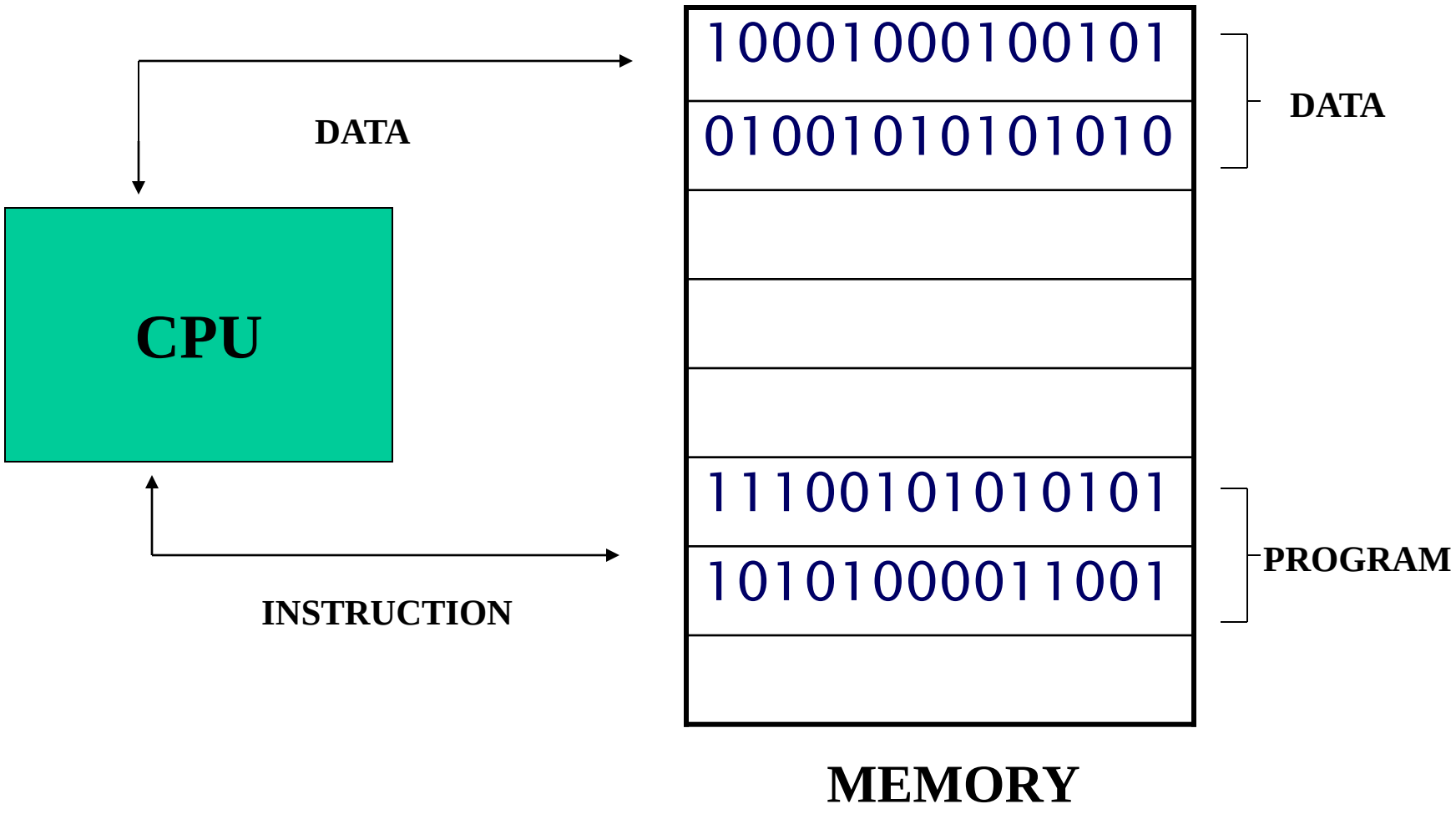
https://classroom.google.com/u/0/c/NjE1NzM1NTU0MTda

Class Code: n6ep54h

Why Programming Language?

- Computer only understands machine language
  - Consists of 1s and 0s
  - 1001011100001000
- Initially all computers were programmed using machine language
  - Difficult and cumbersome
  - Only small programs can be written

MEMORY ORGANIZATION



LOW AND HIGH LEVEL PROGRAMMING

- **Lowest Level: Machine Codes**
- Directly process able, written in binary:
- 10001011 01100111 10011011 11000111
- Hard to ‘read’, slow to create, fast to run.

LOW AND HIGH LEVEL PROGRAMMING

- **Next lowest level: Assembler**
- Mnemonics directly represent machine code, Symbolic, :
  - mov A, 90h;
  - inc A;
  - jnz loop;
- Human readable, slow to create, fast to run, processor specific.

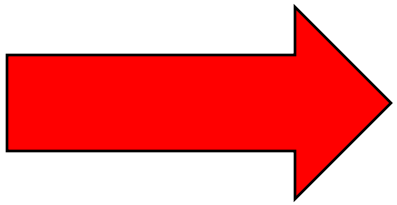
LOW AND HIGH LEVEL PROGRAMMING

- **High level: Pascal, ‘C’, Fortran, ‘C++’/Java etc**
- One statement is equivalent of many machine code operations.
- Human understandable, fast to write.

High-Level Language

```
#include <iostream>

int main()
{
 std::cout<<"HelloWorld";
 return 0;
}
```



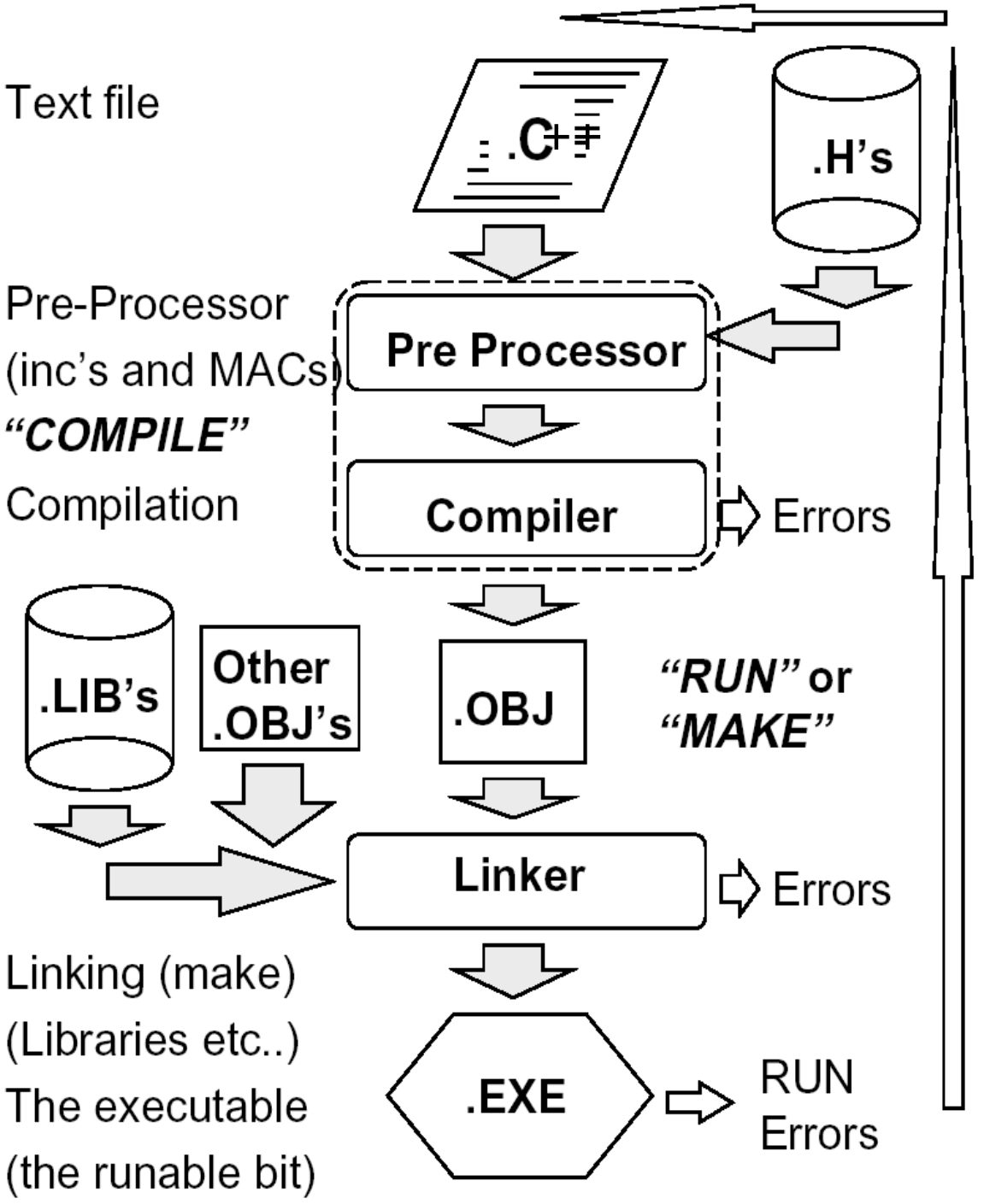
```
10100110 01110110
00100110 00000000
11111010 11111010
01001110 10100110
11100110 10010110
11001110 00101110
10100110 01001110
11111010 01100110
01001110 10000110
etc...
```

Source code

Executable code

- Compilers and linkers translate a high level program into executable machine code.

Steps in compilation of C++ Program



Structure of C++ Program

- C++ program consists of three main parts;
  - Preprocessor Directives.
    - Start with “#”
  - The main( ) function.
  - C++ statements.

C++ Program:

```
#include <iostream>

int main()
{
  std::cout<<"Hello World!";
  return 0;
}
```

Basic Structure of a C++ Program

Example: Hello World

output “Hello World!”

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<“Hello World!”;
   return 0;
}
```

Basic Structure of a C++ Program (cont)

Example: Hello world

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<"Hello World!";
   return 0;
}
```

Includes standard input/output library of procedures.

Read: "Hash-include"

Basic Structure of a C++ Program (cont)

Example: Hello world

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<"Hello World!";
   return 0;
}
```

every C++ program must have a main

Basic Structure of a C++ Program

Example: Hello World

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<"Hello World";
   return 0;
}
```

Curly braces mark the **beginning** and **end** of a block of instructions.

Basic Structure of a C++ Program

Example: Hello World

Instruction (**function call**) to output "Hello World"

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<"Hello World";

   return 0;
}
```

Basic Structure of a C++ Program

Example: Hello World

"Statements" (lines of instructions) always end with a **semi-colon** (;)

C++ Program:

```
#include <iostream>

int main()
{
   std::cout<<"Hello World";
   return 0;
}
```

C and C++

- Traditionally C programs use the file extension .C and C++ programs the extension .CPP
- C is essentially a subset of C++, so you could use a C++ compiler to run a C program. The two languages are extremely similar.
- In the labs we will be using a Code::Blocks software (codeblocks-16.01mingw-setup.exe).

https://sourceforge.net/projects/codeblocks/files/Binaries/16.01/Windows/

Some Programmer Jargon

- Some words that will be used a lot:
  - Source code: The stuff you type into the computer. The program you are writing.
  - Compile (build): Taking source code and making a program that the computer can understand.
  - Executable: The compiled program that the computer can run.
  - Library: Added functions for C++. programming to do certain tasks.
  - Header file: Files ending in .h which are included at the start of source code.