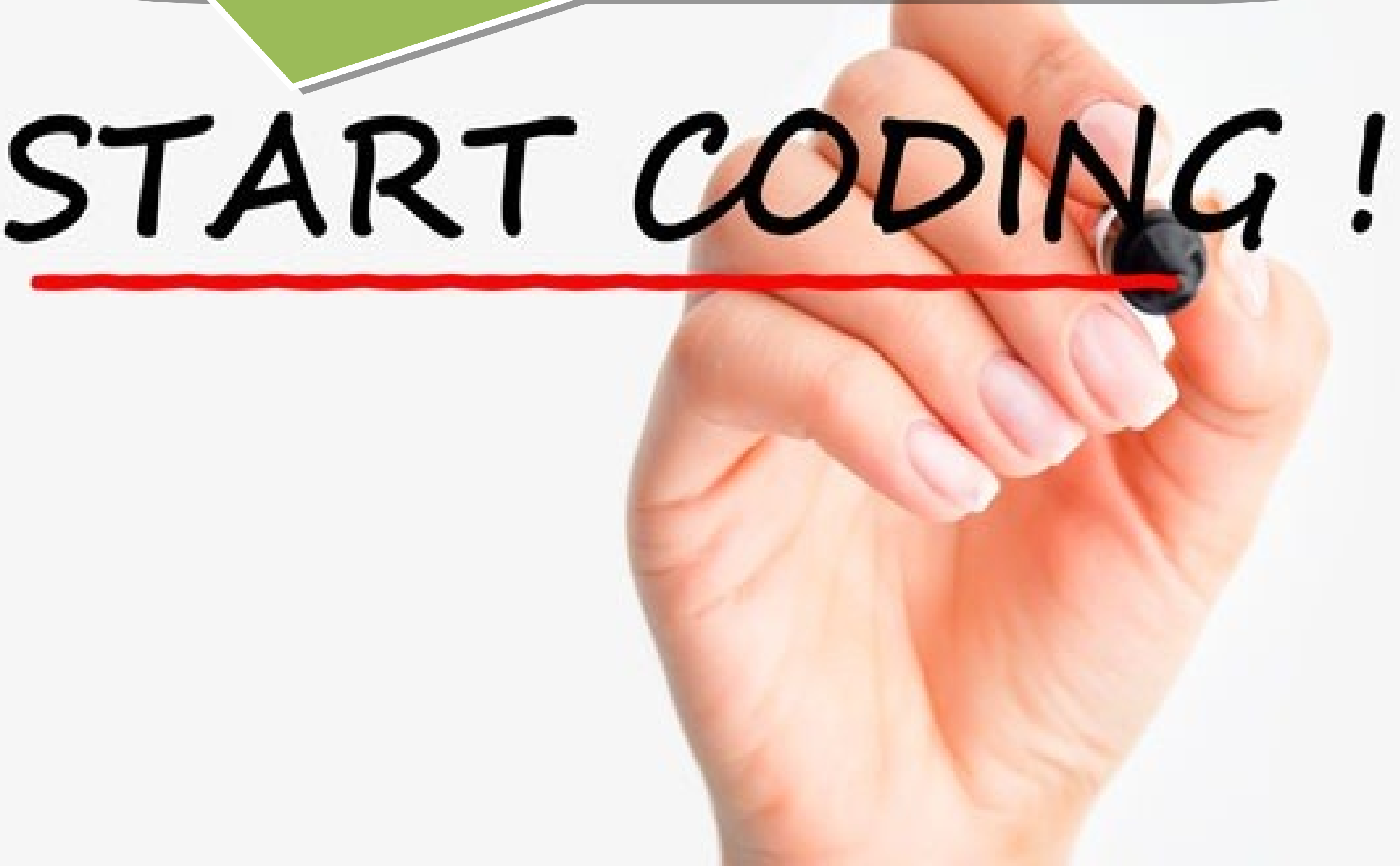
Let Us

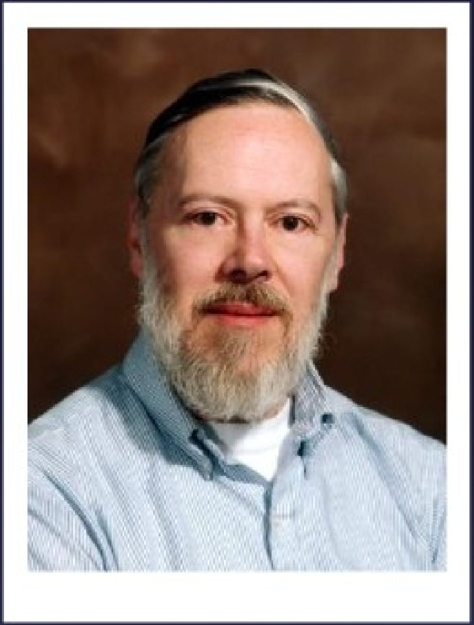
First Step to the 21st Century Literacy : Programming



Introduction to C

- The C programming language was designed or invented by Dennis Ritchie at Bell Laboratories in the early 1970s
- Influenced by
  - ALGOL 60 (1960),
  - CPL (Cambridge, 1963),
  - BCPL (Martin Richard, 1967),
  - B (Ken Thompson, 1970)
- Traditional C:
  - *The C Programming Language*, by Brian Kernighan and Dennis Ritchie, 2nd Edition, Prentice Hall
  - Referred to as *K&R*
- Standardized in 1989 by ANSI (American National Standards Institute) known as ANSI C

The Father of C Programming and UNIX



DENNIS RITCHIE

Američan, 1941

"I am not now, nor have I ever been,
a member of the demigodic party."

The C Programming Language

Harvard

Bell Labs

UNIX

Introduction to C

- C is a Middle-level language: suitable language for systems programming
- It is a procedural or sequential language
- C is also called ELL or English like language
- C is easy to learn or understand
- It is a case sensitive language
- C is a small language: relies on a “library” of standard functions
- C is highly portable: means that c programs written for one computer can be run on other computer with no modification.
- C is a permissive language: it assumes that you know what you’re doing, so it allows you a wider degree of latitude than many languages. It doesn’t mandate the detailed error-checking found in other language

Strength of C

1. Portability: means that c programs written for one computer can be run on other computer with no modification.
2. Robustness: it is a robust language which is rich in built in functions and operators.
3. Easy to understand: it is called ELL as almost all the structures are very much similar to English language.
4. Efficiency: intended for applications where assembly language had traditionally been used.
5. Power: large collection of data types and operators
6. Flexibility: not only for system but also for embedded system commercial data processing
7. Programs written in C is fast and efficient
8. Standard library
9. Integration with UNIX

Weakness of C

1. error-prone
2. Difficult to modify
3. Difficult to debug
4. It is difficult to write large codes or solve complex problems in C

Basic Structure of C Programs

1. Documentation Section

2. Link section

3. Definition Section

4. Global Declaration Section

5. Main Function( )

   {

   1. Declaration part
   2. Executable part

   }

6. Subprogram section

   User defined functions are build here

Basic Structure of C

1. Documentation section: it consists of a set of comment lines giving the name of the program, the author, the purpose of the program and how the program works. The intention is to provide with some documentation or information so that the program can be used or analyzed later.
2. Link section: it provides instruction to the compiler to link functions from the system library.
3. Definition section: definition of all the symbolic constants are goes here. (if any symbolic constants are used in the program)
4. Global declaration: global variables are declared here. The user defined functions also can be declared here. (if any global variables are used in the program)

Basic Structure of C

5. Main function section: every C program must have one main function. This section contains two parts: declaration part and executable part. These two parts must appear in between the opening and closing curly braces. The declaration part declares all the variables that are going to be used in the executable part. The executable part contains the main programming logical statements or algorithm statements. The executable must contain at least one statement. All the statements in the declaration and executable parts must end with a semicolon (;). This section is the logical end of the program.
6. Subprogram section: if necessary then user defined functions are defined here or created here.(if user defined functions are used)

Need to understand

- Concept of definition and declaration
- Declaration: it tells or declares the identity or type of something. Like Rahim is a boy. It means Rahim is here declared as a boy.
- Definition: it tells or defines the specific type. Like in definition section we will define or describe what are the characteristics of a boy or how the boy works.

Need to understand

- ( ) – is called the parenthesis
- { } – is called the curly braces
- [ ] – is called the bracket
- **Parenthesis is used to denote a function**
- Curly braces is used to create a body
- **Every statement in C ends with a semicolon**

A Simple C Program

```
/* This is the sample program to print a
message hello world. This is done by
course teacher */

#include <stdio.h>

#include <conio.h>



main ( )

{
    clrscr();
    printf(“Hello World\n”);
    getch();

}
```

How a C program is Executed ?

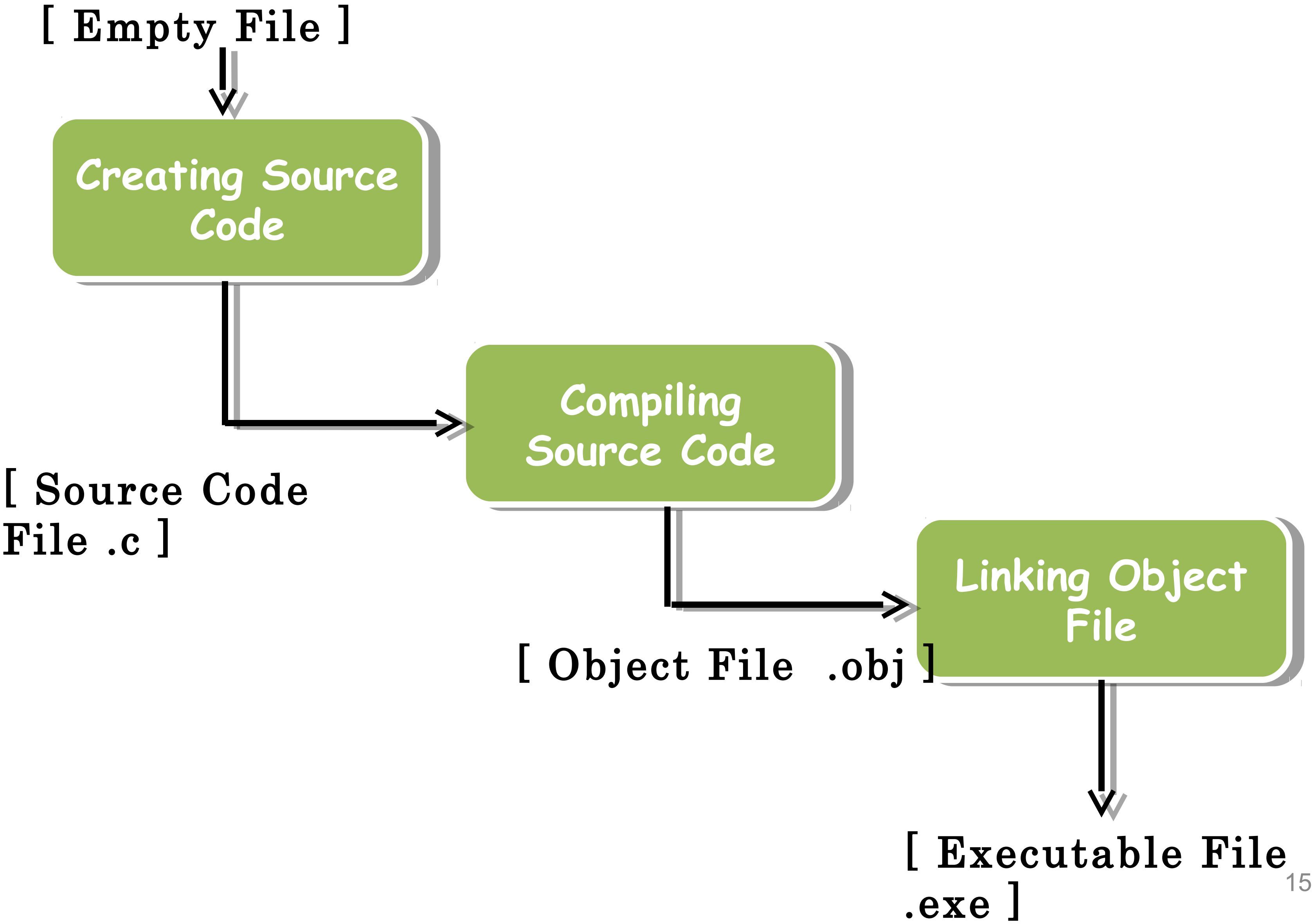
- A C program is executed in three phases:

1. Creating Source Code file
   [Empty file(input)→ Source Code File(output)]

2. Compiling
   [Source Code File(input)→ Object File(output)]

3. Linking
   [Object File(input)→ Executable File(output)]

How a C program is Executed ?



[Empty File]

Creating Source Code

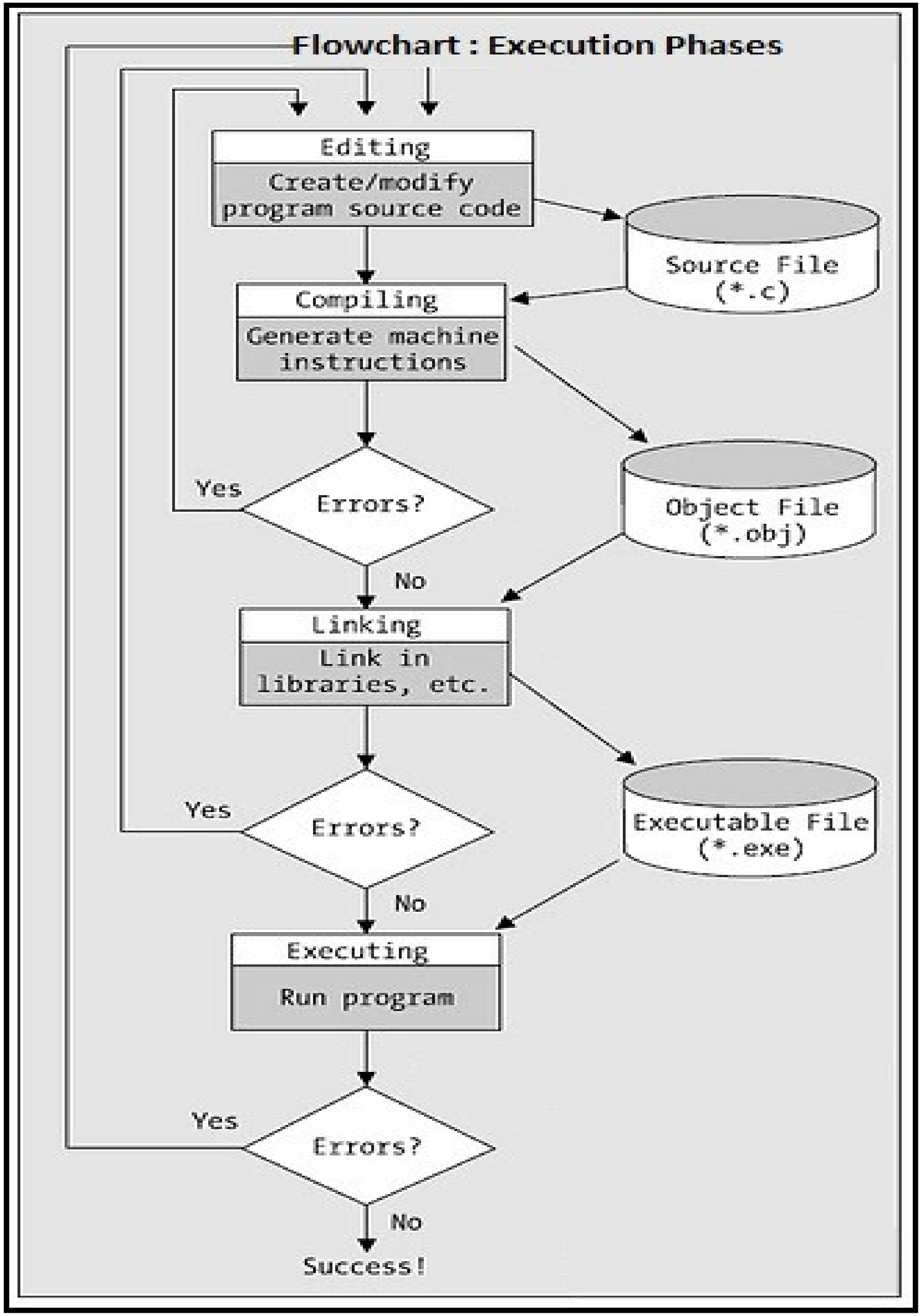
[Source Code File .c]

Compiling Source Code

[Object File .obj]

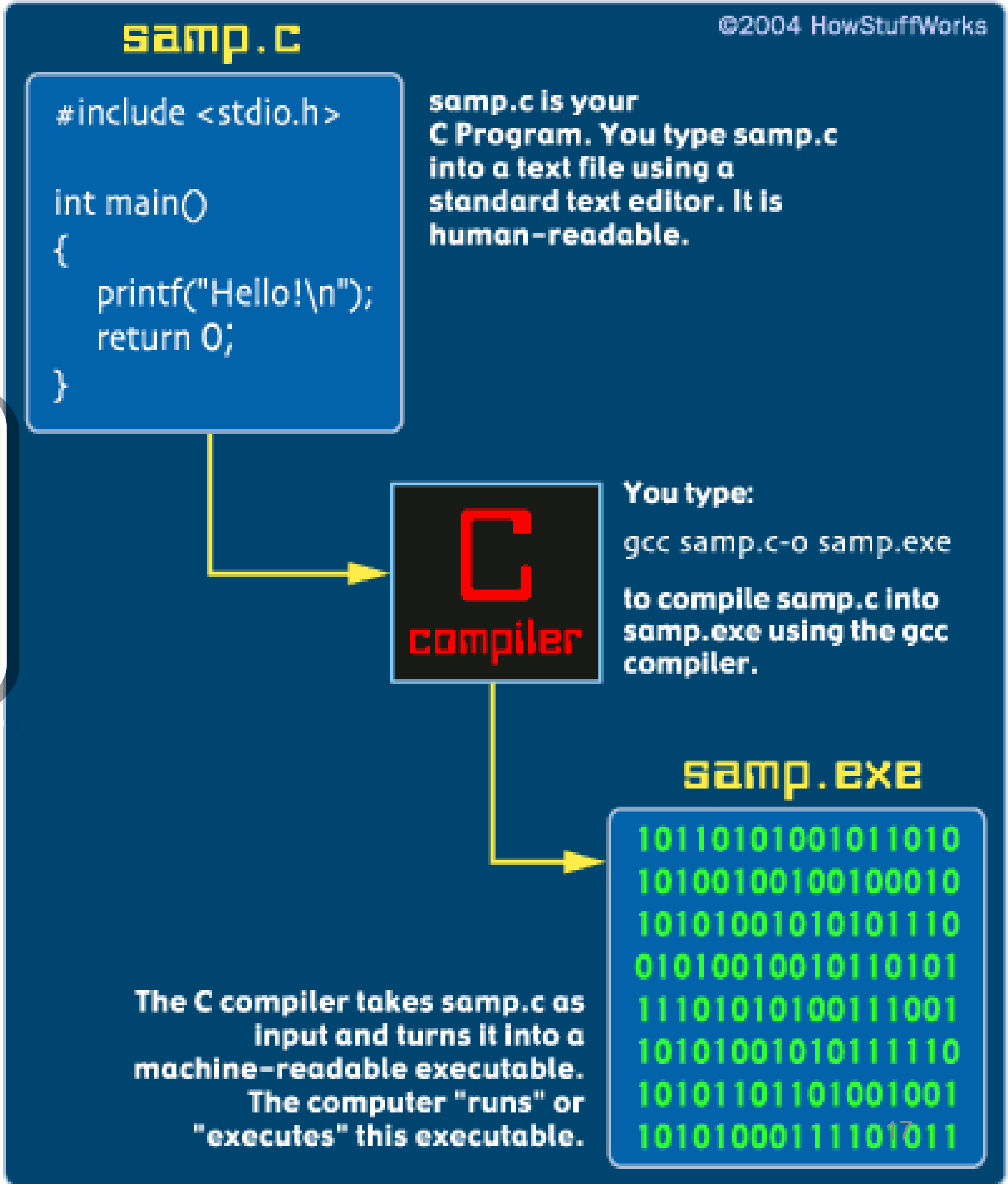
Linking Object File

[Executable File .exe]



Step by step procedure how a C program is executed

How a C program is executed ?



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```
#include <stdio.h>

int main()
{
    printf("Hello!\n");
    return 0;
}
```

samp.c is your C Program. You type samp.c into a text file using a standard text editor. It is human-readable.

You type:

```
gcc samp.c-o samp.exe
```

to compile samp.c into samp.exe using the gcc compiler.

```
1011101010010111010
1010010010010001 0
1010100101010111 0
0101001001011010 1
1110101010011100 1
1010100101011111 0
1010110110100100 1
1010100011110101 1
```

The C compiler takes samp.c as input and turns it into a machine-readable executable. The computer "runs" or "executes" this executable.

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