INTRODUCTION TO GCC

What is GCC?

GCC, or the GNU Compiler Collection, is a set of compilers produced by the GNU Project. It includes compilers for several programming languages, such as C, C++, Fortran, Ada, and others. GCC is widely used in the development of open-source and commercial software and is available for various platforms.

Key Components:

1. C Compiler (gcc):

The gcc command is used to compile C source code into executable binaries.

Example:

gcc myfile.c -o myprogram

2. C++ Compiler (g++):

The g++ command is used to compile C++ source code.

Example:

g++ mycppfile.cpp -o mycppprogram

3. Compilation Process:

The compilation process involves several steps, including pre-processing, compilation, assembly, and linking.

gcc manages these steps automatically when you run the compiler.

Compilation and Execution:

Compile a C Program:

gcc myprogram.c -o myprogram

This command compiles the C source code (myprogram.c) and produces an executable named myprogram.

Compile a C++ Program:

g++ mycppprogram.cpp -o mycppprogram

This command compiles the C++ source code (mycppprogram.cpp) and produces an executable named mycppprogram.

Execution:

./myprogram

Execute the compiled program. The ./ is used to run an executable in the current directory.

Compilation with Multiple Source Files:

To compile a program with multiple source files:

gcc file1.c file2.c -o myprogram

Compiler Flags:

Compiler flags can be used to enable optimizations, specify include paths, or set other options.

gcc myprogram.c -o myprogram -Wall -O2

Timestamp in Linux:

Linux systems maintain three primary timestamps associated with files:

Access Time (atime):

Indicates the last time a file was accessed (read or executed).

View using ls -lu or check with stat command.

Modification Time (mtime):

Indicates the last time the content of a file was modified.

View using ls -l or check with stat command.

Change Time (ctime):

Indicates the last time metadata of a file (permissions, ownership) was changed.

View using ls -lc or check with stat command.

Example:

$ ls -l myfile.txt -rw-r--r-- 1 user user 1024 Dec 12 10:30 myfile.txt

In this example, Dec 12 10:30 represents the modification time of the file.