Operating Systems

Lab Manual # 3

Introduction to C Programming and GCC on Ubuntu

Objectives:

In this lab, you will learn the basics of C programming and the process of installing and using the GCC compiler on the Ubuntu operating system. The lab covers essential steps, from checking the presence of GCC to compiling and executing a simple C program.

1. Understand the basics of C programming.
2. Install and configure the GCC compiler on Ubuntu.
3. Compile and execute a simple C program.
4. Verify the installation and version of GCC.
5. Learn basic Linux commands for file manipulation.

Pre-requisites:

- Basic understanding of Linux/Unix File System and Shell commands.
- Completion of Lab 2.
- Ubuntu operating system (either installed on your computer or in a virtual machine).

Lab Setup:

1. Virtual Machine Setup:

   - Ensure that your virtual machine (VM) is running Ubuntu 23.08 LTS.
   - Confirm the installation of VMware/VirtualBox tools.

2. Terminal Basics:

   - Open a terminal in Ubuntu to execute commands.
   - Familiarize yourself with basic commands:

Lab Tasks:

Exercise 1: Checking GCC Installation

- Open a terminal on your Ubuntu system.
- Check if GCC is installed by running the following command:

```
$ gcc --version
```

Exercise 2: Installing GCC

- Install the GCC compiler by running the following command:

```
$ sudo apt-get install g++
```

- This command installs the GNU Compiler Collection, including the C++ compiler (g++).

```
$ sudo apt-get update
```

- This ensures that the package information is up-to-date.

Exercise 3: Creating and Compiling a C Program

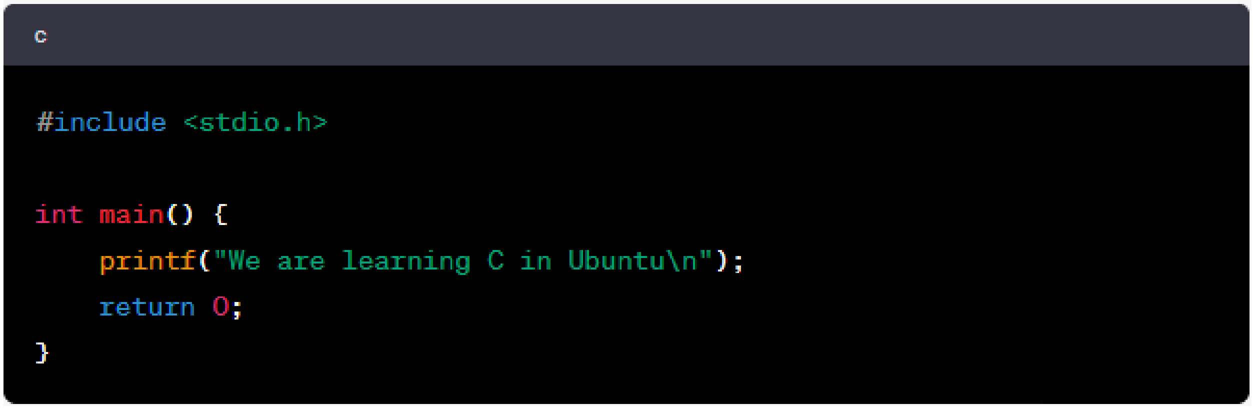
- Create a C source file named `hello.c` using the `touch` command:

```
$ touch hello.c
```

- Open `hello.c` in a text editor (e.g., `nano`, `vim`, or `gedit`) and add the following C code:

```
$ nano hello.c
```

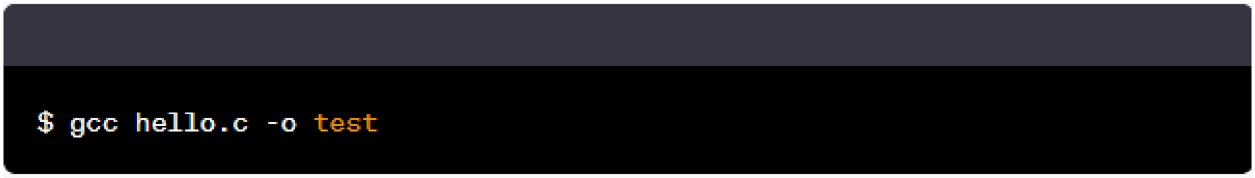
- (Inside the text editor)



```c
#include <stdio.h>

int main() {
    printf("We are learning C in Ubuntu\n");
    return 0;
}
```

- Save and close the text editor.
- Compile the C program using GCC:

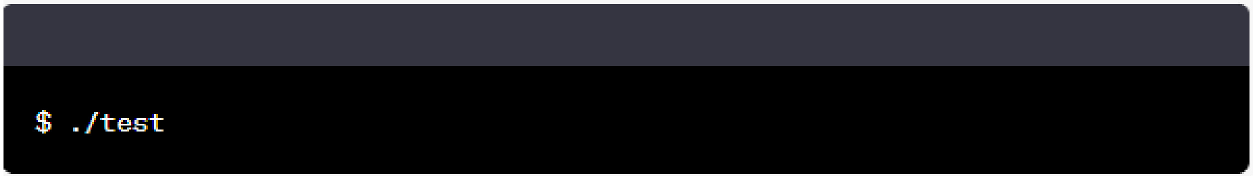


```
$ gcc hello.c -o test
```

- The `-o` flag specifies the output file name.

Exercise 4: Executing the Compiled Program

- Run the compiled program:



```
$ ./test
```

Conclusions:

Congratulations! You've successfully completed this lab, gaining hands-on experience with C programming and the GCC compiler on Ubuntu. These foundational skills are crucial for further exploration in the field of operating systems programming and software development.