# Lab Exercise - 1

## ❖ AIM :: Introduction to Linux & vi-Editor

### 1. Introduction to Linux

- **What is Linux?**: Linux is a powerful and versatile open-source operating system based on the Unix architecture. It was created by Linus Torvalds in 1991 and has since grown into a widely-used platform for both personal and professional computing.
- **Open Source Nature**: One of the defining characteristics of Linux is that its source code is freely available for anyone to view, modify, and distribute. This has led to a collaborative environment where developers worldwide contribute to its development.
- **Kernel and Distributions**: Linux is composed of a kernel, which is the core component of the OS, and various distributions (distros) that bundle the kernel with software and package management systems. Popular distributions include Ubuntu, Fedora, Debian, and CentOS.
- **Linux in Different Environments**: Linux is used in a variety of environments, including desktops, servers, mobile devices, and embedded systems. Its flexibility allows it to run on a wide range of hardware, from supercomputers to small IoT devices.

### 2. Overview of the `vi` Editor

The `vi` (Visual Editor) is a powerful text editor available on almost all Unix-like operating systems, including Linux. It's known for its efficiency and versatility, particularly in environments where only a terminal interface is available. Here is a detailed look at the `vi` editor and its commands, presented in informative points.

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### 1. Basics of `vi` Editor

- **Launching** `vi`: To start `vi`, type `vi filename` in the terminal. If `filename` does not exist, `vi` will create it.
- **Modes in** `vi`:
  - **Normal Mode**: The default mode where you can navigate and manipulate text.
  - **Insert Mode**: Used for inserting text. Enter by pressing `i`, `a`, or `o`.
  - **Command Mode**: Enter by typing `:` in Normal Mode for commands like saving, quitting, etc.
  - **Visual Mode**: Used to highlight and manipulate blocks of text.

### 2. Basic Commands for Running a C File

To work with C files in the `vi` editor, you only need a few basic commands to edit, save, and compile the file. Here's a simplified guide:

- **Open a File**: `vi filename.c`
  - Launches `vi` and opens the file named `filename.c`. If it doesn't exist, `vi` will create it.
- **Insert Mode**:
  - `i`: Enter Insert Mode before the cursor position.
  - `I`: Enter Insert Mode at the beginning of the line.
  - `a`: Enter Insert Mode after the cursor position.
  - `A`: Enter Insert Mode at the end of the line.
  - `o`: Open a new line below the current line and enter Insert Mode.
  - `O`: Open a new line above the current line and enter Insert Mode.
- **Save and Exit**:
  - `:w`: Save the file without exiting.
  - `:w filename`: Save the file with a new name.
  - `:q`: Quit `vi` without saving.
  - `:wq` **or** `ZZ`: Save the file and quit `vi`.
  - `:q!`: Quit without saving changes.

# Implementation

Writing and Running a basic "Hello, World!" program in C using the terminal on a Linux system.

```
1. cd ~/project

2. vi hello.c



/* Save and Exit vi:

    • Press Esc to exit Insert Mode.
    • Type :wq and press Enter to save the file and quit vi.

*/


3. gcc hello.c -o hello

4. ./hello
```

```
#include <stdio.h>

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

~
~
~
~
:wq
```

```
amit@Toshiba-Satellite-C850:~$ cd Downloads/
amit@Toshiba-Satellite-C850:~/Downloads$ vi hello.c
amit@Toshiba-Satellite-C850:~/Downloads$ gcc hello.c -o hello
amit@Toshiba-Satellite-C850:~/Downloads$ ./hello
Hello, World!
amit@Toshiba-Satellite-C850:~/Downloads$
```