

# Installing compilers using apt command

Open the terminal app and type the following apt/apt-get command:

```
$ sudo apt update  
$ sudo apt upgrade  
$ sudo apt install build-essential
```

OR

```
$ sudo apt-get update  
$ sudo apt-get upgrade  
$ sudo apt-get install build-essential
```

## Verify installation

Type the following commands:

```
$ whereis gcc  
$ gcc --version  
$ make -v
```

Related Websites

[nixCraft](#)  
[Ubuntu](#)  
[C Programs](#)

# Console Apps

Tmux:

Sudo apt install tmux

CTRL B + % To split the current screen vertically

CTRL B + " To split the current screen horizontally CTRL B + arrow keys Moves cursor to another screen

[tmux](#)

[tmux start](#)

Midnight Commander:

Sudo apt install mc

## ANSI Testing

Colortest:

sudo apt install colortest

Start test: colortest-256 colortest-16

# Openssh Setup

Uninstalled ssh-server, reinstalled it:

```
sudo apt purge openssh-server
```

```
sudo apt install openssh-server
```

Configure ssh-server: `sudo nano /etc/ssh/sshd_config`

disallow root login by setting: `PermitRootLogin no`

Then add a line beneath it that says: `AllowUsers yourusername`

make sure is set to yes if you want to login using a password: `PasswordAuthentication yes`

Disable privilege separation by adding/modifying:

`UsePrivilegeSeparation no`

made sure it's started with: `sudo service ssh --full-restart`

Connect to your Linux subsystem from Windows using a ssh client like PuTTY

# C console programs

Ok, let's get started with some coding. Start in your home directory and make some new directories. This is where your code will go.

```
$ mkdir code
```

```
$ cd code
```

```
$ mkdir cdev
```

```
$ mkdir cppdev
```

```
$ cd cdev
```

Open up editor to create new C code:

```
$ vi hi.c
```

Insert this code by pressing the I key and typing in the following C program.

When done hit the esc key and type in :wq

```
#include<stdio.h>
```

```
Int main()
```

```
{
```

```
    printf("Hi\n");
```

```
}
```

Compile your C program by using this command:

```
$ cc hi.c
```

Run your program with this command:

```
$ ./a.out
```

# C++ console programs

You made the directory in the C sections. So if you are in the cdev directory just do a "cd .." to get back to the code directory.

From the code directory:

```
$ cd cppdev
```

Or

From the home directory

```
$ cd code/cppdev
```

Open editor to create new C++ code:

```
$ vi hi.cpp
```

Insert this code by pressing the I key and typing in the following C++ program.  
When done hit the esc key and type in :wq

```
#include<iostream>
using namespace std;
// Simple C++
// no class no ooping
// using cout
int main()
{
    cout<<"Hi there\n";
    return 0;
}
```

Compile your C++ program by using this command:

```
$ g++ hi.cpp
```

Run your program with this command:

```
$ ./a.out
```

There are two more simple C++ programs in the ccpdev. The first one hicolorv1.cpp is just like the hi.cpp but has the Esc code sequence added to it. The second, hicolorv2.cpp has enum type added to it. None of these C++ have any Object Orientated Programming stuff in them. I will make another directory called oop start with simple oop code.

## Python

Install python and startup:

```
$ sudo apt-get install python2.7
$ python
```

Or and both

```
$sudo apt-get install python3
$ python
```

Python test:

```
$ python
```

The python2.7 interactive script IDE starts up

```
>>> 5+6
Returns 11
>>> a=3*5
>>> print a
Returns 15
```

cd to code and mkdir pycon and cd pycon  
vi assii.py  
insert the code below:

```
c='\033[1;31m'
for a in range(ord('A'), ord('Z')):
    c = c + chr(a);
print c;
```

python assii.py

Do the same for this one:

```
# Hi app in color
print u'\u001b[2J'
print u'\u001b[31mHi there \u001b[0mAppa'
print u'\u001b[1;31mHi there \u001b[0mAppa'
print u'\u001b[32mHi there \u001b[0mAppa'
print u'\u001b[1;32mHi there \u001b[0mAppa'
print u'\u001b[33mHi there \u001b[0mAppa'
print u'\u001b[1;33mHi there \u001b[0mAppa'
print u'\u001b[34mHi there \u001b[0mAppa'
print u'\u001b[1;34mHi there \u001b[0mAppa'
```

# ANSI Terminal esc sequence

I will try not to get into too much history at this time. In the late 70s, early 80s I was writing Fortran programs for Automated Test Equipment (ATE). I was having problems getting the results I wanted on some of the plotters and test equipment with the given software libraries. So, I asked Hewlett- Packard about it. They gave me a tape with all the subroutine source code for all of test equipment, plotters, and terminals. The first thing I saw that they all had in common were esc codes being sent to them. I had seen this before with a programable Techtronic oscilloscope. I thought that it was something new. It turns out that almost all manufactures computer peripherals have some esc code sequence. This is how I got started in making my plotters plot better, test equipment measured more accurate and terminal readouts flasher. Even printouts were cooler.

Some of these esc sequence become standard. The ones that I am using in this project is called the ANSI Terminal esc sequence. These esc codes are used on vt100. I will show some simple examples in C/C++ and Python and we will see where we go from there.

==== General text attributes ====

esc code m	Description
"\033[ 0 m"	Reset all
'\033'[ 1 m"	bright
"\033[ 2 m"	dim" attribute
'\033'[ 3 m	standout
"\033[ 4 m"	underscore
"\033[ 5 m"	blink
"\033[ 7 m"	reverse
'\033'[ 8 m"	hidden

==== Foreground coloring ====

esc code m	Description
"\033[ 30 m"	black
"\033[ 31 m"	red
"\033[ 32 m"	green
"\033[ 33 m"	yellow
"\033[ 34 m"	blue
"\033[ 35 m"	magenta
"\033[ 36 m"	cyan
"\033[ 37 m"	white
"\033[ 39 m"	default

## Some esc sequence code ANSI terminal table:

### Text attributes

- 0 All attributes off
- 1 Bold on
- 2 Dim
- 3 Standout
- 4 Underscore
- 5 Blink on
- 7 Reverse video on
- 8 Concealed on

### Foreground colors

- 30 Black
- 31 Red
- 32 Green
- 33 Yellow
- 34 Blue
- 35 Magenta
- 36 Cyan
- 37 White

### Background colors

- 40 Black
- 41 Red
- 42 Green
- 43 Yellow
- 44 Blue
- 45 Magenta
- 46 Cyan
- 47 White

[ANSI escape code](#)  
[VT100 Programming](#)



## Object-oriented programming (OOP)

Ok so there is lots of ways to go and I wanted to try a couple of things C++ 11 that I had not tried before.

Like, default member data in private section of a class, and enum class, which is not a class at all. But does

Resolve some problems with enum type. I started off by making several classes for cursor position, text attributes and screen clearing. I did not want to get into massive C++ oop programming. That not what this project is about.

It is just to show you how to use ANSI Terminal escape sequence. What I really want to do is to have one simple class that could do all those things. The first thing I found is that I did not have a C++ 11 compliant g++ compiler.

That's ok there a procedure to install one. We will not worry about that at this time.

# Games

Space Invaders:

```
sudo apt install ninvaders
```

Bastet:

```
sudo apt install bastet
```

Pacman4console:

```
sudo apt install pacman4console
```

BSDGames:

```
sudo apt install bsdgames
```

