

Lab 0

Ubuntu

실습환경 구축

시스템 프로그래밍 (system programming)

김덕수



Ubuntu 실습 환경 구축

- **Ubuntu PC**

- 버전 무관

- **Windows 10**

- Windows Subsystem for Linux (WSL) 사용 (권장)

- **Windows 8 이하 및 기타 OS**

- 가상화 SW 사용
 - **Virtual Box** (무료)
 - [Goooogling!](#)
 - **Vmware** (상용)
 - [Goooogling!](#)



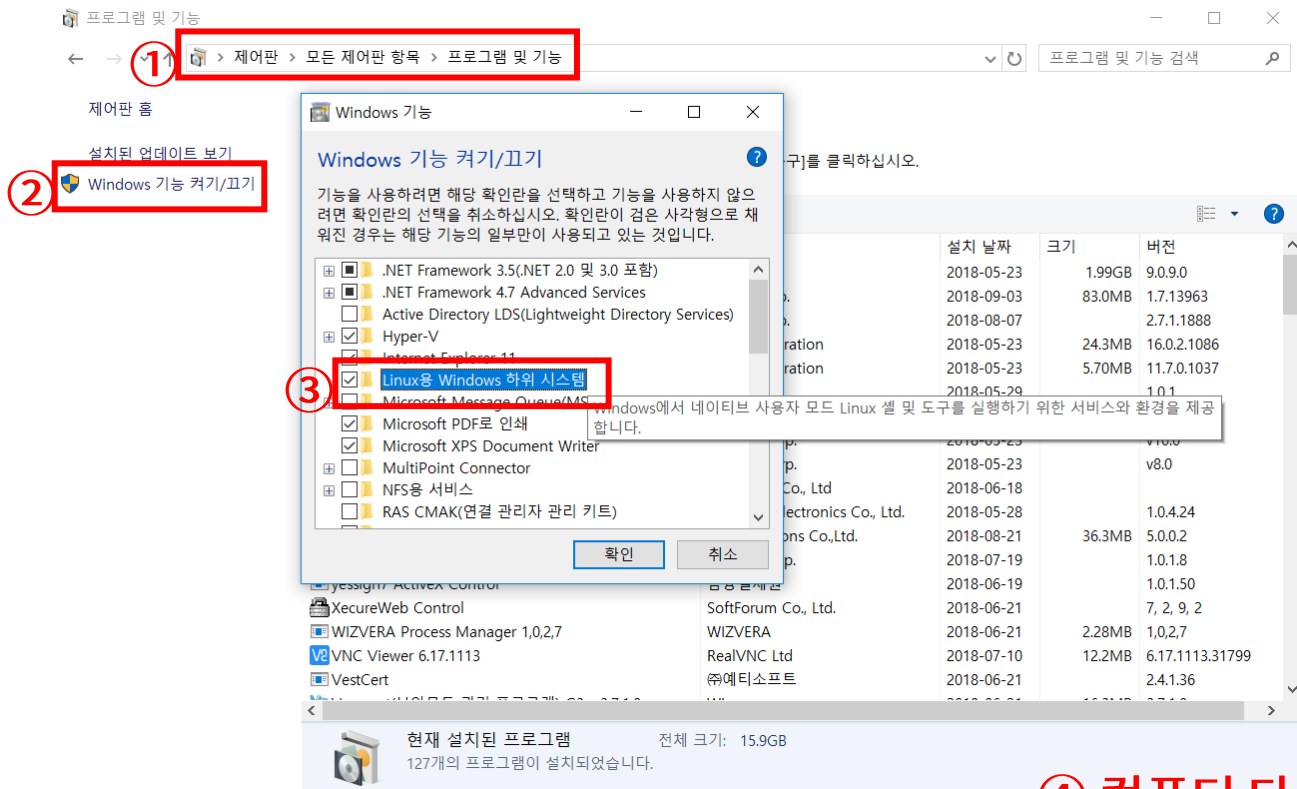
Lab 0-1

Ubuntu 설치

Windows Subsystem for Linux (WSL)

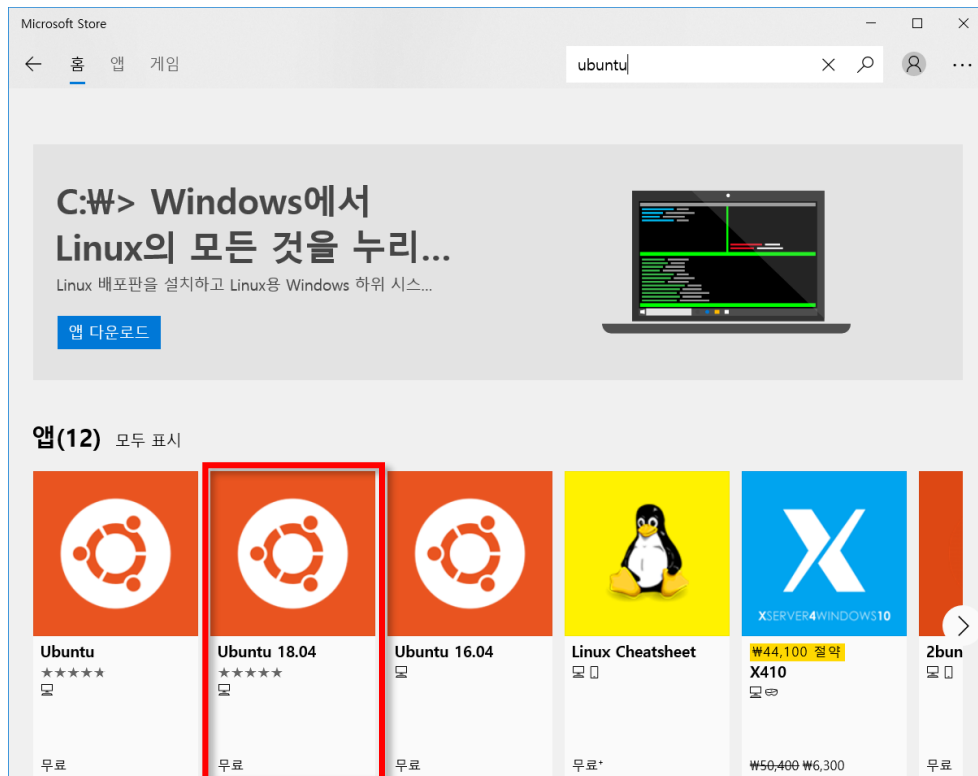


Enabling Linux sub-system

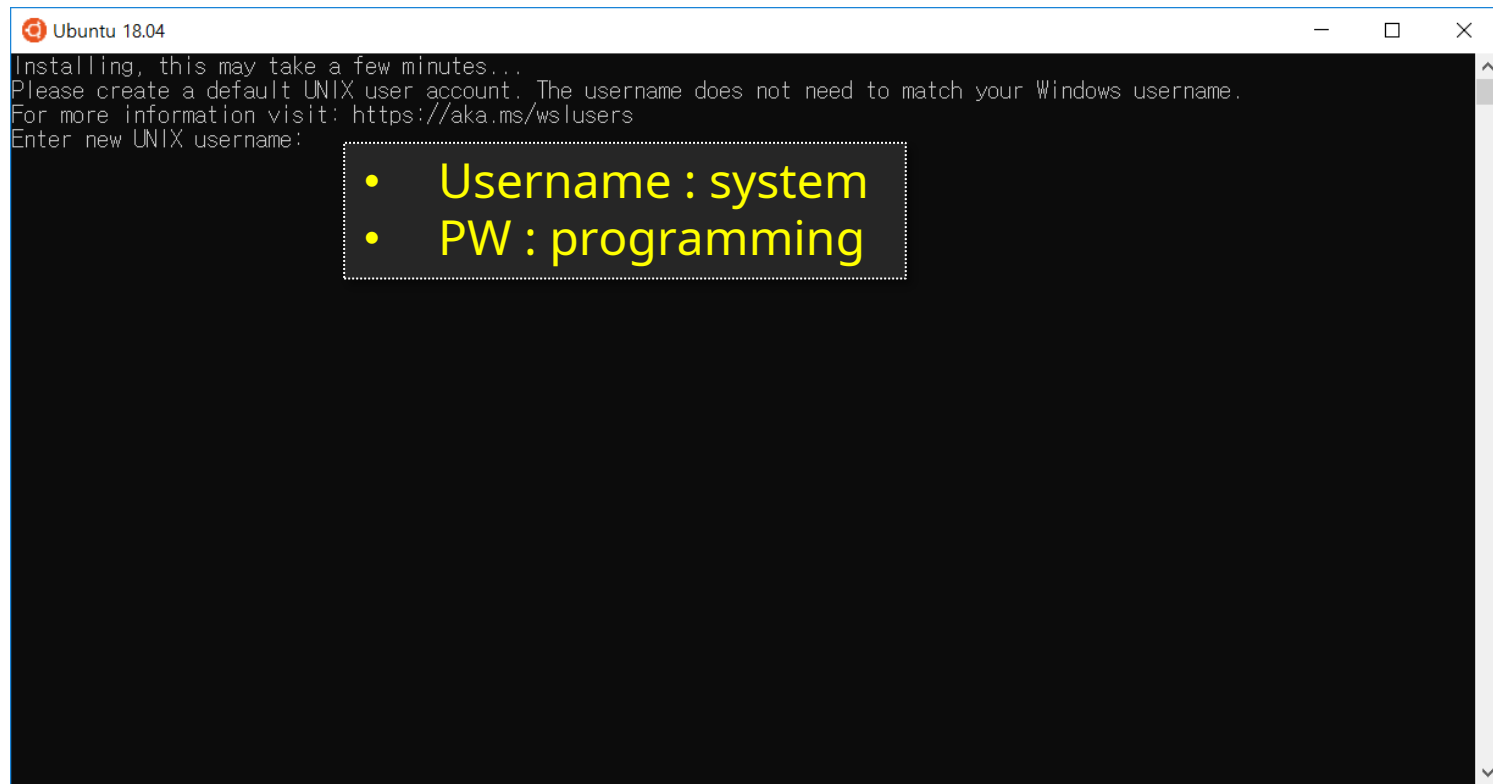


④ 컴퓨터 다시 시작

Windows 10 – Microsoft store



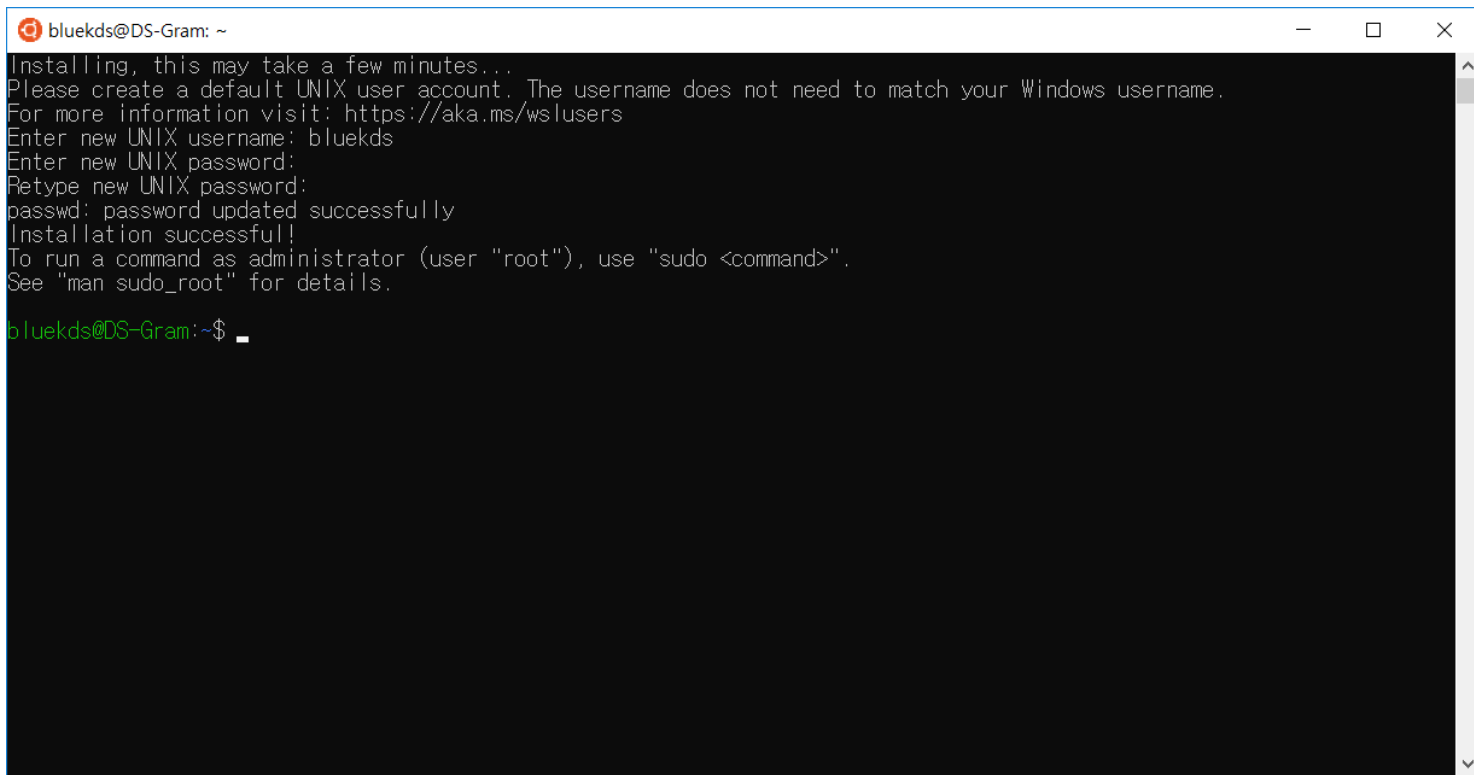
Set username and PW



```
Ubuntu 18.04
Installing, this may take a few minutes...
Please create a default UNIX user account. The username does not need to match your Windows username.
For more information visit: https://aka.ms/wslusers
Enter new UNIX username:
```

- Username : system
- PW : programming

Set username and PW



```
bluekds@DS-Gram: ~  
Installing, this may take a few minutes...  
Please create a default UNIX user account. The username does not need to match your Windows username.  
For more information visit: https://aka.ms/wslusers  
Enter new UNIX username: bluekds  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Installation successful!  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
bluekds@DS-Gram:~$
```



Install GCC compiler

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

- `$ gcc --version`
- `$ man gcc`

```
bluekds@DS-Gram: ~  
bluekds@DS-Gram:~$ gcc --version  
gcc (Ubuntu 5.4.0-6ubuntu1~16.04.10) 5.4.0 20160609  
Copyright (C) 2015 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
bluekds@DS-Gram:~$ man gcc
```

```
bluekds@DS-Gram: ~  
GCC(1)                                GNU                                GCC(1)  
NAME  
gcc - GNU project C and C++ compiler  
SYNOPSIS  
gcc [-c|-S|-E] [-std=standard]  
    [-g] [-pg] [-Olevel]  
    [-Wwarn...] [-Wpedantic]  
    [-Idir...] [-Ldir...]  
    [-Dmacro[=defn]...] [-Umacro]  
    [-foption...] [-mmachine-option...]  
    [-o outfile] (@file) infile...  
  
Only the most useful options are listed here; see below for the remainder. g++ accepts mostly the same  
options as gcc.  
DESCRIPTION  
When you invoke GCC, it normally does preprocessing, compilation, assembly and linking. The "overall options"  
allow you to stop this process at an intermediate stage. For example, the -c option says not to run the  
linker. Then the output consists of object files output by the assembler.  
  
Other options are passed on to one stage of processing. Some options control the preprocessor and others the  
compiler itself. Yet other options control the assembler and linker; most of these are not documented here,  
since you rarely need to use any of them.  
  
Most of the command-line options that you can use with GCC are useful for C programs; when an option is only  
useful with another language (usually C++), the explanation says so explicitly. If the description for a  
particular option does not mention a source language, you can use that option with all supported languages.  
Manual page gcc(1) line 1 (press h for help or q to quit).
```


Lab 0-2

Hello Linux

Your first program with VI editor



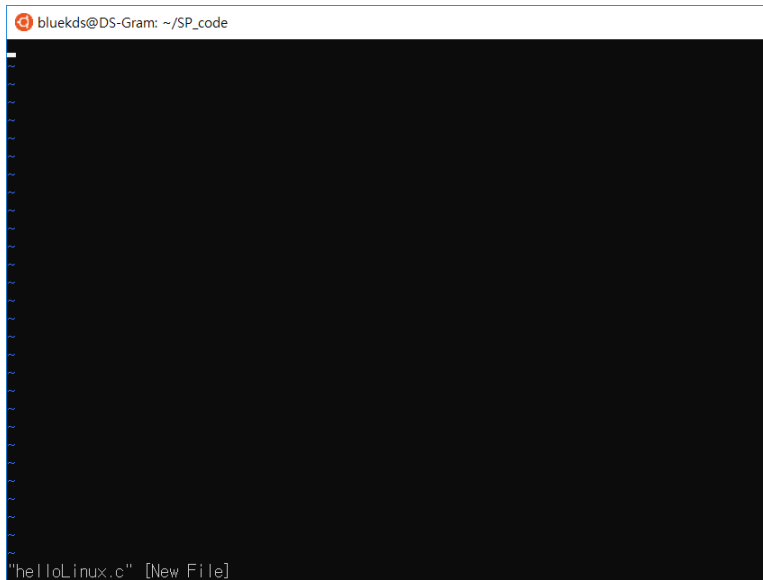
Hello Linux를 출력하는 프로그램

- **Make a folder**

- \$ **cd** ~ → move to home directory
- \$ **mkdir** (folder name)
- \$ **cd** (folder name)

- **VI editor**

- \$ **vi** helloLinux.c



VI editor

기능	명령	기능	명령
입력모드전환	i(a,o,O) (시작 위치 지정) 2는 커서	명령모드전환	<Esc>
커서이동	j,k,h,l 또는 방향키	행이동	#G (50G, 143G 등) 또는 :행번호
한글자수정	r	여러글자수정	#s (5s, 7s 등)
단어수정	cw	명령취소	u, U
검색하여수정	:%s/aaa/bbb/g	복사	#yy (5yy, 10yy 등)
붙이기	p	커서이후삭제	D(shift-d)
글자삭제	x, #x(3x,5x 등)	행삭제 (잘라내기)	dd, #dd(3dd, 4dd 등)
저장하고 종료	{wq! 또는 ZZ}	저장하지않고 종료	:q!

Hello Linux를 출력하는 프로그램

bluekds@DS-Gram: ~/SP_code

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

int main(void) {
    printf("Hello Linux!\n");
    exit(0);
}
```

- **Compile**

- gcc -o helloLinux helloLinux.c

bluekds@DS-Gram: ~/SP_code

```
bluekds@DS-Gram:~/SP_code$ gcc -o helloLinux helloLinux.c
bluekds@DS-Gram:~/SP_code$ ls
2_1.c 2_2.c bin helloLinux helloLinux.c
bluekds@DS-Gram:~/SP_code$ ./helloLinux
Hello Linux!
bluekds@DS-Gram:~/SP_code$
```

Lab 0-2

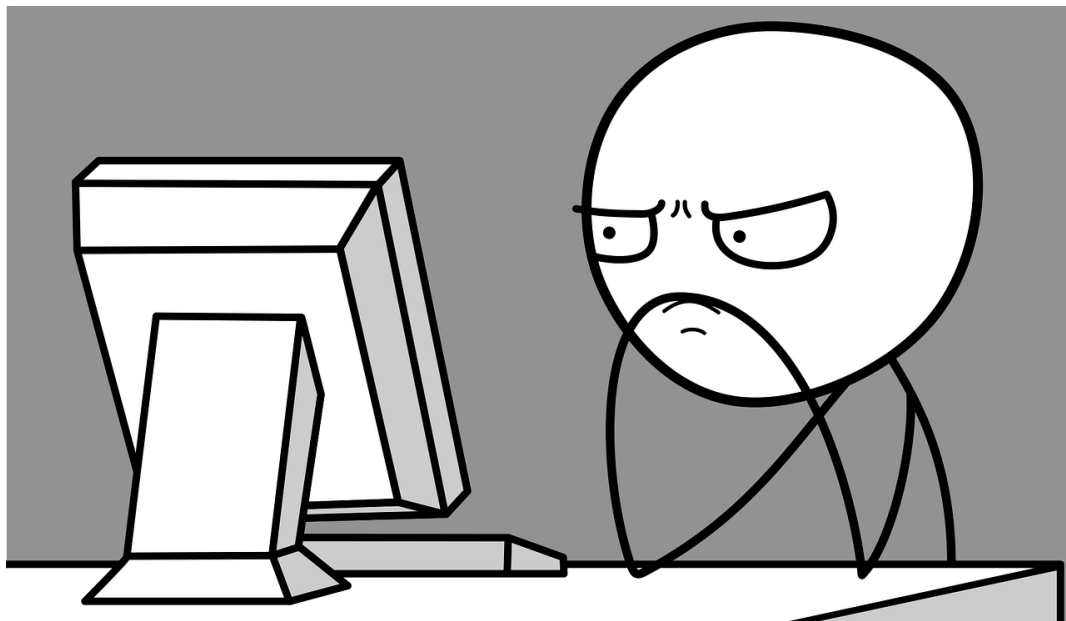
GUI 환경 구축

Windows subsystem for Linux (WSL)

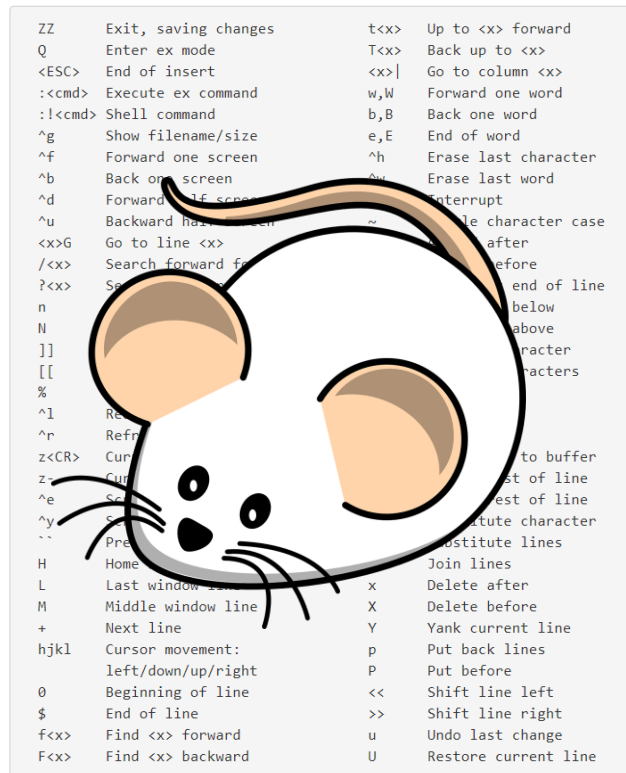


Command user interface (CUI)

- Unix/Linux는 기본적으로 CUI 사용



Pixabay로부터 입수된 OpenClipart-Vectors님의 이미지입니다.

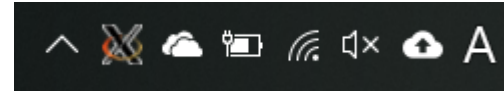
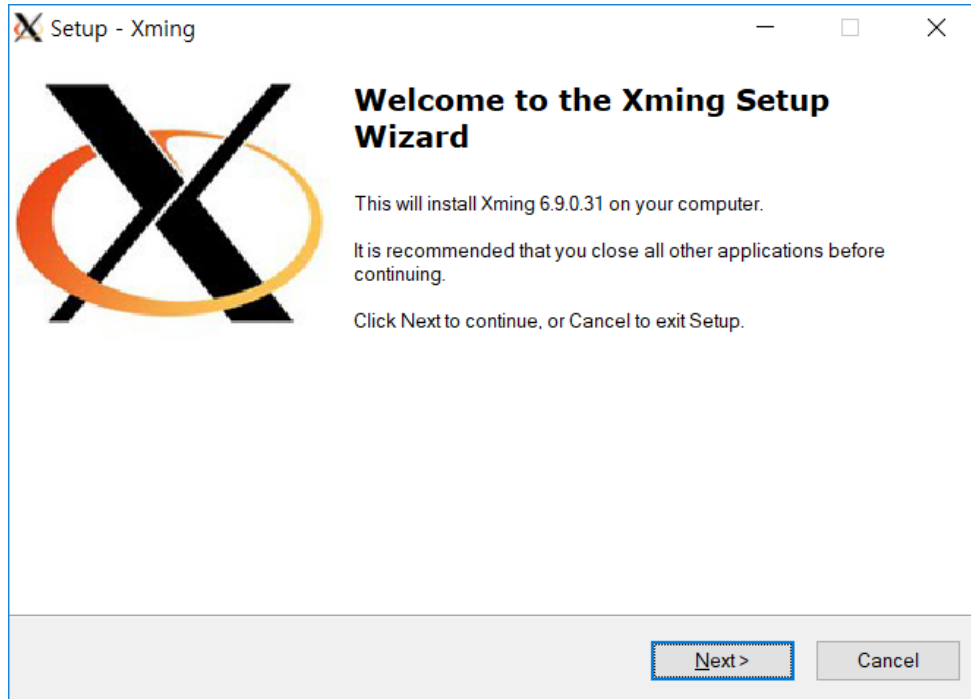


Pixabay로부터 입수된 Ciker-Free-Vector-Images님의 이미지입니다.

GUI 환경 사용 방법

- **Install X org server on Windows**
 - Xming
 - <https://sourceforge.net/projects/xming/>
 - VCXRV
- **Install X Window System on Ubuntu**
 - [Reference \(click\)](#)

Install X org server on Windows



Install X Window system on Ubuntu

- \$ **sudo** systemd-machine-id-setup
- \$ **sudo** dbus-uuidgen --ensure
- \$ **cat** /etc/machine-id

```
bluekds@DS-Gram: ~  
bluekds@DS-Gram:~$ sudo systemd-machine-id-setup  
[sudo] password for bluekds:  
Initializing machine ID from random generator.  
bluekds@DS-Gram:~$ sudo dbus-uuidgen --ensure  
bluekds@DS-Gram:~$ cat /etc/machine-id  
01cb705281ae4b048bf6df0ba128e282  
bluekds@DS-Gram:~$
```

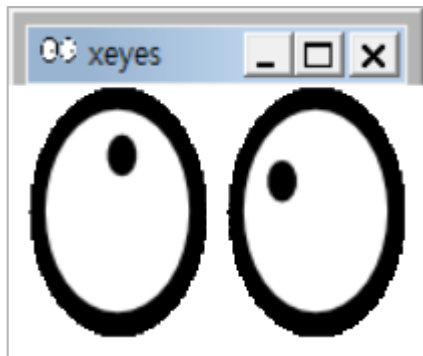
Install X Window system on Ubuntu

- **\$ sudo apt -y install x11-apps xfonts-base xfonts-100dpi xfonts-75dpi xfonts-cyrillic**

```
선택 bluekds@DS-Gram: ~
bluekds@DS-Gram:~$ sudo apt -y install x11-apps xfonts-base xfonts-100dpi xfonts-75dpi xfonts-cyrillic
[sudo] password for bluekds:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  fontconfig-config fonts-dejavu-core libfontconfig1 libfontenc1 libice6 libsm6 libxaw7 libxcursor1 libxfixes3 libxft2
  libxkbfile1 libxmu6 libxpm4 libxrender1 libxt6 x11-common xbitmaps xfonts-encodings xfonts-utils
Suggested packages:
  mesa-utils xfs | xserver
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libfontconfig1 libfontenc1 libice6 libsm6 libxaw7 libxcursor1 libxfixes3 libxft2
  libxkbfile1 libxmu6 libxpm4 libxrender1 libxt6 x11-apps x11-common xbitmaps xfonts-100dpi xfonts-75dpi xfonts-base
  xfonts-cyrillic xfonts-encodings xfonts-utils
Get:3 http://archive.ubuntu.com/ubuntu bionic/main amd64 libsm6 amd64 2:1.2.2-1 [15.8 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-dejavu-core all 2.37-1 [1041 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/main amd64 fontconfig-config all 2.12.6-0ubuntu2 [55.8 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/main amd64 libfontconfig1 amd64 2.12.6-0ubuntu2 [137 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/main amd64 libxrender1 amd64 1:0.9.10-1 [18.7 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/main amd64 libxft2 amd64 2.3.2-1 [36.1 kB]
Get:9 http://archive.ubuntu.com/ubuntu bionic/main amd64 libfontenc1 amd64 1:1.1.3-1 [13.9 kB]
Get:10 http://archive.ubuntu.com/ubuntu bionic/main amd64 libxt6 amd64 1:1.1.5-1 [160 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/main amd64 libxmu6 amd64 2:1.1.2-2 [46.0 kB]
```

Install X Window system on Ubuntu

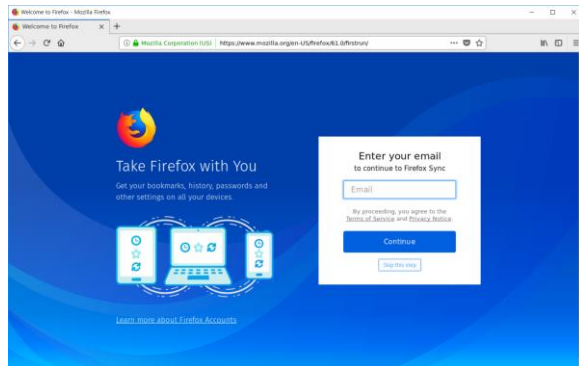
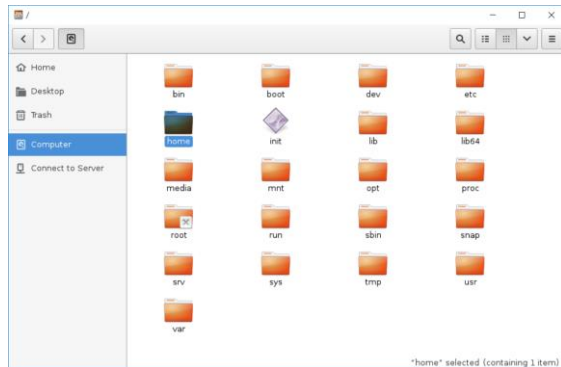
- `$ export DISPLAY=:0`
- `$ xeyes`
- **export 설정 로그인시 자동으로 하기**
 - `$ vi ~/.bashrc`



```
if ! shopt -oq posix; then
  if [ -f /usr/share/bash-completion/bash_completion ]; then
    . /usr/share/bash-completion/bash_completion
  elif [ -f /etc/bash_completion ]; then
    . /etc/bash_completion
  fi
fi
export DISPLAY=:0
```

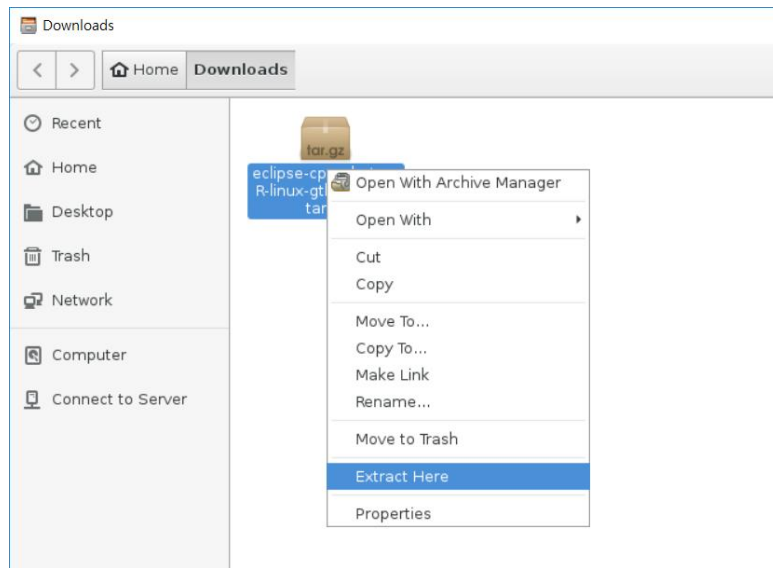
필수 프로그램들 설치

- **Nautilus – GUI file manager**
- **File-roller – Compression manager**
 - `sudo apt -y install nautilus file-roller`
(Already installed)
- **Firefox – Web browser**
 - `sudo apt -y install firefox`

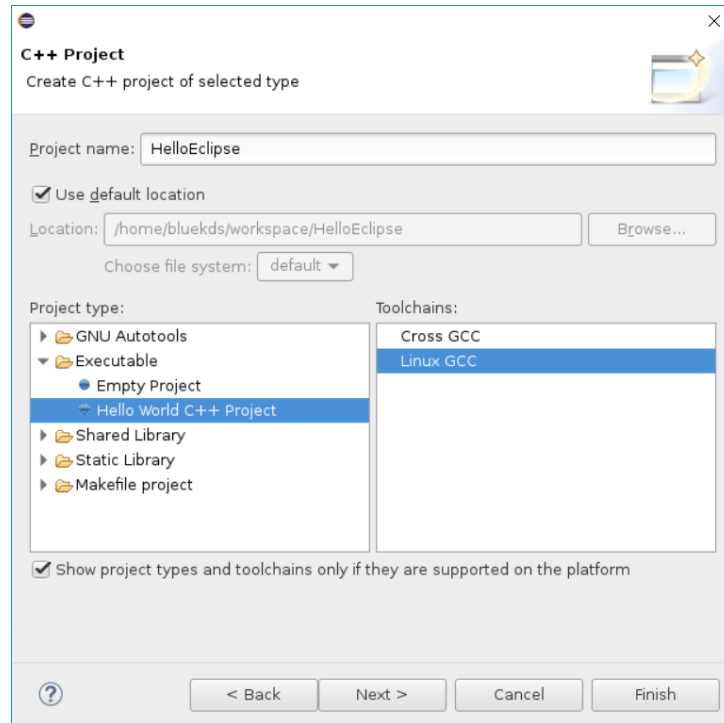
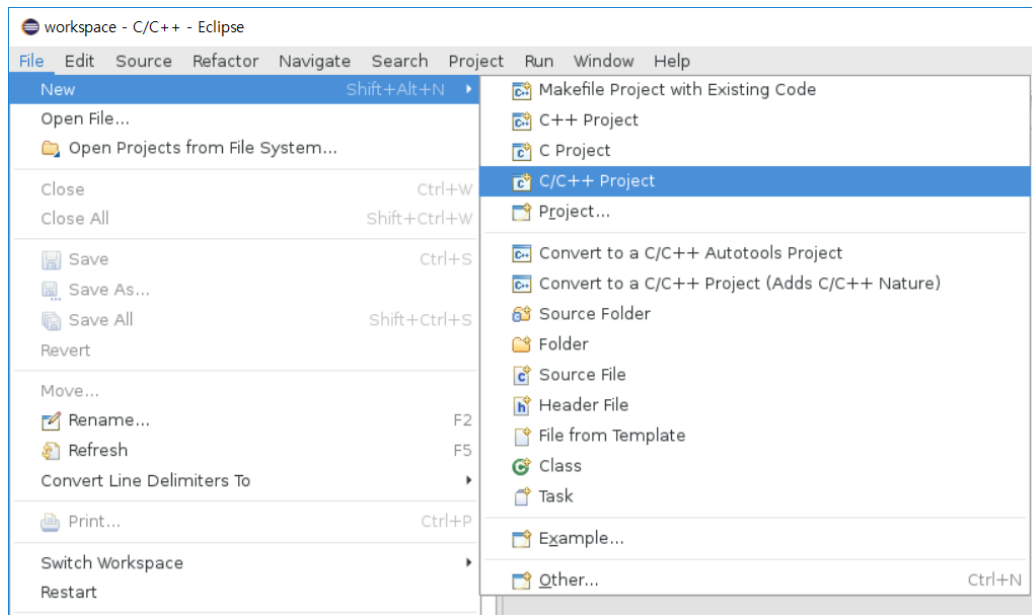


Install Eclipse CDT

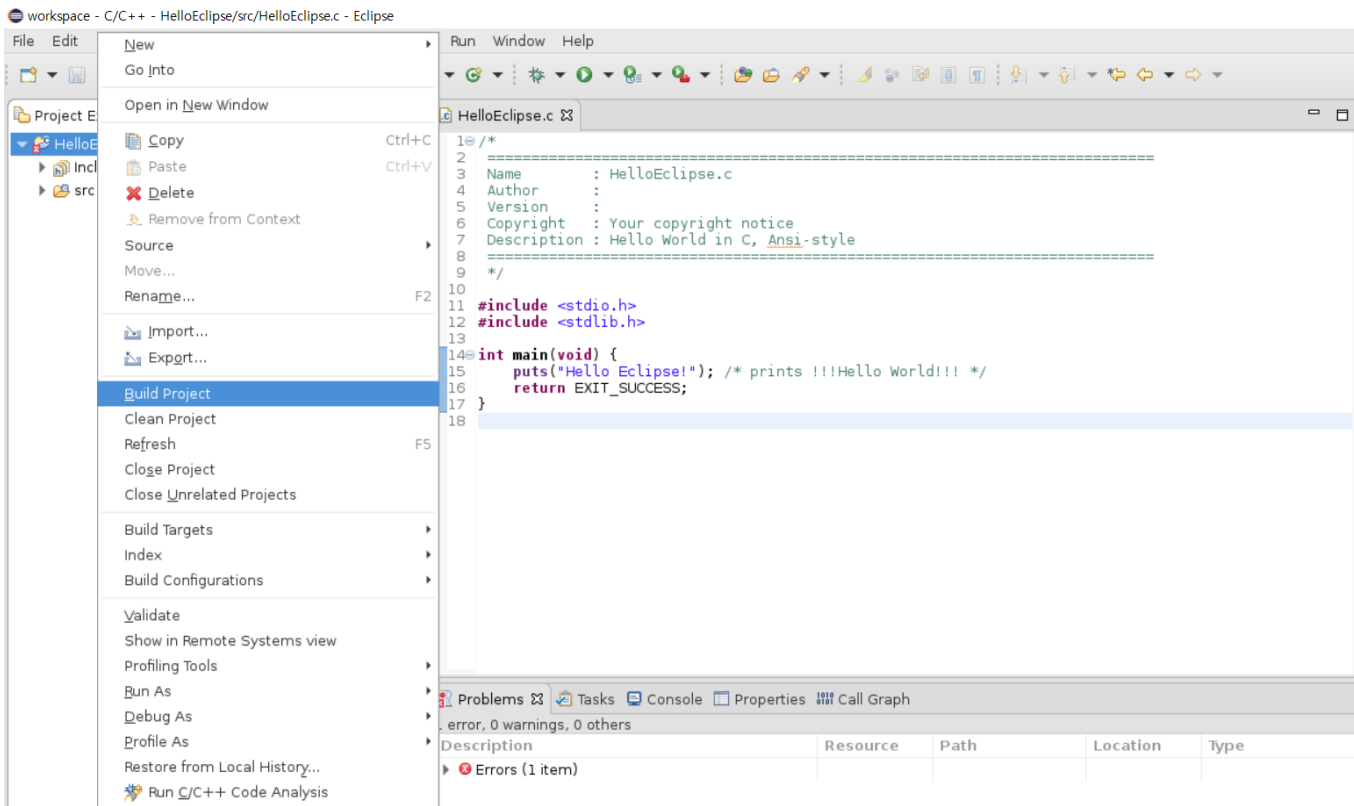
- **Download eclipse CDT**
 - <https://www.eclipse.org/downloads/>
 - Eclipse IDE for C/C++ Developers → linux 64 bit
- **Extract the downloaded file**
- **Move to your home directory**
 - \$ **mv** ~/Download/eclipse ~/
- **Run eclipse**
 - \$ **cd** ~/eclipse
 - \$ **./eclipse**



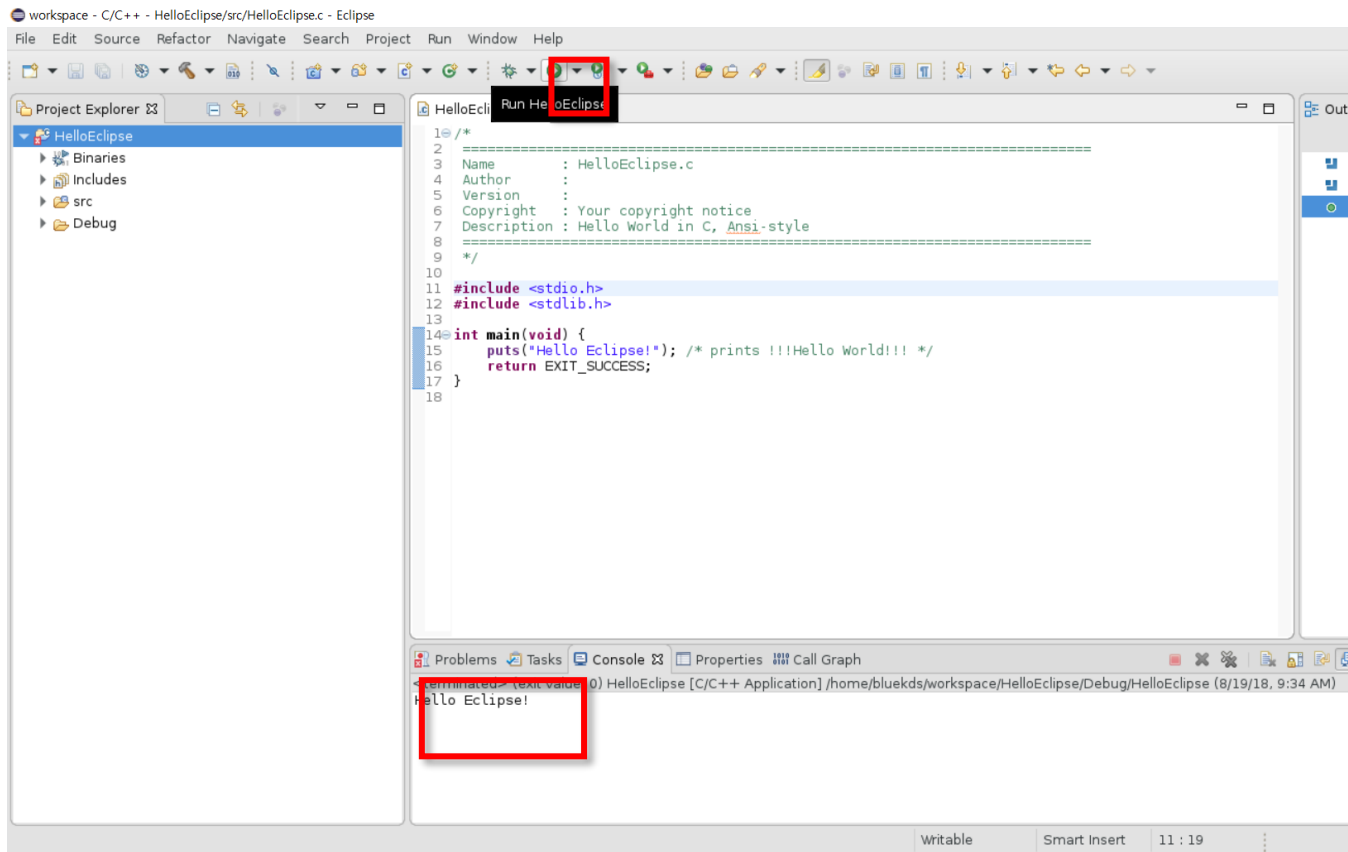
Hello Eclipse!



Hello Eclipse!



Hello Eclipse!



기타

- **기타 유용한 프로그램들**

- gedit – GUI text editor
- Gnome Terminal – GUI terminal
- Libre Office – Office for linux

- **한글 지원 설정**

- `$ sudo apt -y install language-pack-ko`
- `$ sudo locale-gen ko_KR.UTF-8`
- `$ sudo apt -y install fonts-unfonts-core fonts-unfonts-extra fonts-baekmuk fonts-nanum fonts-nanum-coding fonts-nanum-extra`

Linux ↔ Window 파일 접근

- **Location of the Linux files**

- %localappdata%\Packages\CanonicalGroupLimited.UbuntuonWindows_...\LocalState\rootfs

- **Access Windows folder in Linux**

- cd /mnt/c

```
bluekds@DS-Gram: /mnt/c
bluekds@DS-Gram:~$ firefox &
[1] 7518
bluekds@DS-Gram:~$ /mnt/c
-bash: /mnt/c: Is a directory
[1]+  Done                  firefox
bluekds@DS-Gram:~$ ls
Desktop  Downloads  eclipse
bluekds@DS-Gram:~$ cd /mnt/c
bluekds@DS-Gram:/mnt/c$ ls
ls: cannot read symbolic link 'Documents and Settings': Permission denied
ls: cannot access 'hiberfil.sys': Permission denied
ls: cannot access 'pagefile.sys': Permission denied
_AcroTemp      hiberfil.sys  pagefile.sys  Program Files (x86)
Config.Msi     index        perlcache    Recovery
Documents and Settings  MSOCCache   Program Files  System Volume Information
Users
Windows
```

이미지 출처

- 본 슬라이드에 사용된 이미지들은,
 - 다음 출처로 부터 가져 왔으며, 상업적 사용 및 출처 표시 제한이 없는
이미지만 사용 했습니다
 - [Pixarbay](#)
 - [illustAC](#)



Pixabay로부터 입수된 Peggy und Marco Lachmann-Anke님의 이미지입니다.

폰트 정보

- 기본 폰트 [[link](#)]
 - Noto Sans, Noto Sans KR
 - Google 제공, 상업적 사용 제한 없음
- Source code 폰트 [[link](#)]
 - Hack
 - 오픈소스 폰트, 상업적 사용 제한 없음