2022년 IoT기반 스마트 솔루션 개발자 양성과정

Programming : Python

1-Raspberry Pi

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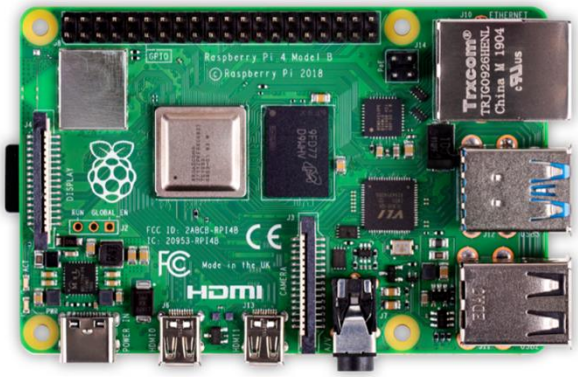
Raspberry Pi

개 발 사	라즈베리 파이 재단
종 류	마이크로 컴퓨터
출 시 일	2012년 1월 29일
운영체제	리눅스(라즈비안, 데비안 GNU/Linux, 아크 리눅스등)
CPU	모델 A, B, B+ - ARM1176JZF-S 700 MHz 싱글코어 (오버클럭시 최대 1000MHz만큼의 성능을 낼 수 있다.) 2 - 900MHz ARM Cortex-A7 쿼드코어
전 원	2.5 W (모델 A), 3.5 W (모델 B, B+), 4 W (2 모델 B)
저장매체	SD 카드(B+, 2 모델 B는 Micro SD Card)
RAM	모델 A, 모델 A+ - 256 MB 모델 B, 모델 B+, 모델 0 - 512 MB 모델 2 - 1 GB
GPU	비디오코어 IV
입 력	USB 1개(A, A+, B 모델은 2개, B+, 2세대 모델은 USB포트 4개, CSI, GPIO 포트, LAN 포트(모델 A, A+ 제외)

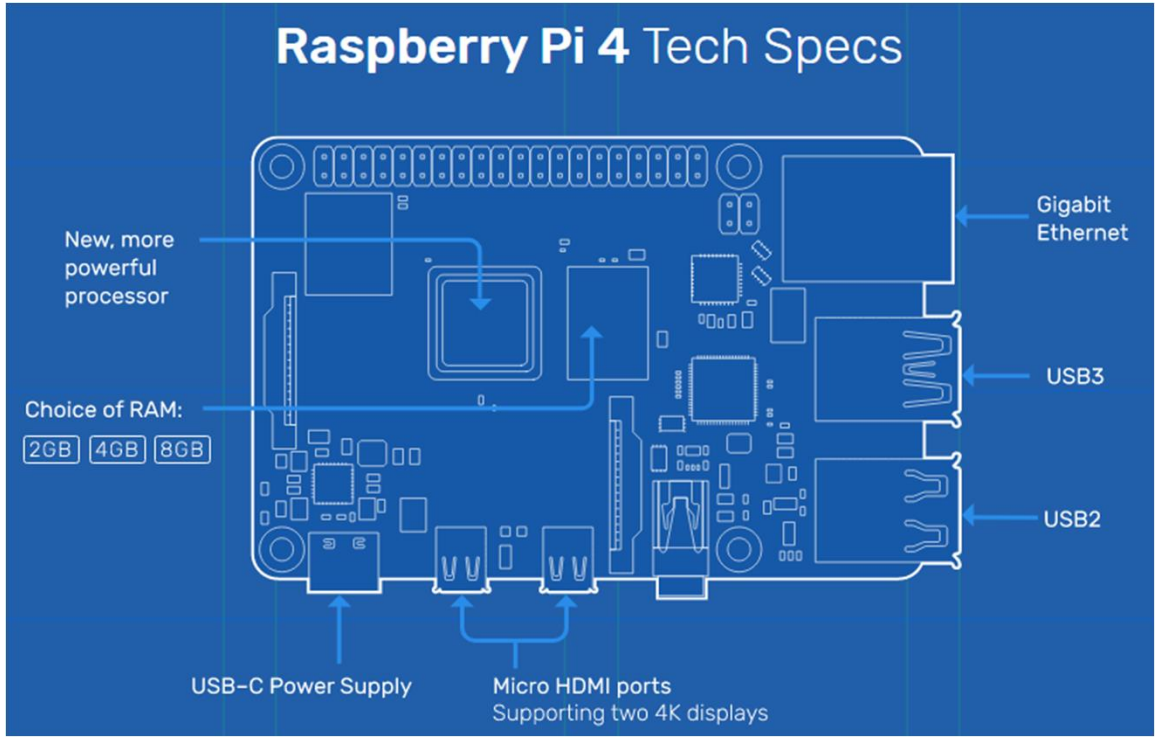
Arduino vs RaspberryPi

Board	Arduino	Rpi A+	Rpi B+	Rpi2 B	Rpi3 B+	Rpi4 B
Price	$30	$20	$35	$35	$30	$75
Processor	ATmega328	ARM11		Cortax A7	A53	Cortax A72
Clock	16Mhz	700Mhz		900Mhz	1.4Ghz	64bit Soc @ 1.5Ghhz
Core	Single	Single		Quard	Quard	Quad
RAM	2KB	256MB	512MB	1GB	1GB	2GB,4GB,8GB
Flash	32KB	Micro SD				
GPIO	20	Raspberry Pi standard 40 pin GPIO				
Ethernet	N/A	10/100				Gigabit Ethernet
USB	N/A	USB2.0x1	USB2.0x4			USB2.0x2, USB3.0x2
WIFI	N/A				2.4/5.0Ghz WIFI	
Bluetooth	N/A				BLE 4.0	BLE 5.0
Video Out	N/A	Composite	HDMI			Micro HDMI x 2
Audio Out	N/A	Analog	HDMI/Analog			4 Pole Stereo

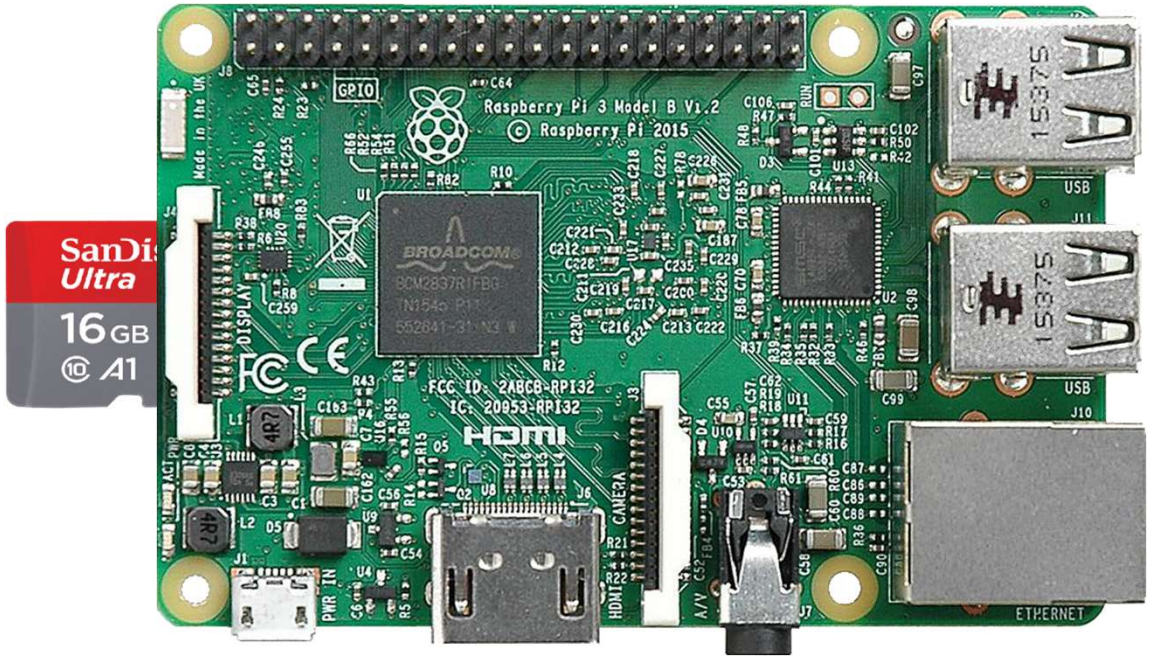
Model



Raspberry Pi 4 Model B



Raspberry Pi 3 Model B



Raspberry Pi 3 Model B Spec.

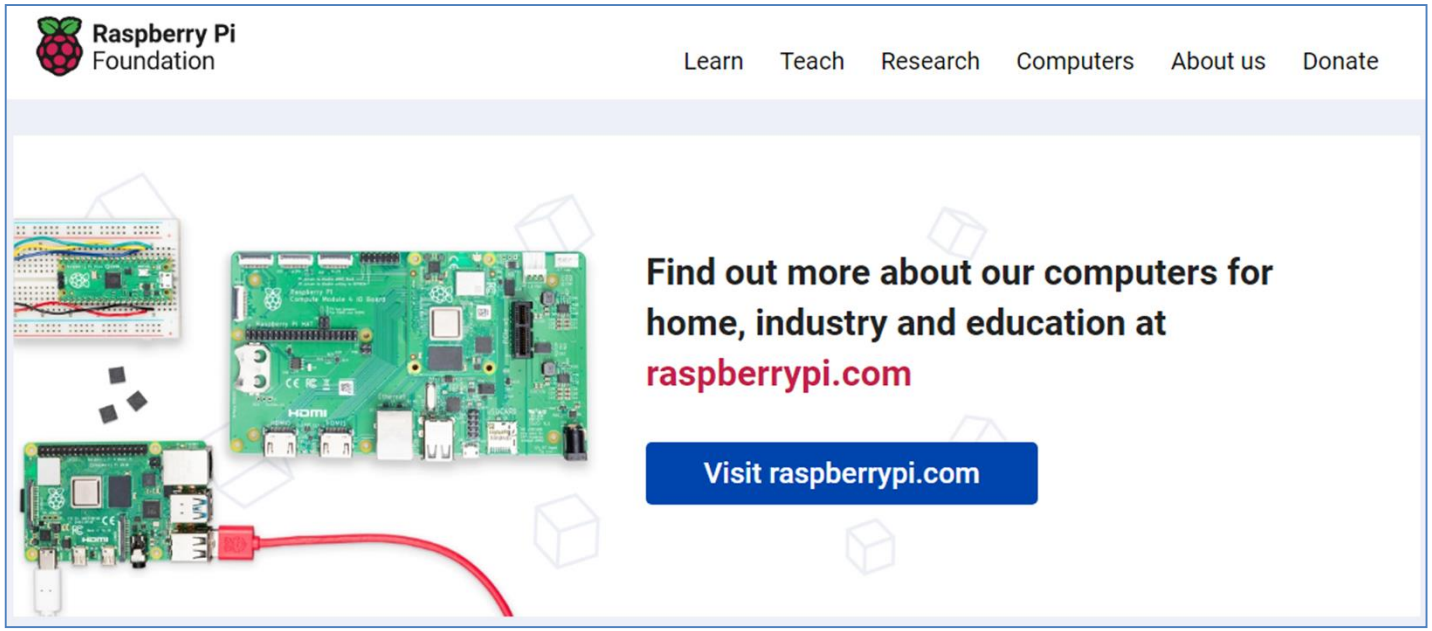
- SoC: Broadcom BCM2837 (roughly 50% faster than the Pi 2)
- CPU: 1.2 GHZ quad-core ARM Cortex A53 (ARMv8 Instruction Set)
- GPU: Broadcom VideoCore IV @ 400 MHz
- Memory: 1 GB LPDDR2-900 SDRAM
- USB ports: 4
- Network: 10/100 MBPS Ethernet, 802.11n Wireless LAN, Bluetooth 4.0
- Storage: Micro-SD
- GPIO: 40-pin GPIO header, populated
- Ports: HDMI, 3.5mm analogue audio-video jack, 4x USB 2.0, Ethernet, Camera Serial Interface (CSI), Display Serial Interface (DSI)

Operating System

- Arch Linux ARM
- 데비안 6.0 (Squeeze)
- Gentoo Linux
- Puppy Linux
- Raspberry Pi Fedora Remix
- Raspbian (Wheezy port with faster FP support)
- RiscOS
- Slackware ARM (formally ARMedslack)
- FreeBSD 10 ARM (RPI-B)
- QtonPi (임베디드 리눅스)
- Redsleeve (ARM용 RedHat 기반)
- Ubuntu (라즈베리 파이 2)
- 윈도우 10 IoT Core (라즈베리 파이 2)
- Tizen IoT (라즈베리 파이3)

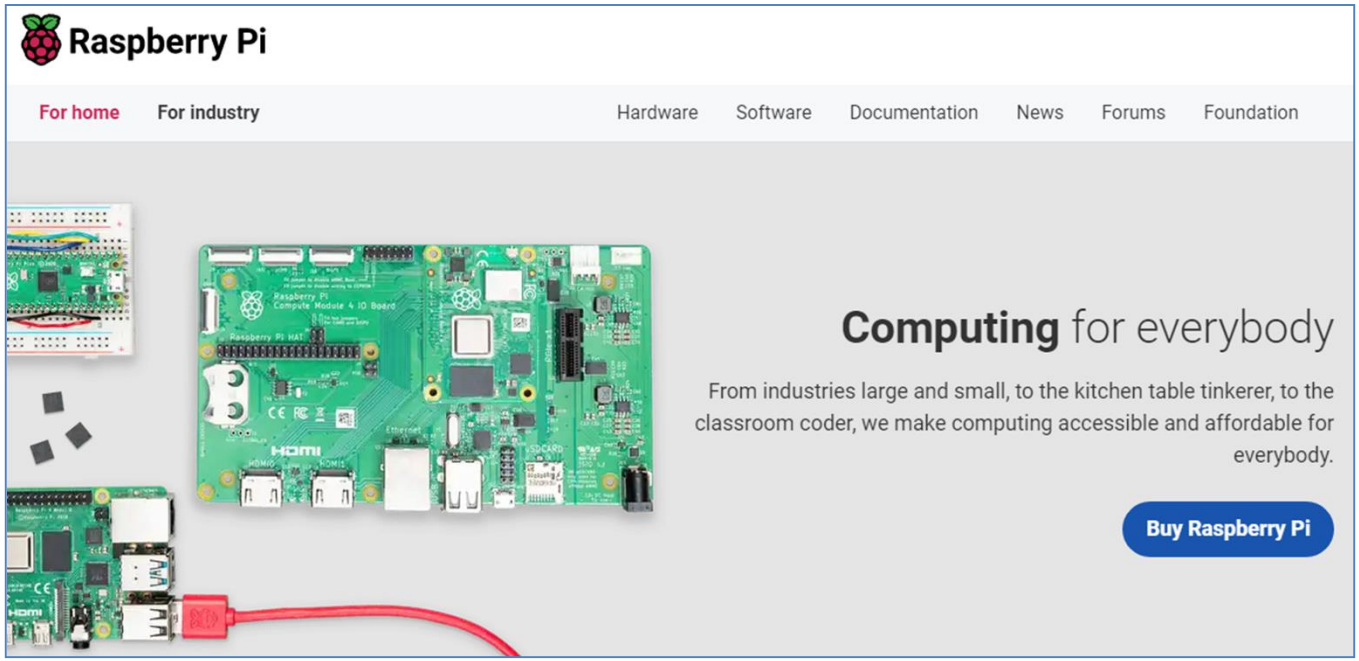
raspberry.org

- https://www.raspberrypi.org/

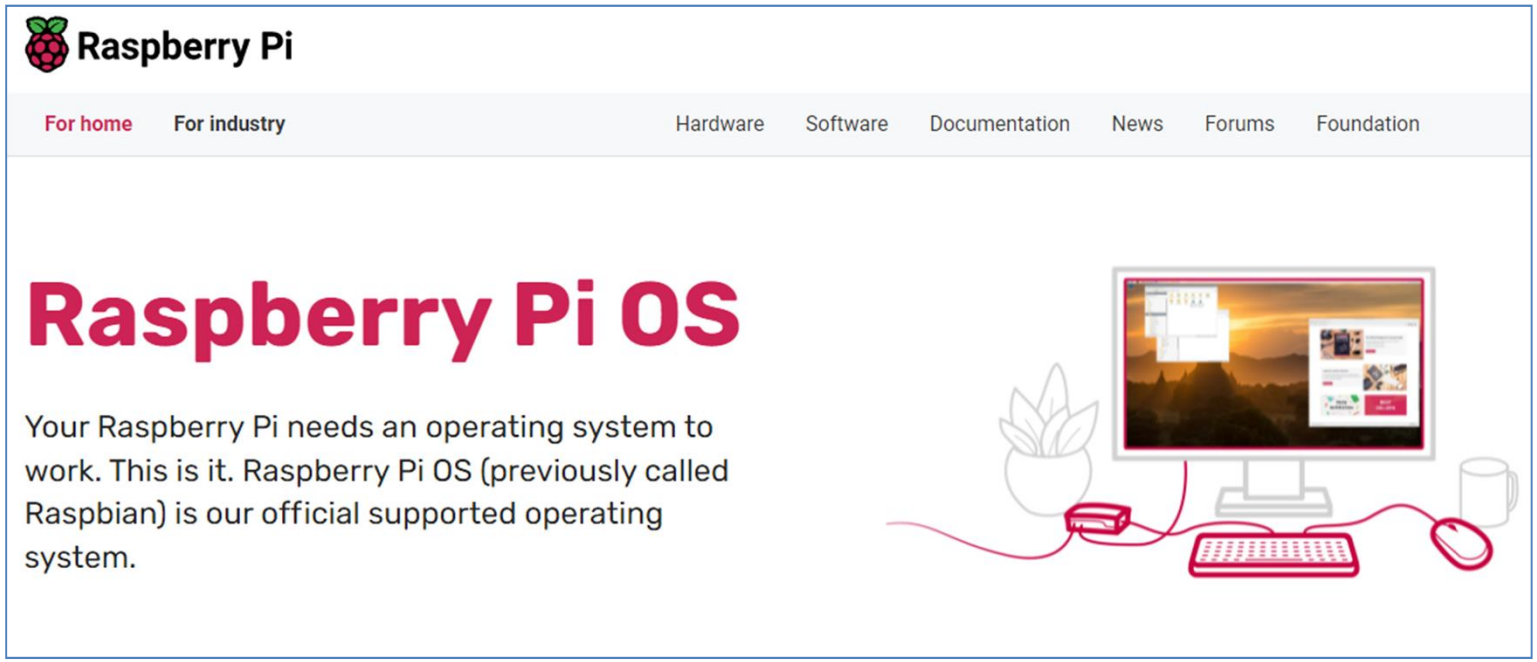


raspberrypi.com

- https://www.raspberrypi.com/



raspberrypi.com/software/



Raspberry Pi Imager

Install Raspberry Pi OS using Raspberry Pi Imager

Raspberry Pi Imager is the quick and easy way to install Raspberry Pi OS and other operating systems to a microSD card, ready to use with your Raspberry Pi. Watch our 45-second video to learn how to install an operating system using Raspberry Pi Imager.

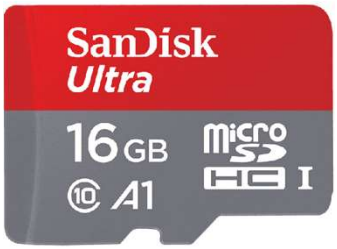
Download and install Raspberry Pi Imager to a computer with an SD card reader. Put the SD card you'll use with your Raspberry Pi into the reader and run Raspberry Pi Imager.

Download for Windows

Download for macOS

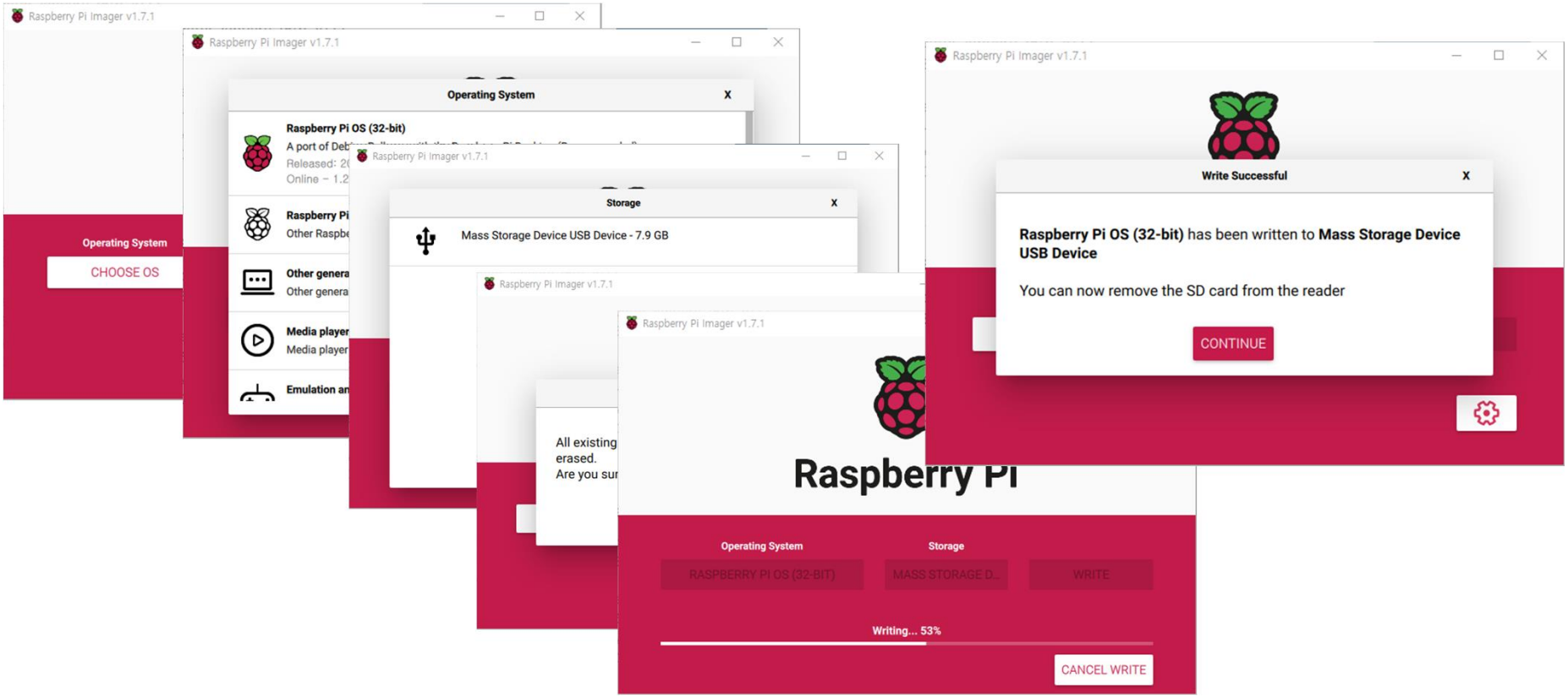
Download for Ubuntu for x86

Micro SD

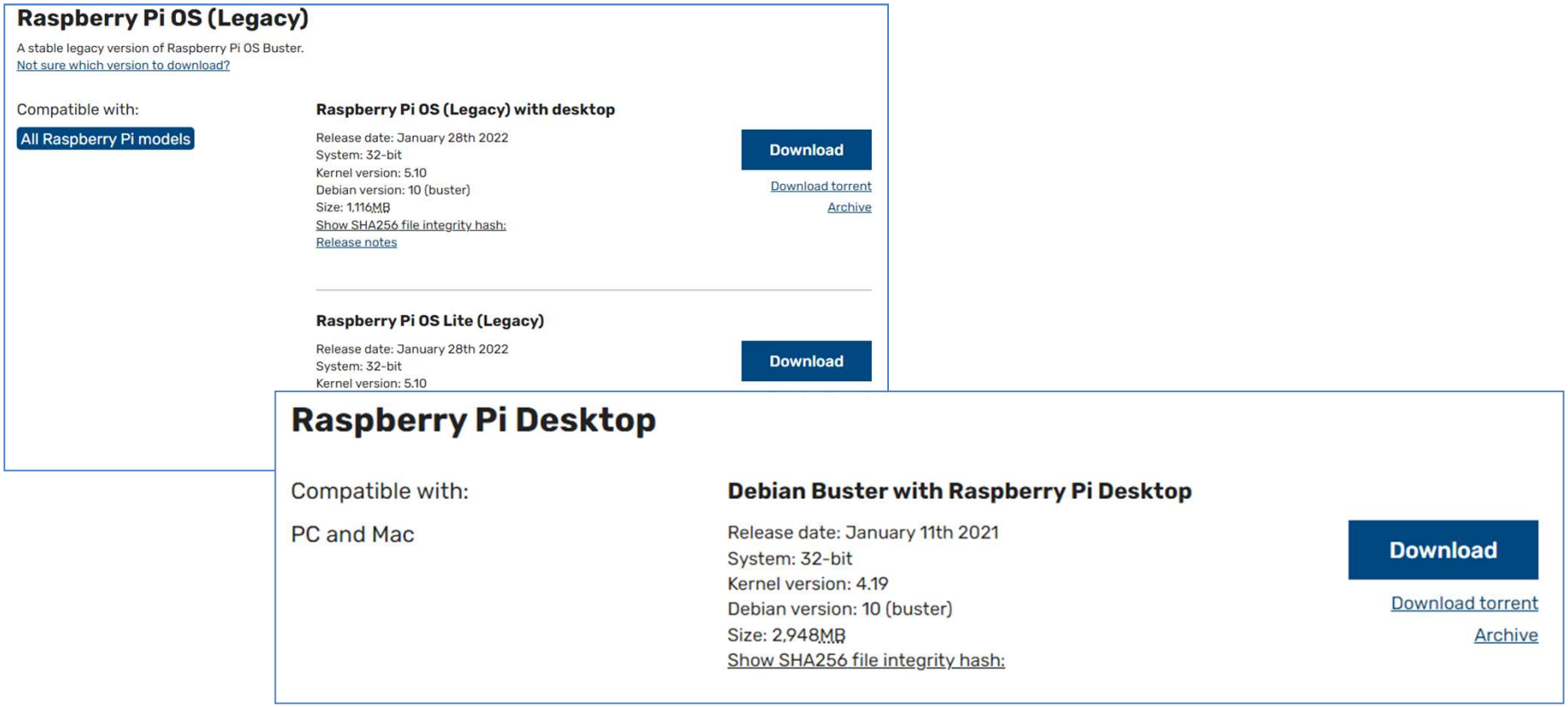


Class	성 능	용 도
Class 2	2MB/s	SD 영상기록
Class 4	4Mb/s	HD 영상기록
Class 6	6Mb/s	Full HD 영상기록
Class 10	10Mb/s	연속적인 HD 영상기록
UHS-1	10Mb/s	실시간 영상 기록
UHS-3	30Mb/s	Ultra HD 영상기록

Imaging BullsEye

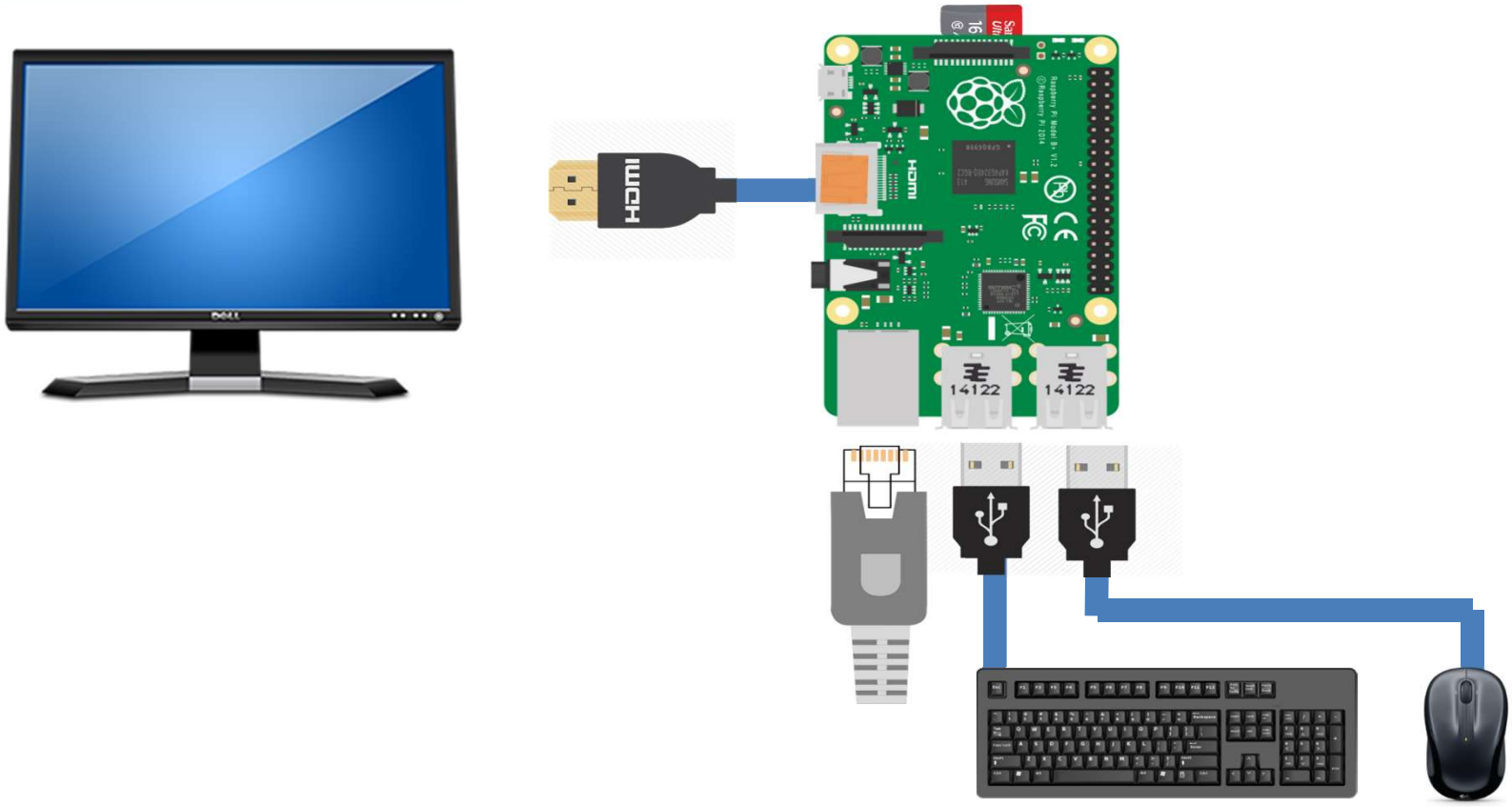


Legacy / PC Version

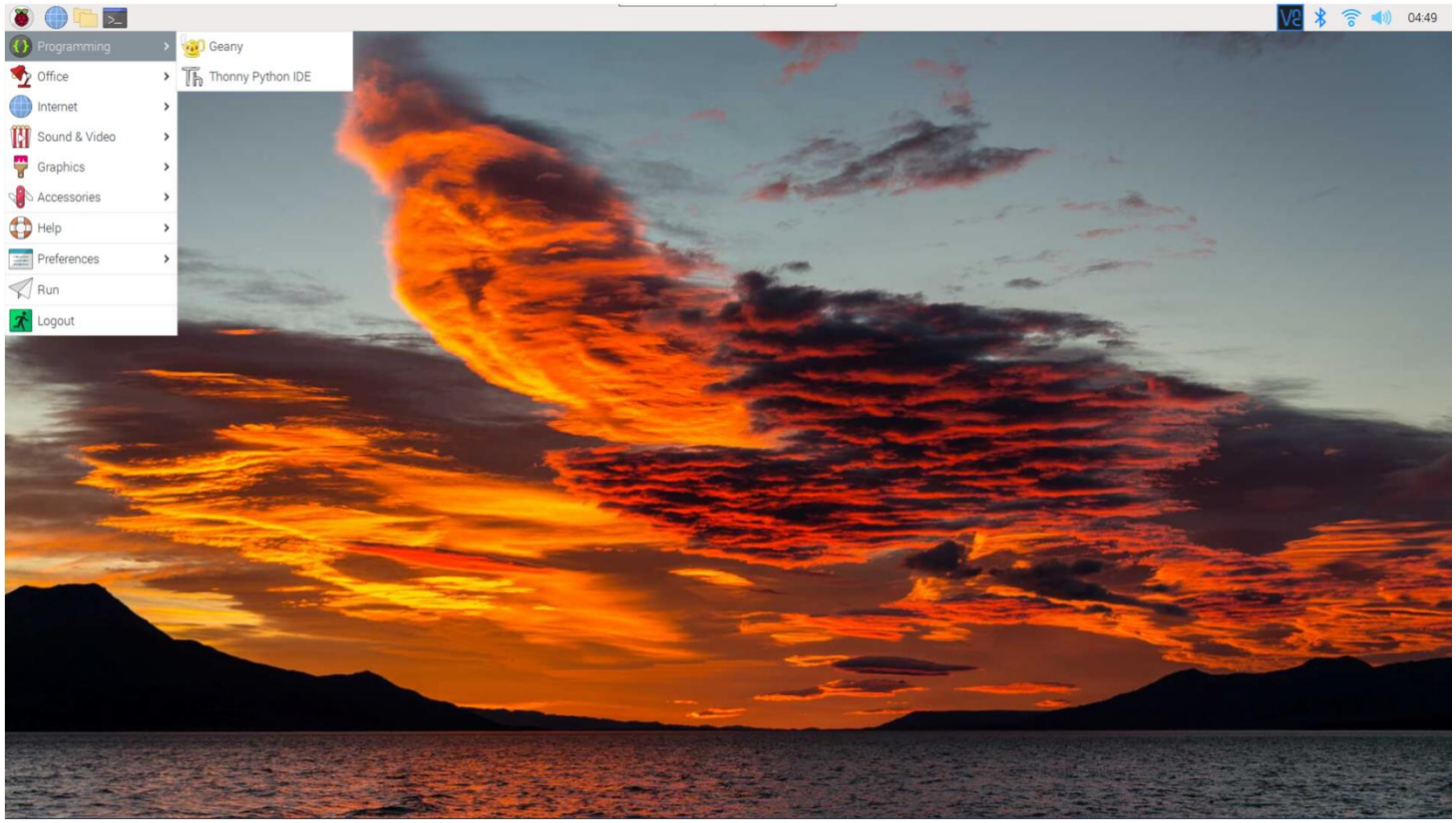


Raspberry Pi Doc

Wiring

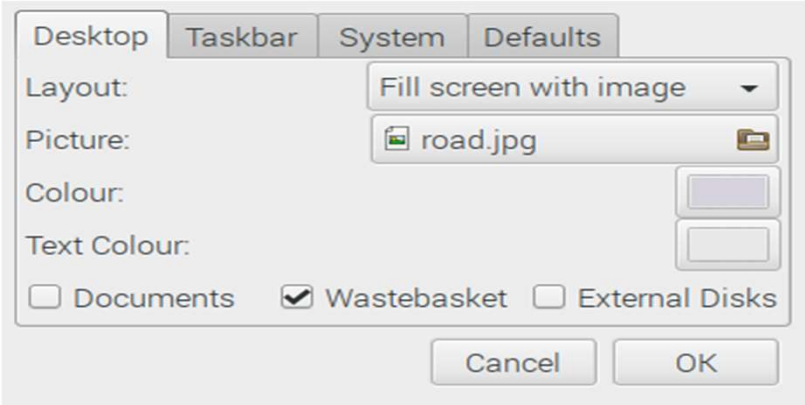


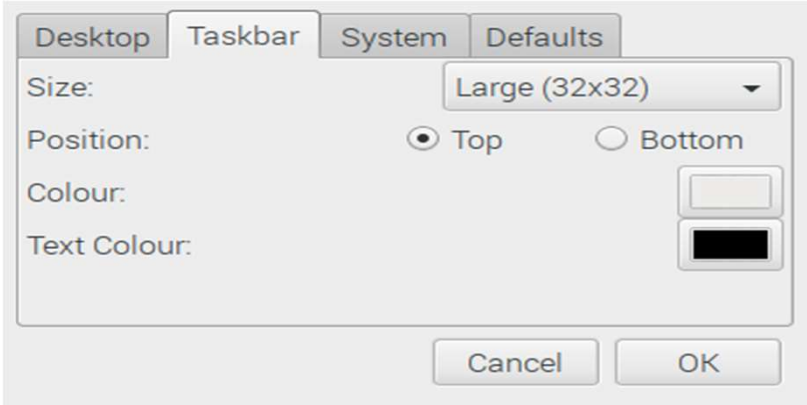
Rasbian Bullseye



Appearance Settings

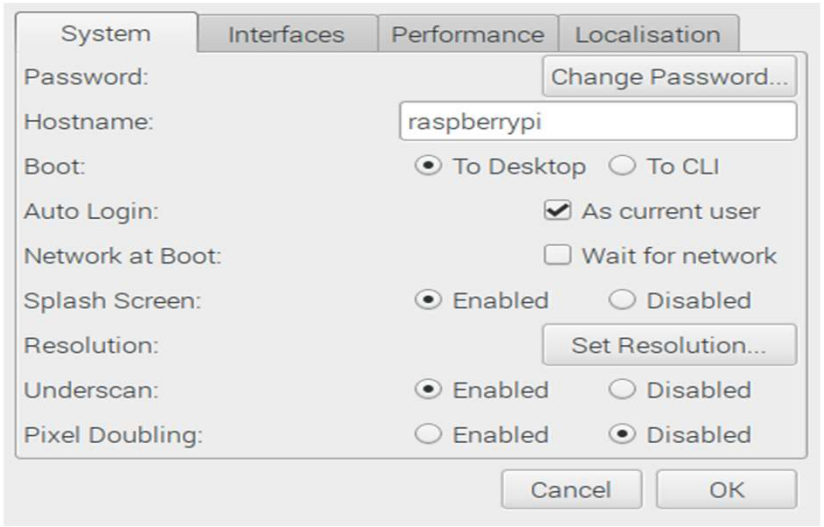
- [Menu] [Preferences] [Appearance Settings]

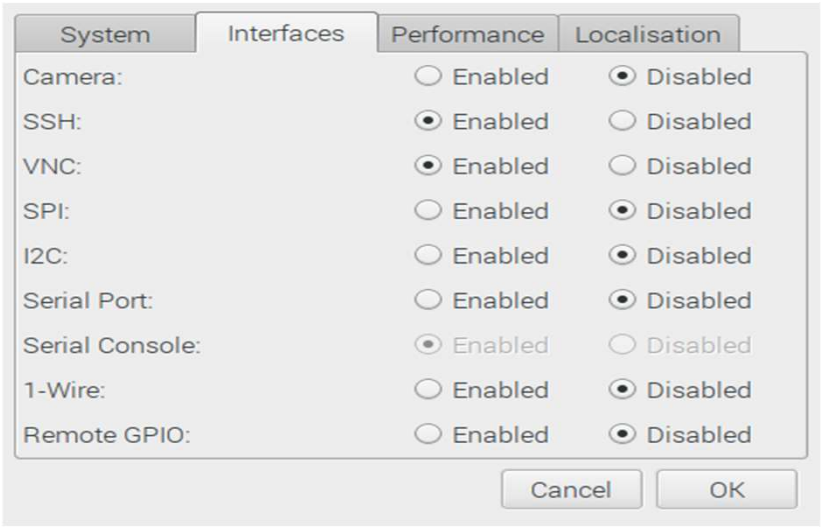




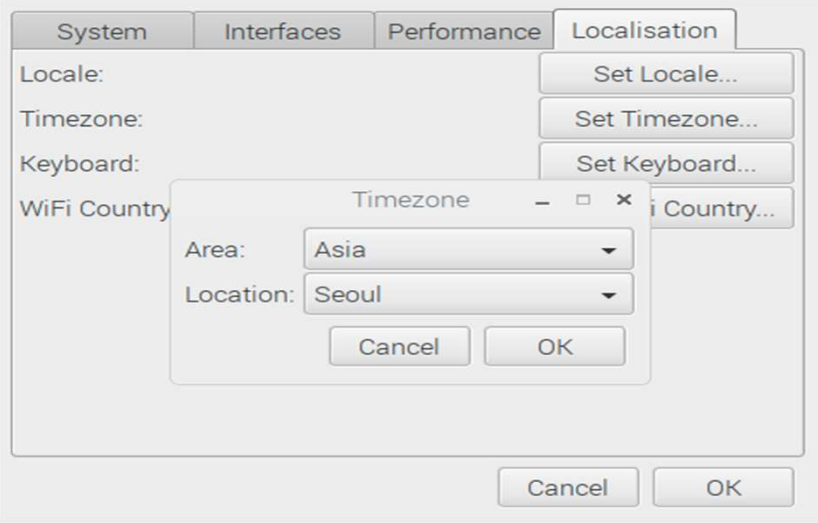
Raspberry Pi Configuration

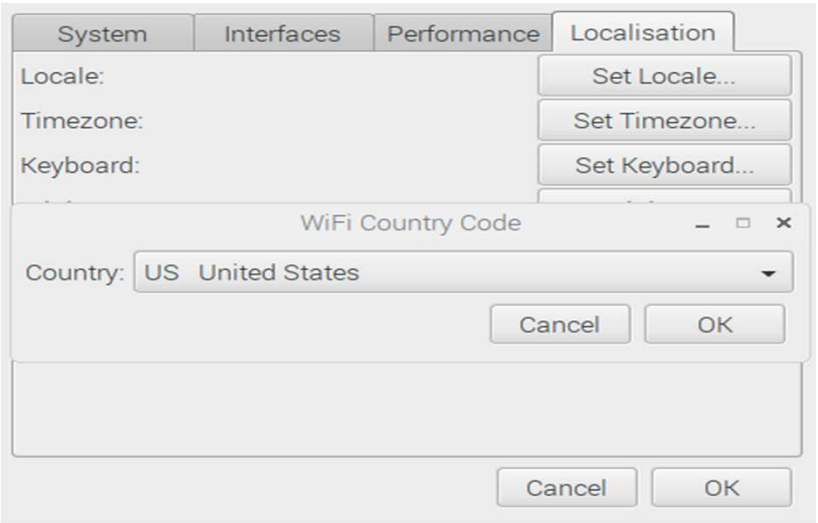
- [Menu] [Preferences] [Raspberry Pi Configuration]





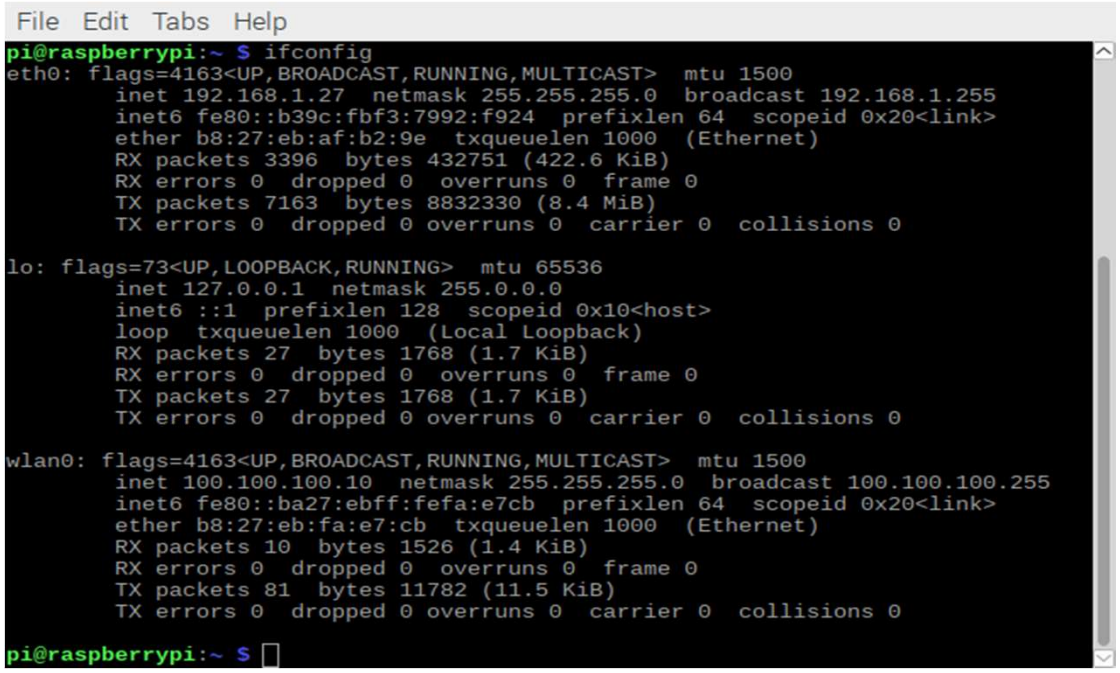
Localisation



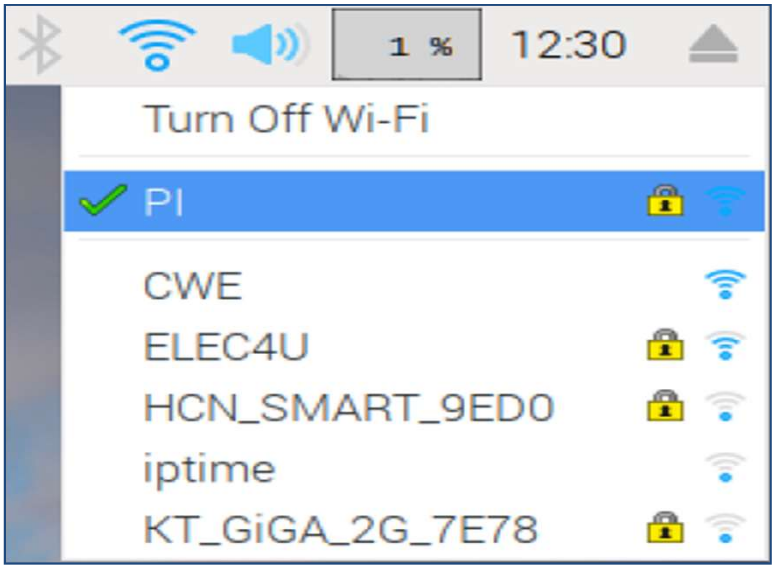


ifconfig

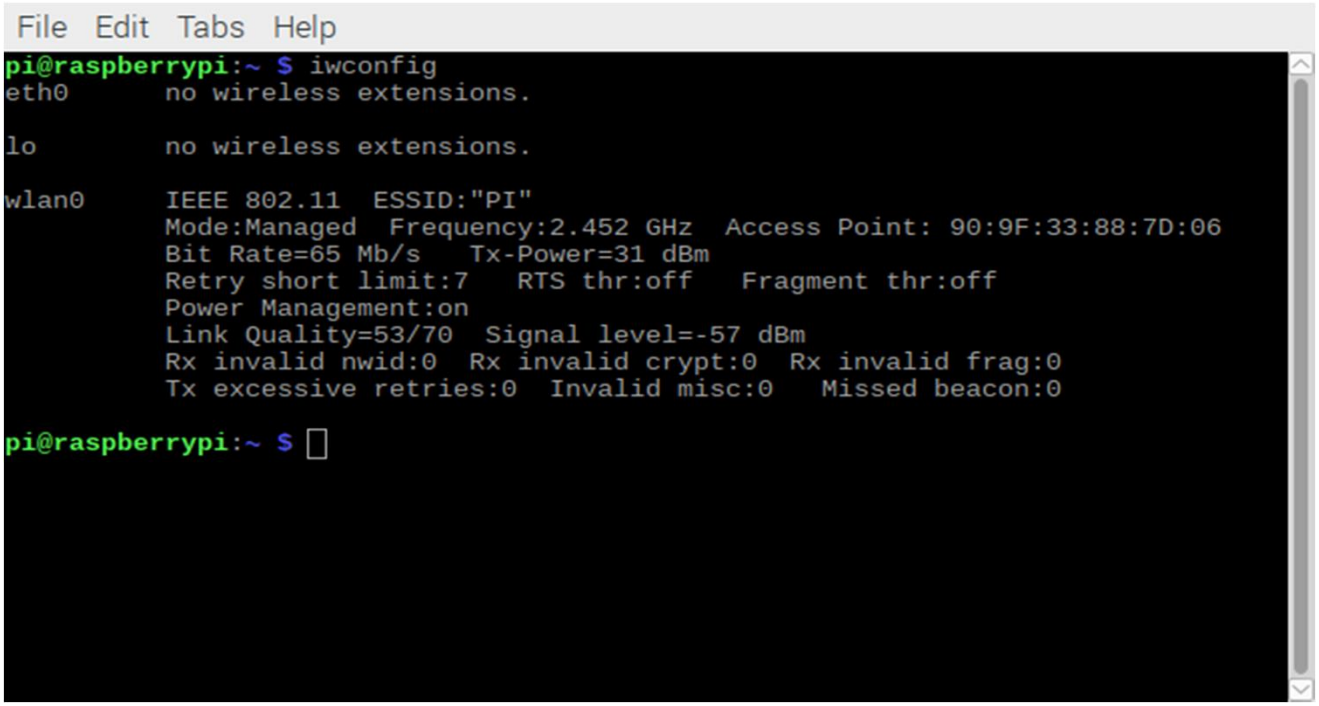
- 유/무선 네트워크 확인
  - $ ifconfig



WiFi 연결

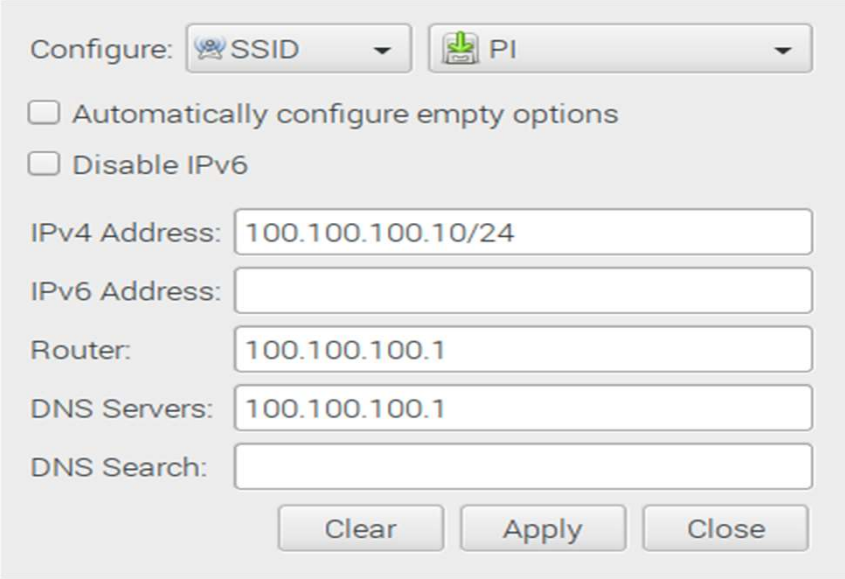

1 %
12:30
Turn Off Wi-Fi
PI
CWE
ELEC4U
HCN_SMART_9ED0
iptime
KT_GiGA_2G_7E78

iwconfig


File Edit Tabs Help
pi@raspberrypi:~ $ iwconfig
eth0 no wireless extensions.
lo no wireless extensions.
wlan0 IEEE 802.11 ESSID:"PI"
Mode:Managed Frequency:2.452 GHz Access Point: 90:9F:33:88:7D:06
Bit Rate=65 Mb/s Tx-Power=31 dBm
Retry short limit:7 RTS thr:off Fragment thr:off
Power Management:on
Link Quality=53/70 Signal level=-57 dBm
Rx invalid nwid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0
pi@raspberrypi:~ $

WiFi Static IP Set

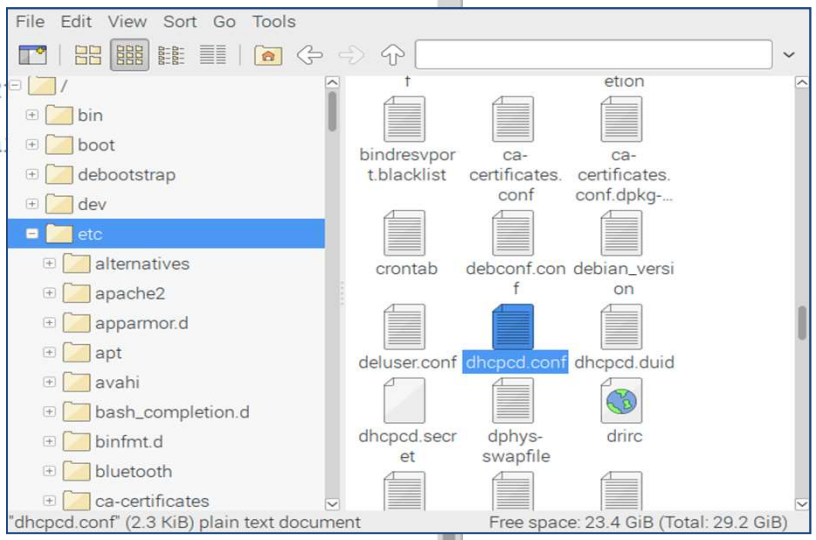
{Wifi} Mouse Left [Wireless & Wired NetWork Setting]



/etc/dhcpcd.conf

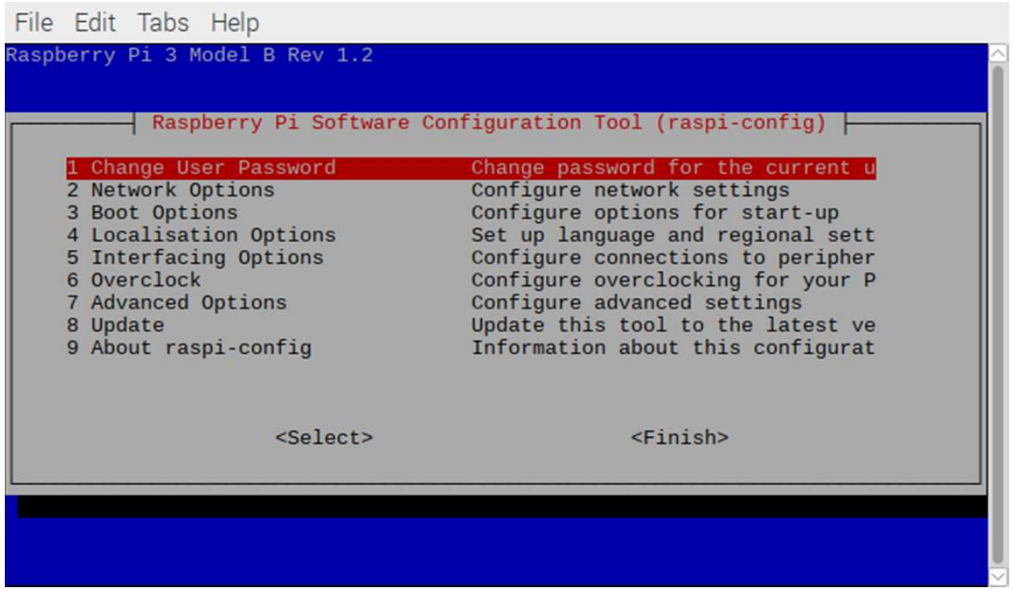
File Edit Search Options Help

```
slaac private

# Example static IP configuration:
#interface eth0
#static ip_address=192.168.0.10/24
#static ip6_address=fd51:42f8:caae:d92e::ff/64
#static routers=192.168.0.1
#static domain_name_servers=192.168.0.1 8.8.8.8 fd51:42

# It is possible to fall back to a static IP if DHCP fa
# define static profile
#profile static_eth0
#static ip_address=192.168.1.23/24
#static routers=192.168.1.1
#static domain_name_servers=192.168.1.1

# fallback to static profile on eth0
#interface eth0
#fallback static_eth0

interface wlan0
noipv6

SSID PI
static ip_address=100.100.100.10/24
static routers=100.100.100.1
static domain_name_servers=100.100.100.1
static domain_search=
```

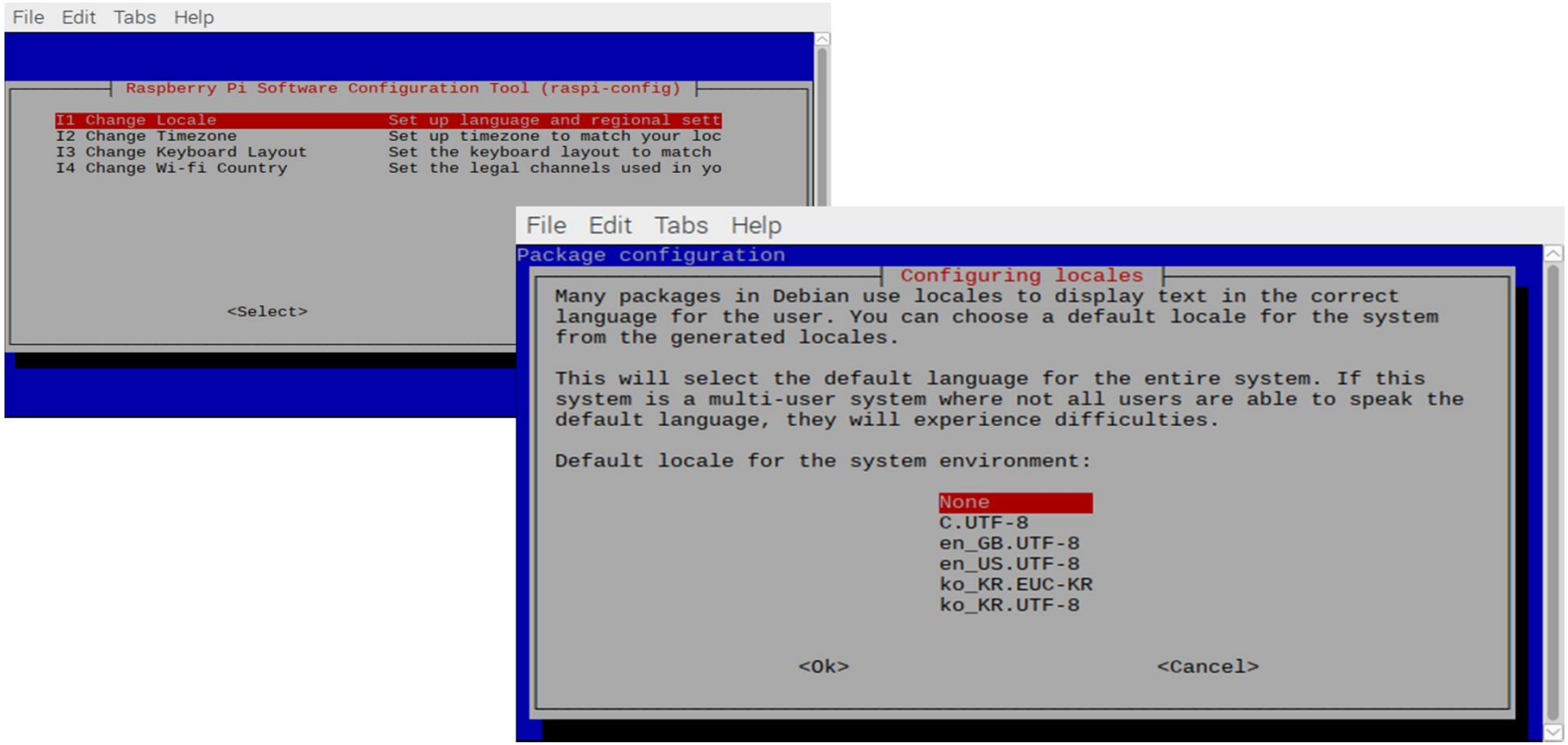


Raspberry Pi Configuration Tool

- $ sudo raspi-config



Change Local



sudo

- 유닉스 및 유닉스 계열 운영 체제에서 사용
- superuser do
- 다른 사용자의 보안 권한을 슈퍼유저로서 프로그램을 구동할 수 있도록 하는 프로그램
- sudo 를 사용할 수 있는 사용자와 권한 설정은 /etc/sudoers 파일에 지정

Basic Command

- X-window 실행
  - $ startx
- OS Version
  - $ cat/proc/version
- CPU Version
  - $ cat/porc/cpuinfo
- Firm version
  - $ vcgencmd version
- Firm Update
  - $ sudo rpi-update
- OS reboot
  - $ sudo reboot
  - $ sudo shutdown –r now
- OS Shutdown
  - $ sudo halt
  - $ sudo shutdown –h now

File System Command

- Change Direcory
  - $ cd xxx
- List
  - $ ls –a : 모든 파일
  - $ ls –l : 추가정보 포함
  - $ ls –d : 디렉토리
- Make directory
  - $ mkdir xxx
- Remove
  - $ rm –r xxx : 삭제
  - $ rm –i xxx : 질의 후 삭제
- Copy
  - $ cp fileA fileB
- Move
  - $ mv fileA /home/otheruser/

Advenced Packaging Tool Command

- 우분투(Ubuntu)를 포함안 데비안(Debian)계열의 리눅스에서 쓰이는 팩키지 관리 명령어 도구
- apt command
  - $ sudo apt-get update
  - $ sudo apt-get upgrade
  - $ sudo apt-get install *packageName*
  - $ sudo apt-get remove *packageName*
  - $ sudo apt-get source *packageName*
  - $ sudo apt-catch search *packageName*
  - $ sudo apt-catch show *packageName*

- Package Index 정보 : /etc/apt/sources.list
- apt를 이용해서 설치된 deb패키지는 /var/cache/apt/archive/ 에 설치

Linux File System