2022년 IoT기반 스마트 솔루션 개발자 양성과정

Programming : Python

19-Connect to Arduino

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충북대학교 공동훈련센터

Install Arduino

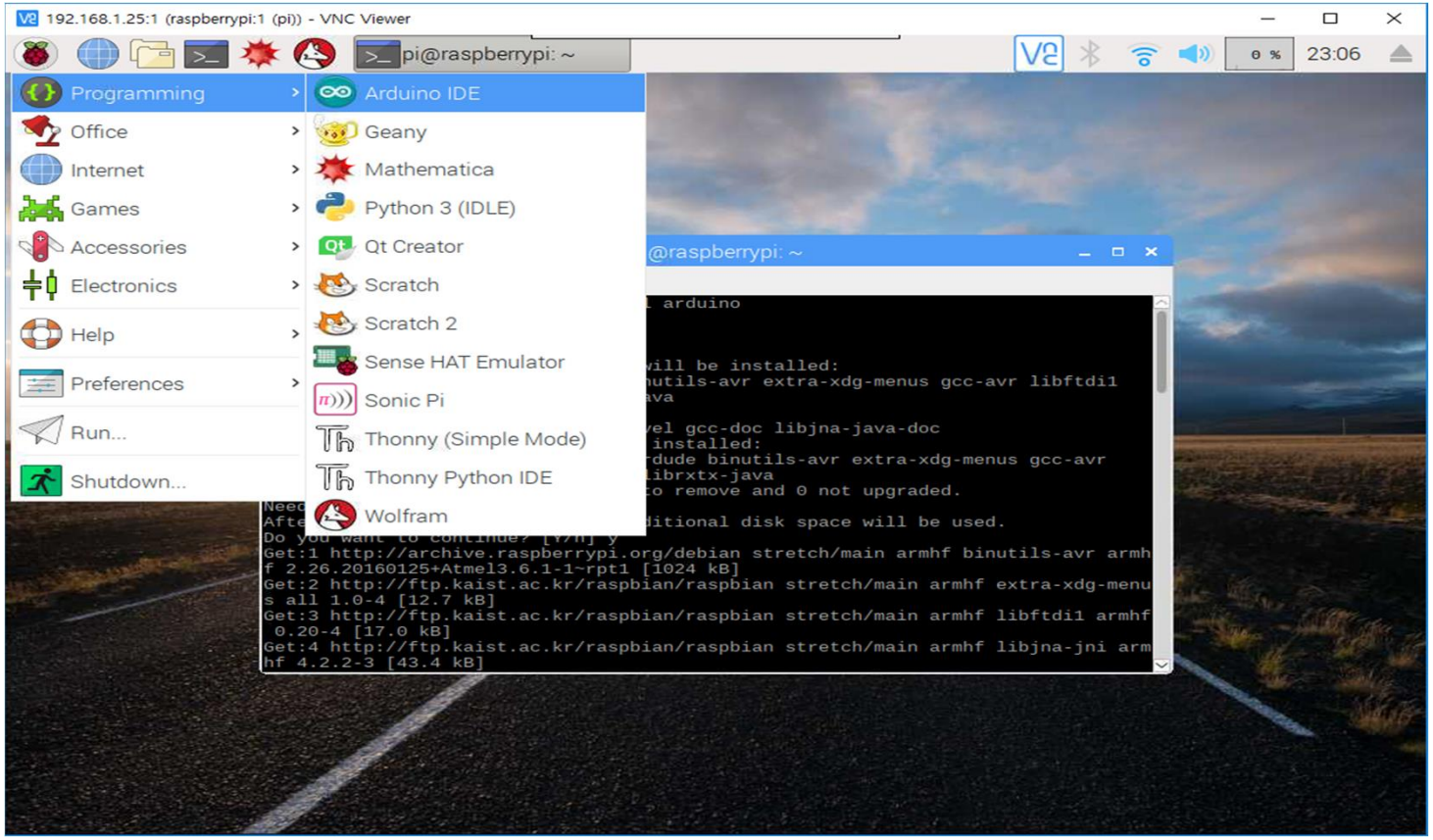
- $ sudo apt-get install arduino

pi@raspberrypi: ~

File Edit Tabs Help

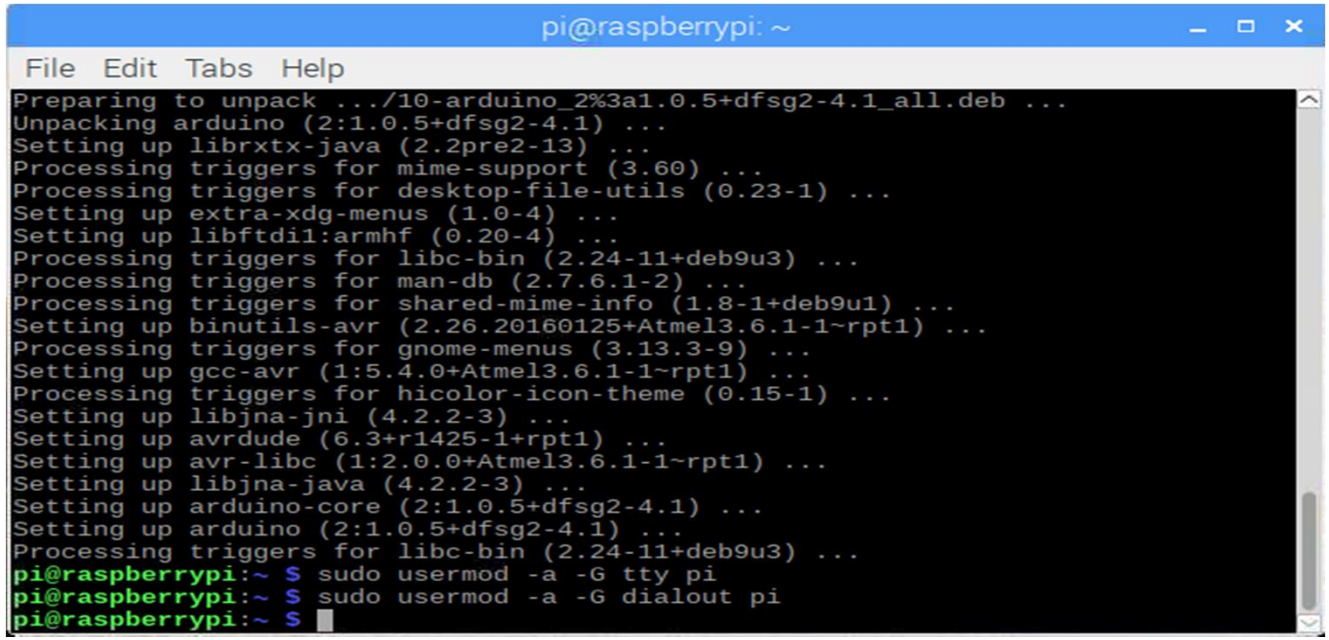
```
pi@raspberrypi:~ $ sudo apt install arduino
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  arduino-core avr-libc avrdude binutils-avr extra-xdg-menus gcc-avr libftdi1
  libjna-java libjna-jni librxtx-java
Suggested packages:
  arduino-mk avrdude-doc task-c-devel gcc-doc libjna-java-doc
The following NEW packages will be installed:
  arduino arduino-core avr-libc avrdude binutils-avr extra-xdg-menus gcc-avr
  libftdi1 libjna-java libjna-jni librxtx-java
0 upgraded, 11 newly installed, 0 to remove and 0 not upgraded.
Need to get 21.6 MB of archives.
After this operation, 132 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.raspberrypi.org/debian stretch/main armhf binutils-avr armh
f 2.26.20160125+Atmel3.6.1-1~rpt1 [1024 kB]
Get:2 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf extra-xdg-menu
s all 1.0-4 [12.7 kB]
Get:3 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf libftdi1 armhf
 0.20-4 [17.0 kB]
Get:4 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf libjna-jni arm
hf 4.2.2-3 [43.4 kB]
```

Arduino IDE


192.168.1.25:1 (raspberrypi:1 (pi)) - VNC Viewer
pi@raspberrypi: ~
23:06
Programming
Office
Internet
Games
Accessories
Electronics
Help
Preferences
Run...
Shutdown...
Arduino IDE
Geany
Mathematica
Python 3 (IDLE)
Qt Creator
Scratch
Scratch 2
Sense HAT Emulator
Sonic Pi
Thonny (Simple Mode)
Thonny Python IDE
Wolfram
@raspberrypi: ~
Get:1 http://archive.raspberrypi.org/debian stretch/main armhf binutils-avr armhf 2.26.20160125+Atmel3.6.1-1~rpt1 [1024 kB]
Get:2 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf extra-xdg-menus all 1.0-4 [12.7 kB]
Get:3 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf libftdi1 armhf 0.20-4 [17.0 kB]
Get:4 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf libjna-jni armhf 4.2.2-3 [43.4 kB]

Set Serial Port

- $ sudo usermod -a -G tty pi
- $ sudo usermod -a -G dialout pi



Serial Port : /dev/ttyACM0

Blink

Blink | Arduino 2:1.0.5+dfsg2-4.1

File Edit Sketch Tools Help

Blink

```
/*
  Blink
  Turns on an LED on for one second, then off for one second, repeat

  This example code is in the public domain.
 */

// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH);   // turn the LED on (HIGH is the voltage
  delay(1000);               // wait for a second
  digitalWrite(led, LOW);    // turn the LED off by making the volta
  delay(1000);               // wait for a second
}
```

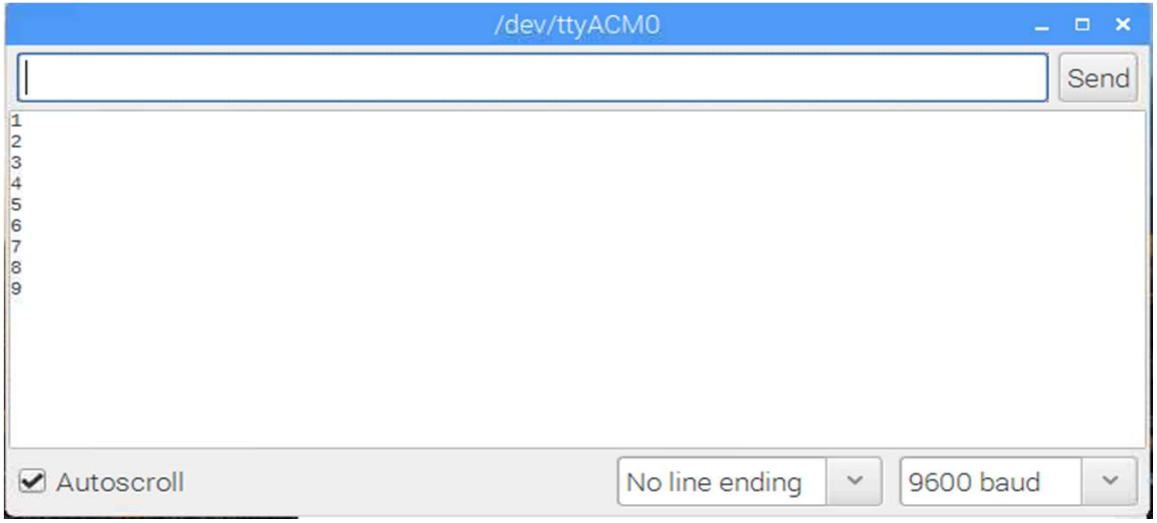
1 Arduino Mega 2560 or Mega ADK on /dev/ttyACM0

Serial Transmit

- 0~9 까지의 숫자를 1초간격으로 전송

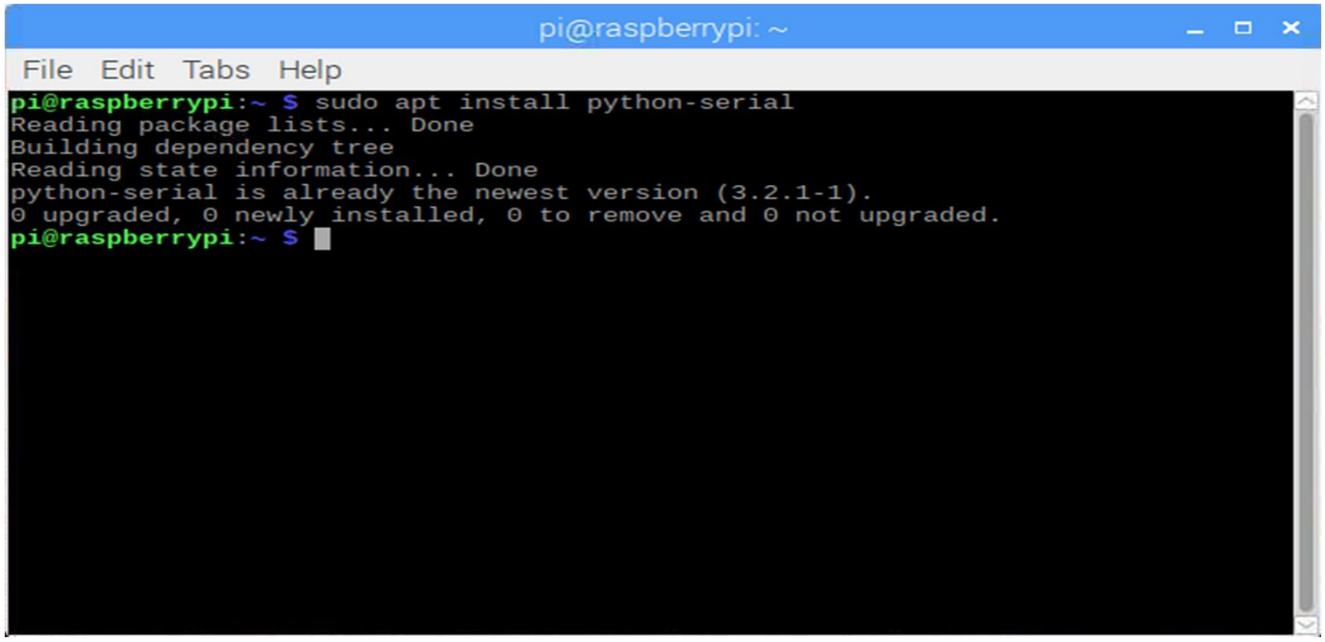
```
int Count=0;

void setup() {
  Serial.begin(9600);
}

void loop() {
  if (++Count>9) Count=0;
  Serial.println(Count);
  delay(1000);
}
```

Serial Monitor



Install Python-Serial

- $ sudo apt install python-serial



USB_RxSerial.py

Thonny - /home/pi/USB_RxSerial.py @ 10 : 14

File Edit View Run Tools Help

Open...

USB_RxSerial.py

```
import serial

port="/dev/ttyACM0"
USB_COM=serial.Serial(port,9600)
USB_COM.close()
USB_COM.open()

while True:
    res=USB_COM.readline()
    print(res)
```

Shell

```
b'1\r\n'
b'2\r\n'
b'3\r\n'
b'4\r\n'
b'5\r\n'
b'6\r\n'
b'7\r\n'
b'8\r\n'
```

Bytes.decode( )

Thonny - /home/pi/USB_RxSerial.py @ 11 : 5

File Edit View Run Tools Help

USB_RxSerial.py

```
1   import serial
2
3   port="/dev/ttyACM0"
4   USB_COM=serial.Serial(port,9600)
5   USB_COM.close()
6   USB_COM.open()
7
8   while True:
9       res=USB_COM.readline()
10      print(bytes.decode(res))
11
```

Shell

```
4
5
6
7
```

Serial4.py

```
import serial
from tkinter import *

port="/dev/ttyACM0"
USB_COM=serial.Serial(port,9600)
if (USB_COM.is_open):
    USB_COM.close( )
USB_COM.open( )

window=Tk( )
window.title("Serial Monitor")

scrollbar=Scrollbar(window)
scrollbar.pack(side=RIGHT,fill=Y)
```

```
log = Text(window, width=30,height=30, takefocus=0)
log.pack( )

log.config(yscrollcommand=scrollbar.set)
scrollbar.config(command=log.yview)

serBuffer=""

def readSerial( ):
    res=USB_COM.readline( )
    log.insert('0.0',res)
    window.after(10, readSerial)

window.after(1000, readSerial)
window.mainloop( )
```

Run Serial4.py