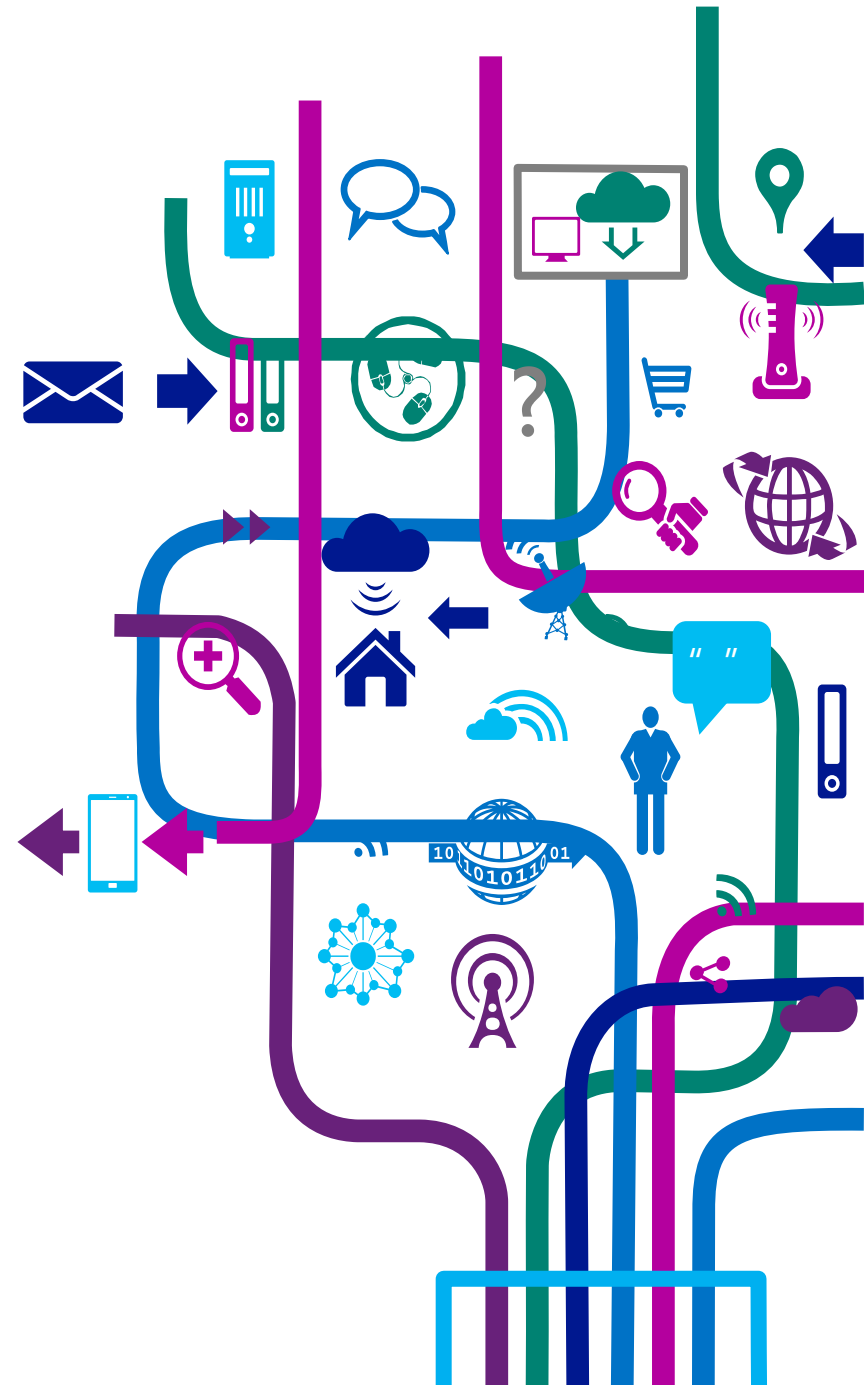


Microsoft IoT Camp #2

Devices & Arduino

김영욱 Technical Evangelist
부장/ DX / Microsoft

youngwook@outlook.com
Blog: Youngwook.com



IoT Devices

Arduino, Raspberry PI,
Galileo, Netduino....





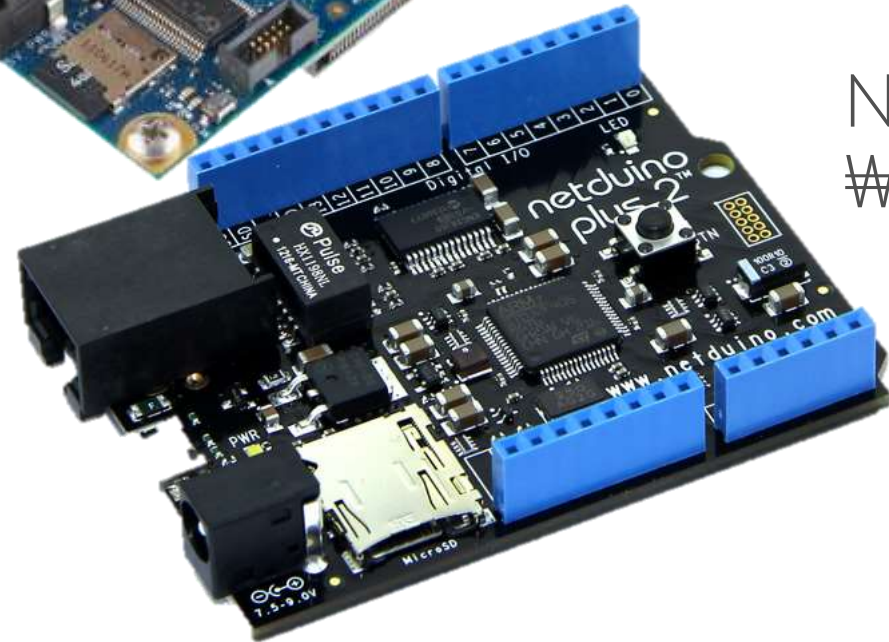
Arduino
¥12,000
C



Galileo GEN 2
¥121,000
Visual C++, C



Raspberry Pi
¥46,000
Python, C

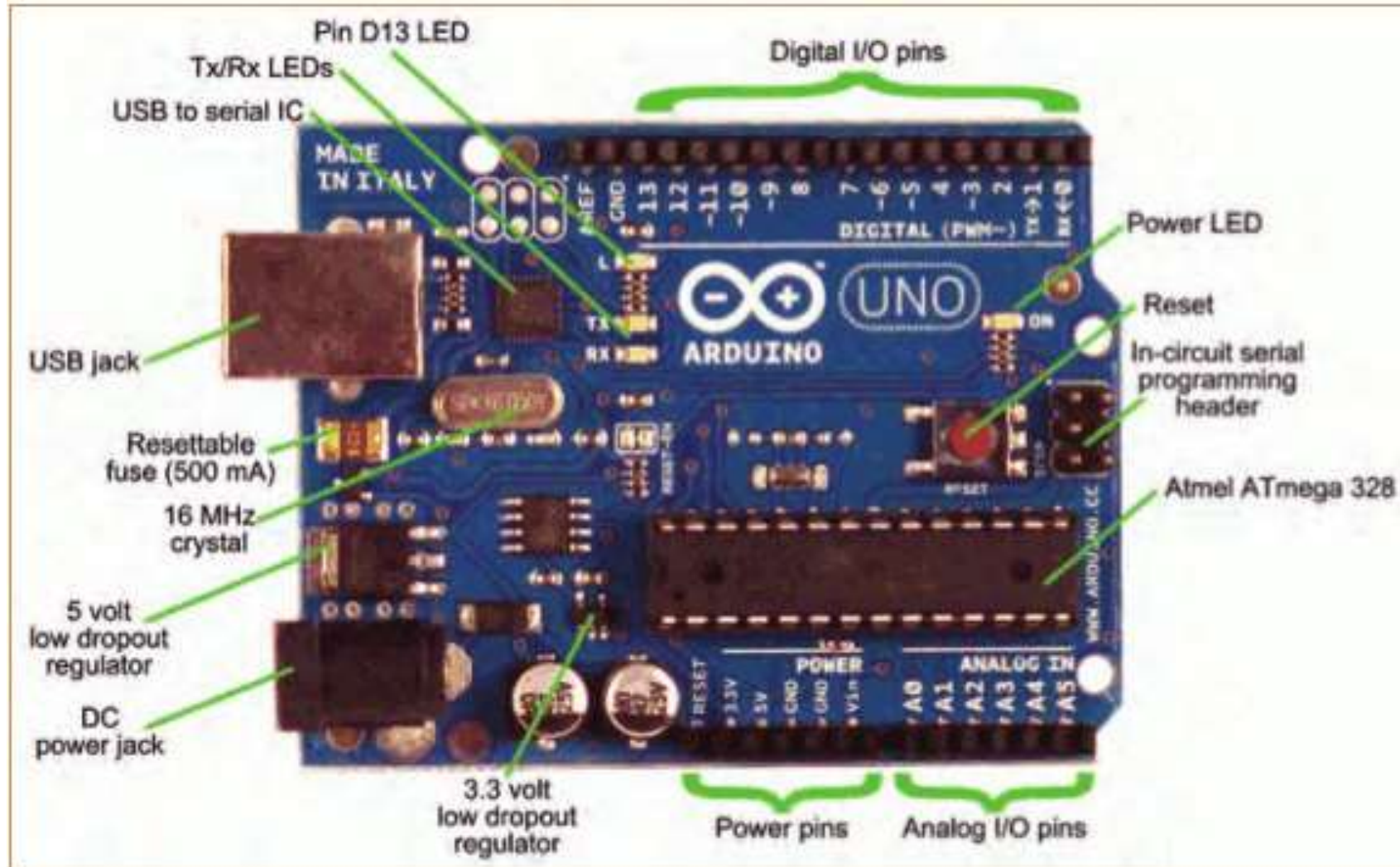


Netduino
¥80,000
C#

1. Arduino

A person with long brown hair, wearing a floral dress and white sneakers, is captured mid-jump with arms raised in a celebratory gesture. They are jumping over a vast, patchwork landscape of green and yellow fields under a cloudy sky. A semi-transparent purple rectangle is overlaid on the image, containing the text '1. Arduino'.

Arduino UNO R3



Microcontroller

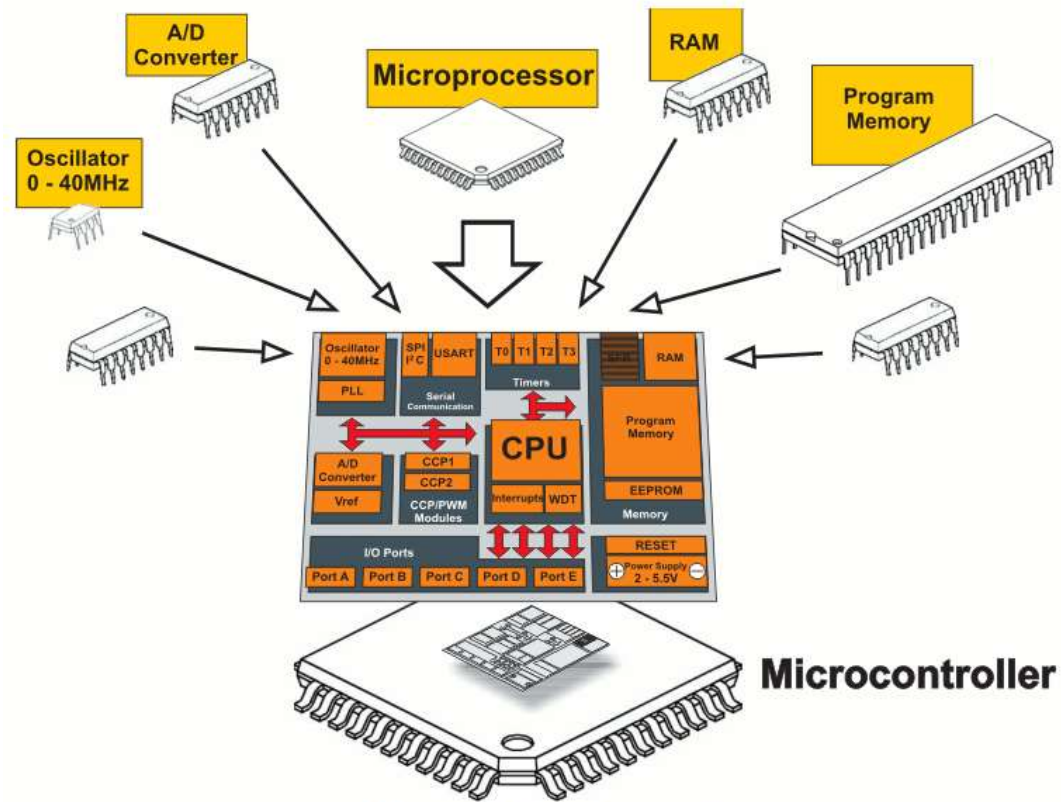
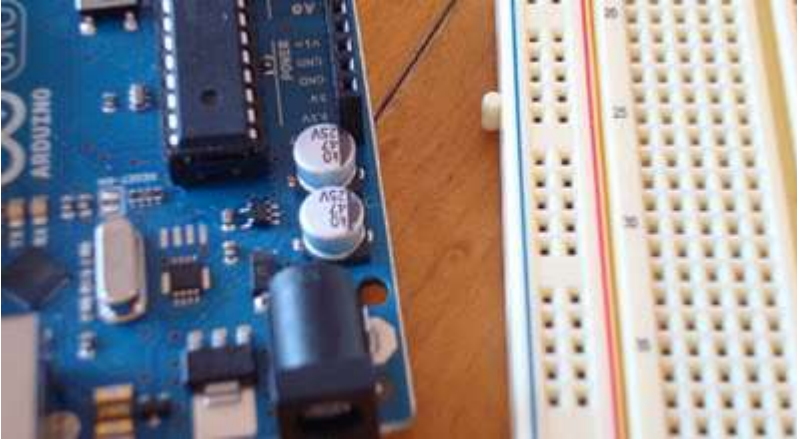


Fig. 0-1 Microcontroller versus Microprocessor

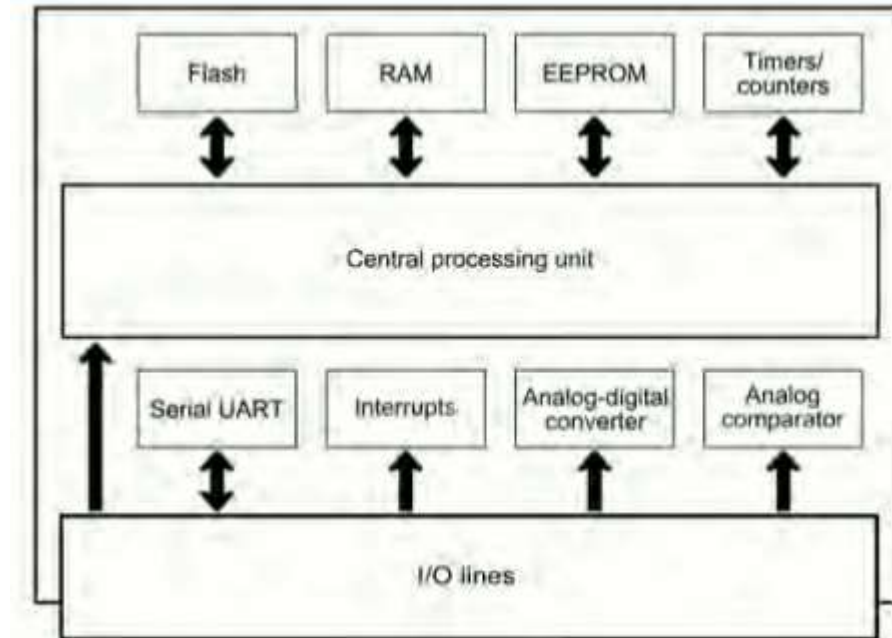
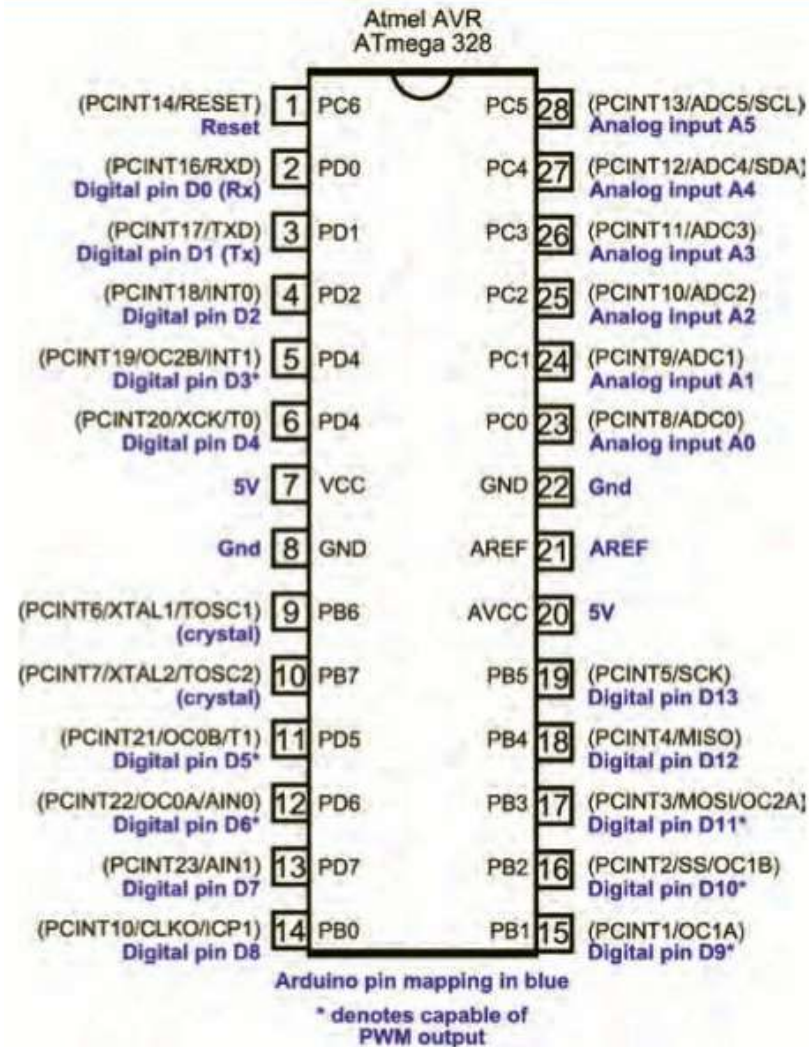
- 하나의 칩으로 구성된 작은 컴퓨터
 - processor, memory, input/output
- 주로 Embedded 영역에서도 최저 성능/비용
- Arduino, Raspberry Pi.....

Open Hardware



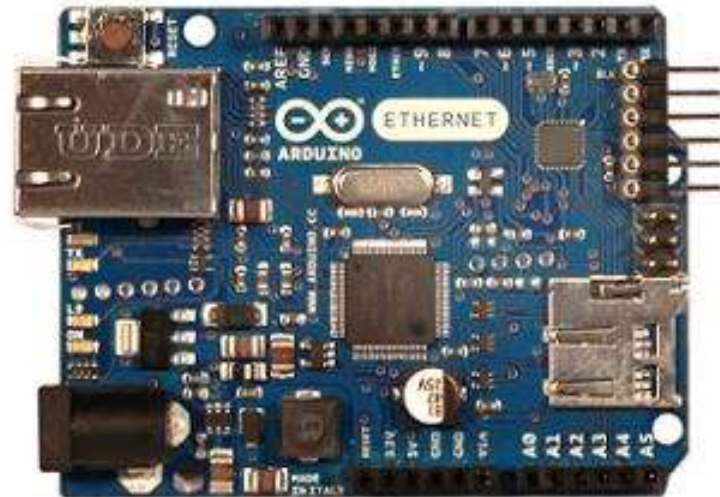
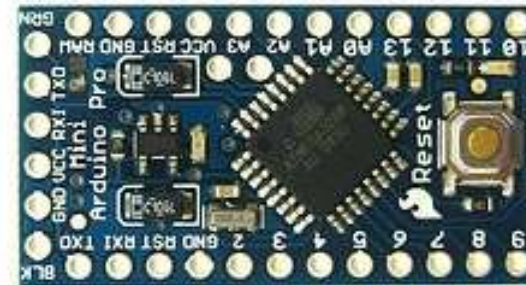
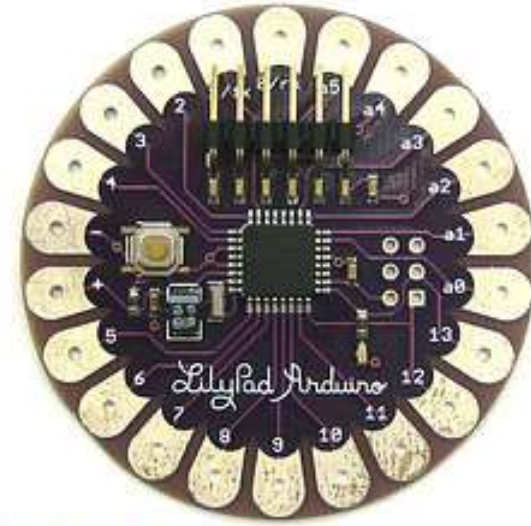
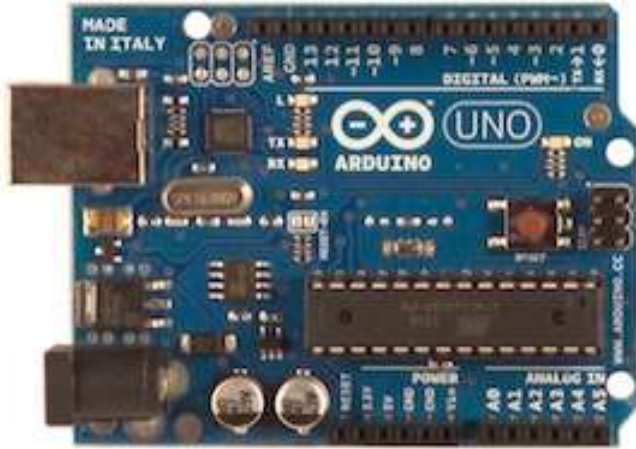
- Typical components include:
 - power circuit
 - programming interface
 - basic input; usually buttons and LEDs
 - I/O pins

Atmega 328 microprocessor



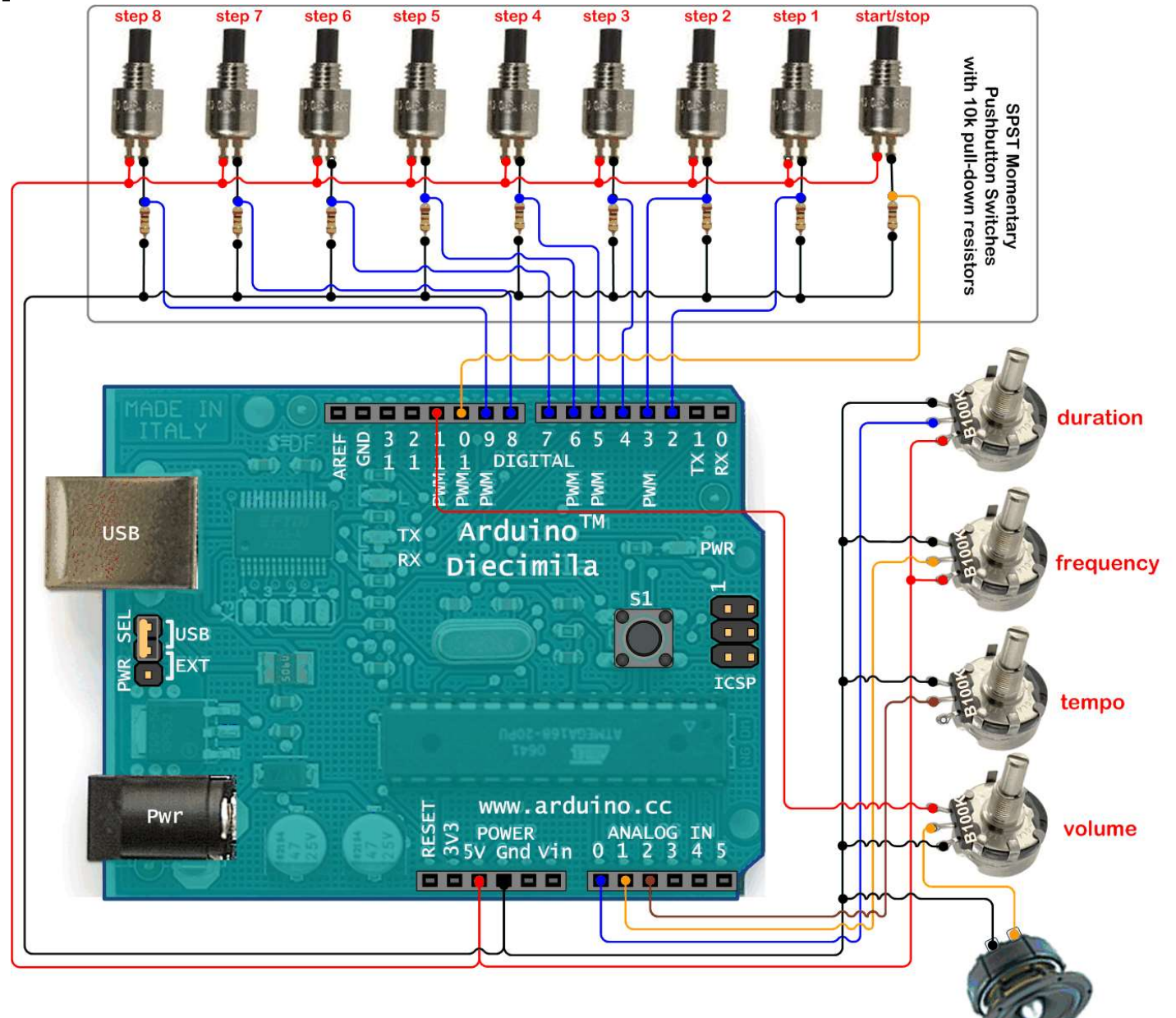
Specification

Arduino I/O Boards



14 current boards

Arduino + Sensor



Sensors



Gas Sensor

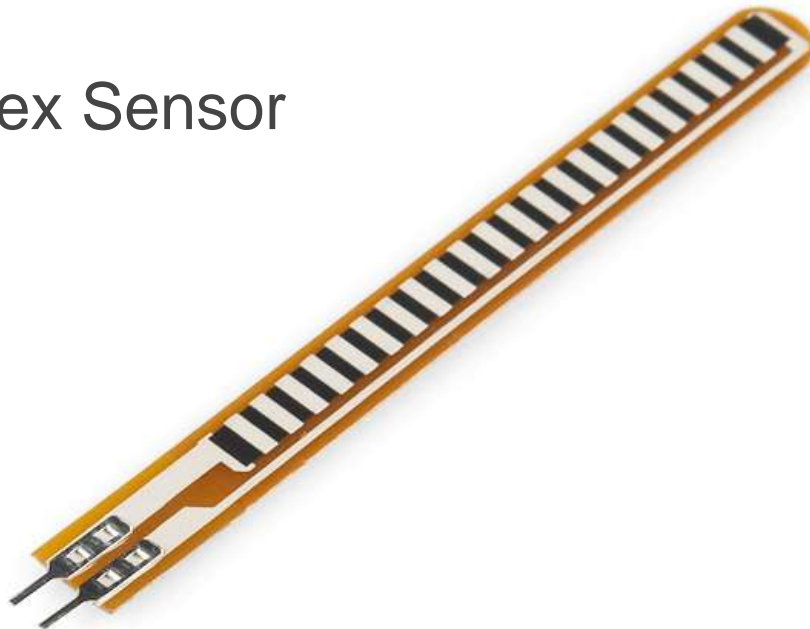


Temp & Humidity

Fingerprint Scanner



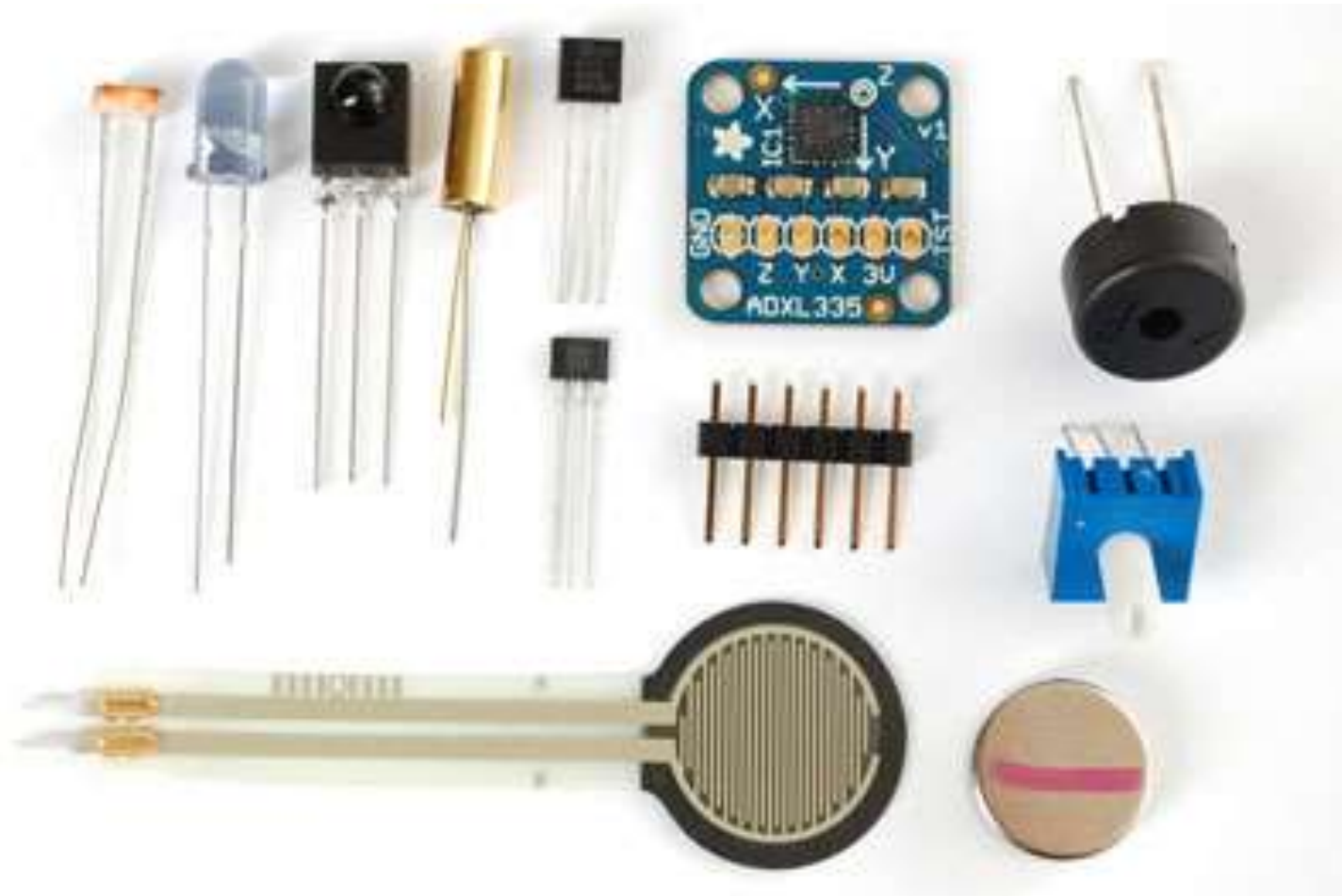
Flex Sensor



Geiger Counter

Sensors

Photo/thermistor, infrared, force sensitive resistor, Hall effect, Piezo, tilt sensor..

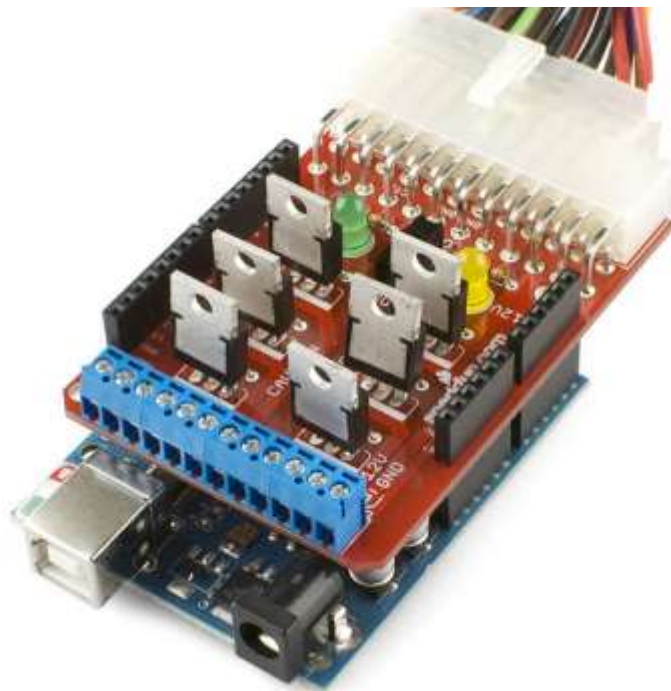
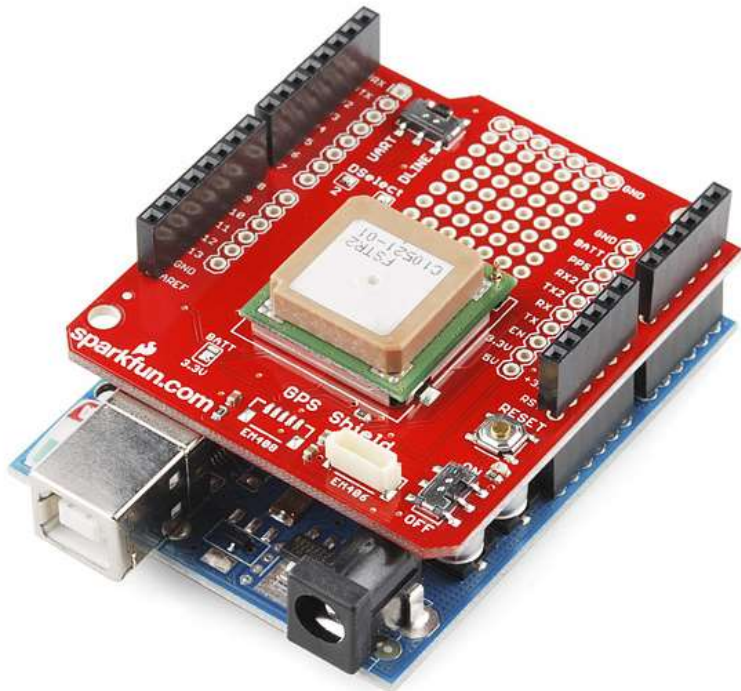


Arduino 난관

1. 성능
2. 네트워킹



Shields



Shields



Touchscreen Shield

Datalogging Shield



Wave Shield



More Shields...



XBee Shield



Ethernet Shield



Wifi Shield

2. Raspberry PI



Raspberry Pi



- 2006년 초기 컨셉이 시작됨 (Eben Upton)
- 2012년 2월 29일 판매 시작
- 2012년 4월 16일 최초 구매자가 받기 시작
- 2013년 1월초 1,000,000 대 판매
- 2013년 2월 라즈베리 파이 MODEL A 판매 시작

Raspberry PI

MODEL B



Memory 512 MB
2 USB
Ethernet

MODEL A



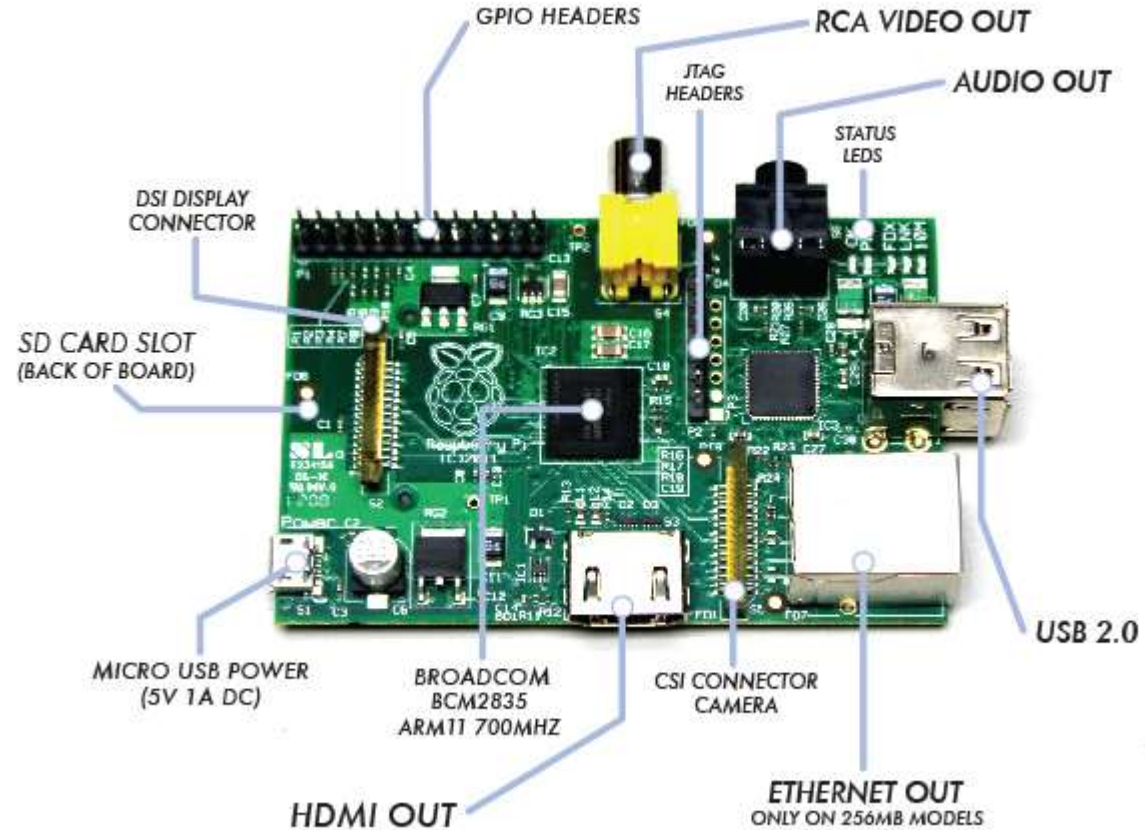
Memory 256 MB
1 USB
No Ethernet

- 운영체제 – 리눅스 (RASPBIAN)
- 저렴한 가격 : Model B – USD 35,
 Model A – USD 25
- 저렴하고 쉬운 저장장치
- 라즈베리 파이 재단
- GPIO (General Purpose Input Output)

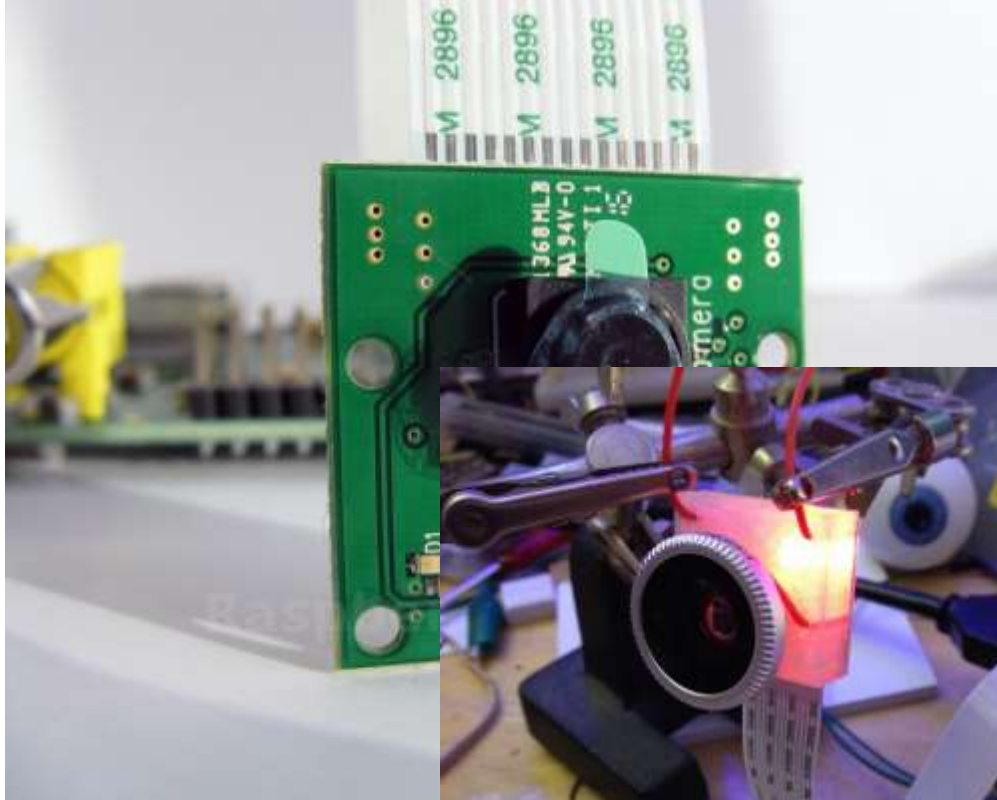
BCM 2835

ARM 11 - 700 Mhz

Raspberry Pi B Type



PI Camera

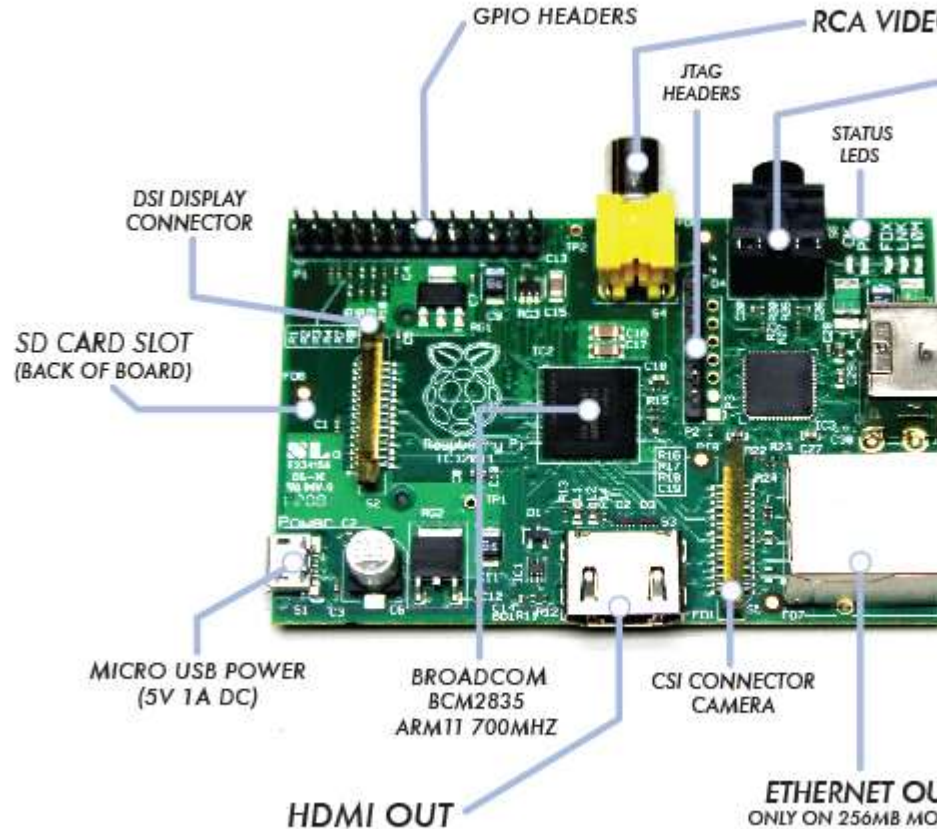


Raspberry PI 난관

1. 개발환경
2. 리눅스 학습



Raspberry Pi B Type



```
25.7 - 13:21 - 160MB - 192.168.0.7 - pridopia-u27a
+ 1 2 Ctrl Alt Esc Tab F# Paste
[ 7.486756] smsc95xx 1-1.1:1.0: eth0: register 'smc95xx' at iobase 0x2708_usb-1.1,0
[ 11.662428] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 12.101693] ### snd_bcm2835_alisa_probe c05ce768 ##### PROBING FOR bcm28#
[ 12.123580] Creating card...
[ 12.129485] Creating device/chip ..
[ 12.136203] Adding controls ..
[ 12.141805] Registering card ....
[ 12.154147] bcm2835 ALSA CARD CREATED!
[ 12.169784] ### BCM2835 ALSA driver init OK ###
[ 12.909986] Adding 131068k swap on /var/swapfile. Priority:-1 extents:4 across:15
[ 14.590169] fuse init (API version 7.17)

Debian GNU/Linux 6.0 raspberrypi ttyAMA0

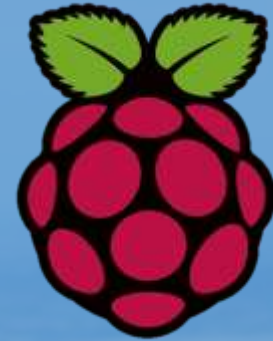
raspberrypi login: pi
Password:
Last login: Thu Jan 1 01:00:23 BST 1970 on ttyAMA0
Linux raspberrypi 3.1.9+ #138 PREEMPT Tue Jun 26 16:27:52 BST 2012 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

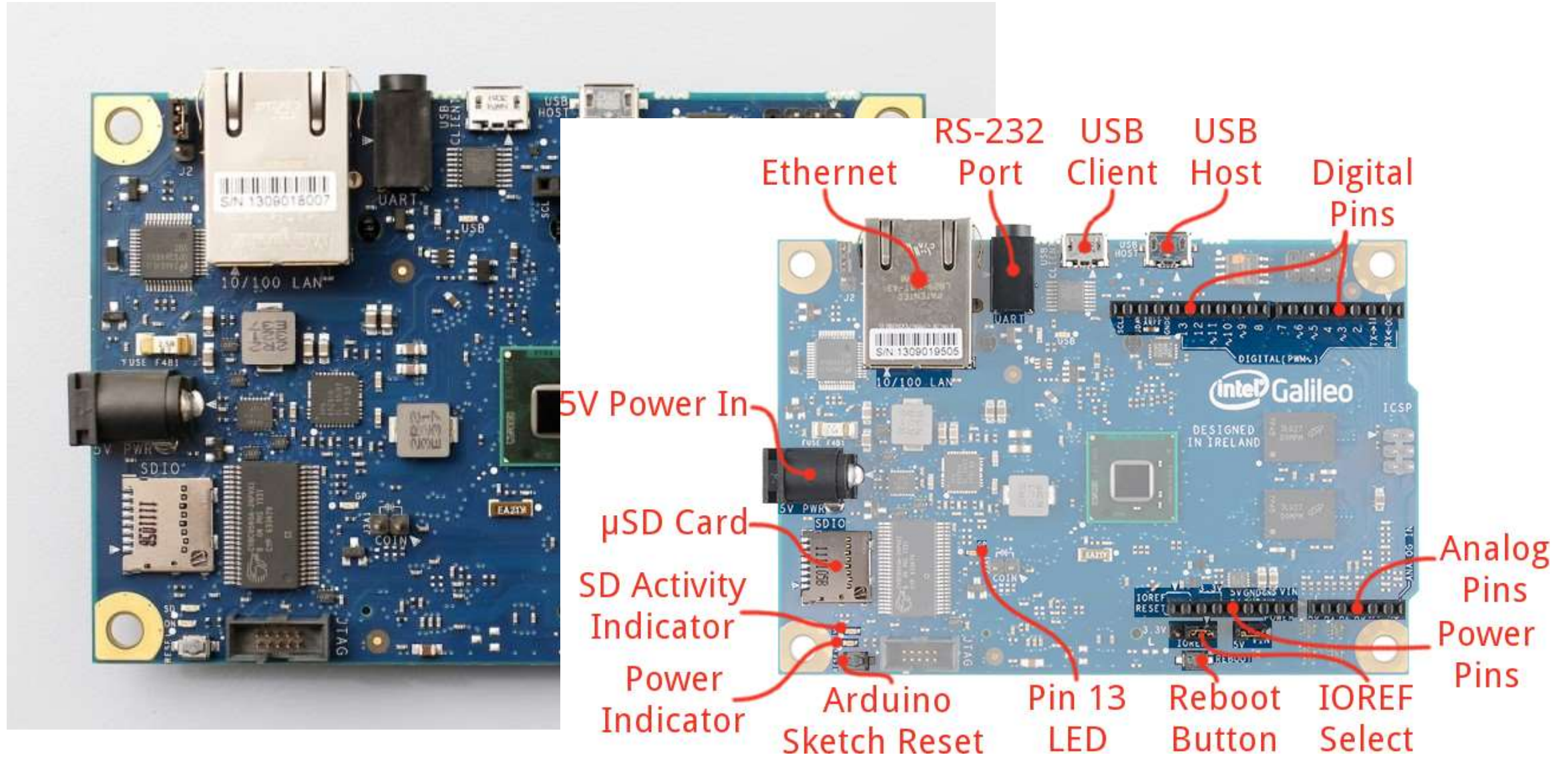
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Date and Time are unknown - using 2012-07-16 11:36 as an approximation
Correct the date and time using e.g: sudo date --set="2012-07-16 11:36"
pi@raspberrypi:~$
CTRL-A Z for help |115200 8N1 | NOR | Minicom 2.2 | VT102 | Offline
```

1. Linux
2. Python

3. Intel Galileo

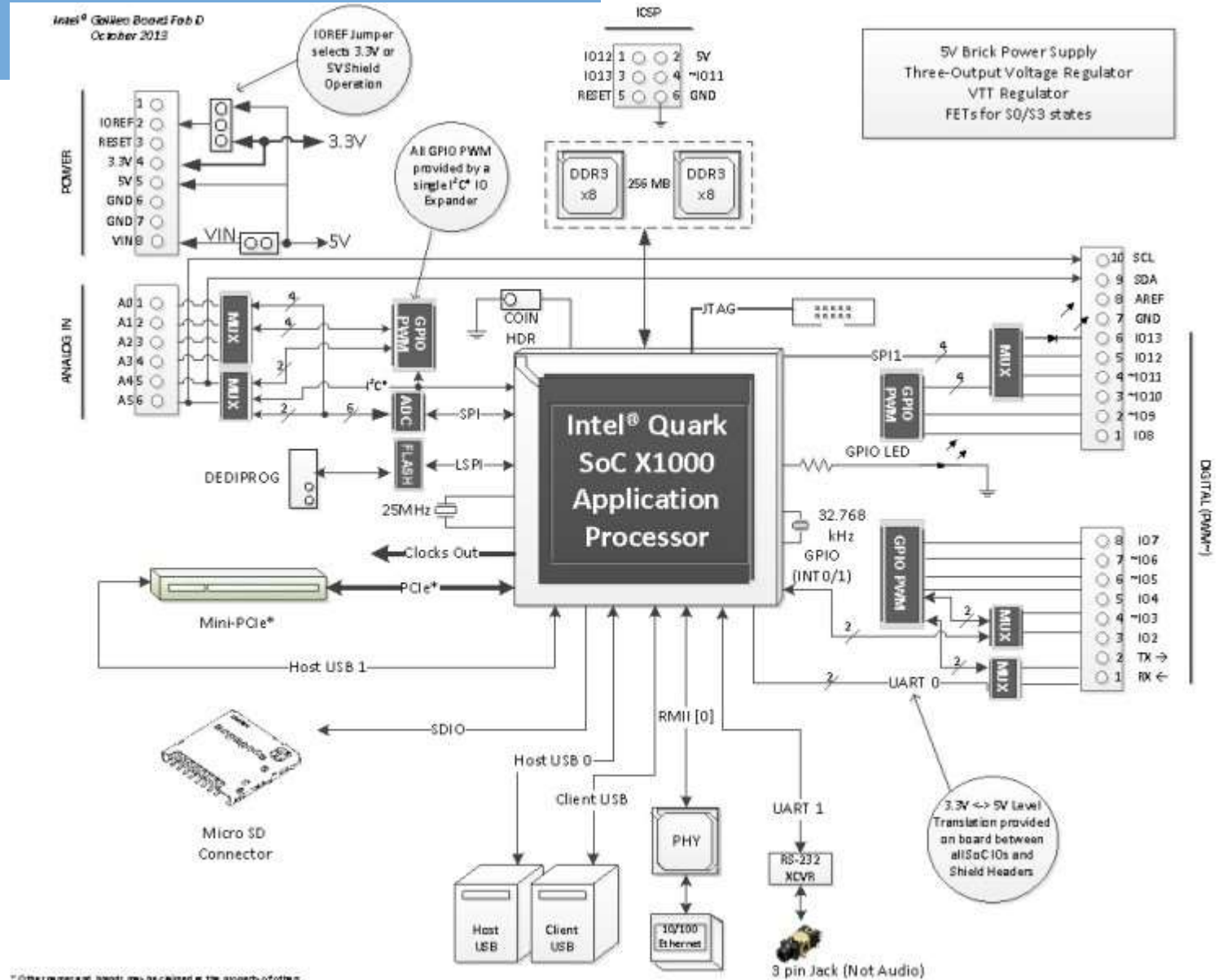


Galileo



Galileo

- Intel Quark
- SoC(System on Chip)
- Arduino와 호환됨
- 추가적인 방법으로 성능 확장 가능



4. Arduino 개발환경 구성



Arduino 의 개발환경

The word “Arduino” can mean 3 things

A physical piece
of hardware



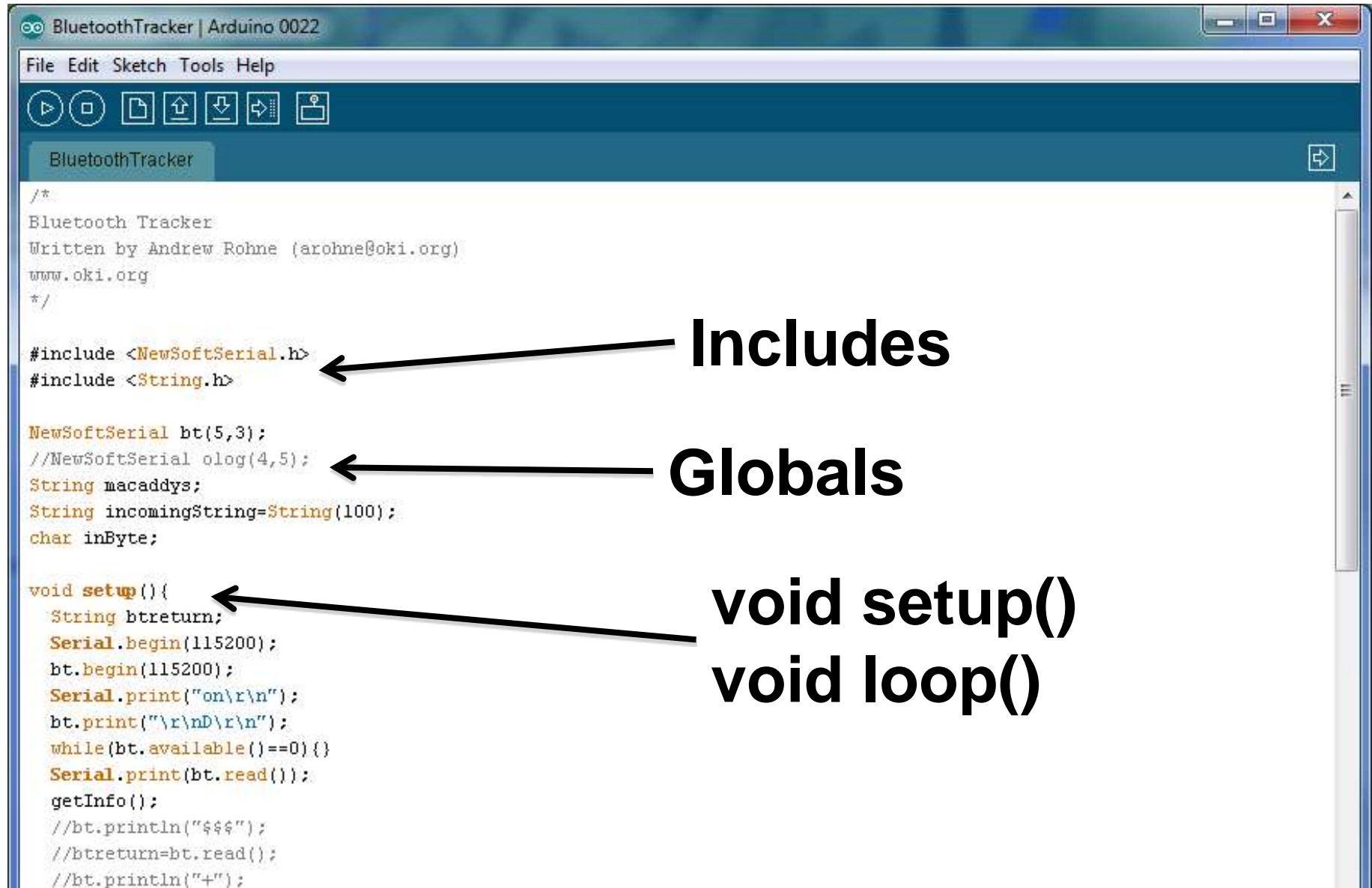
A programming
environment



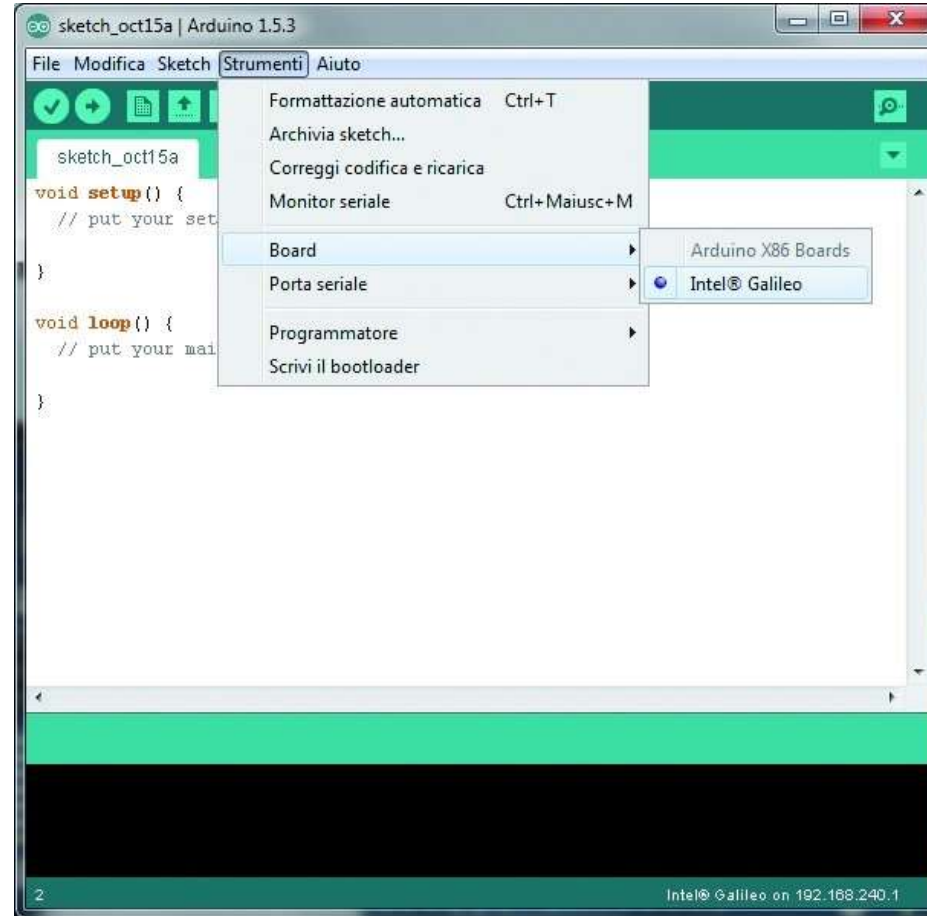
A community
& philosophy



Sketches

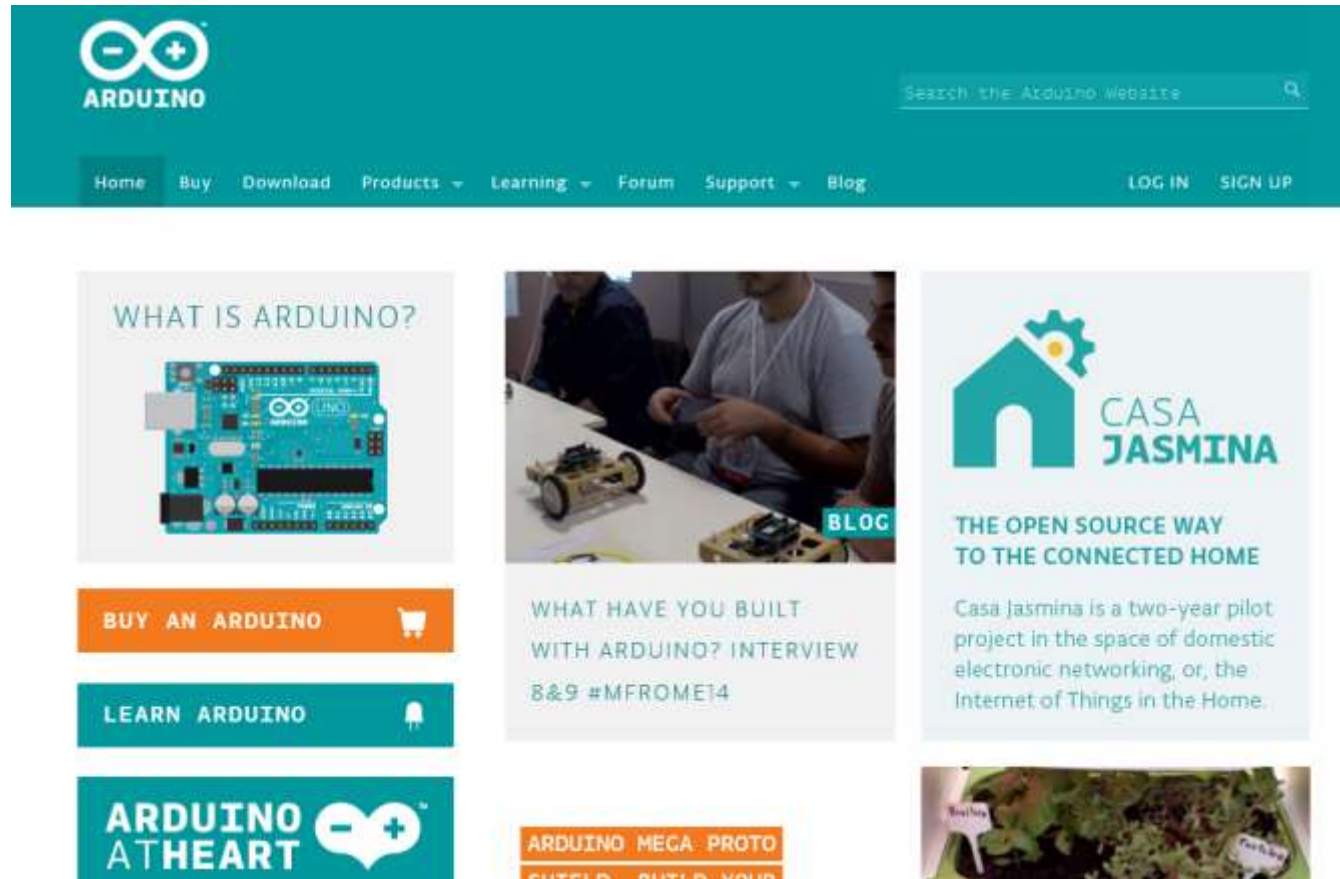


Arduino의 개발환경(IDE)



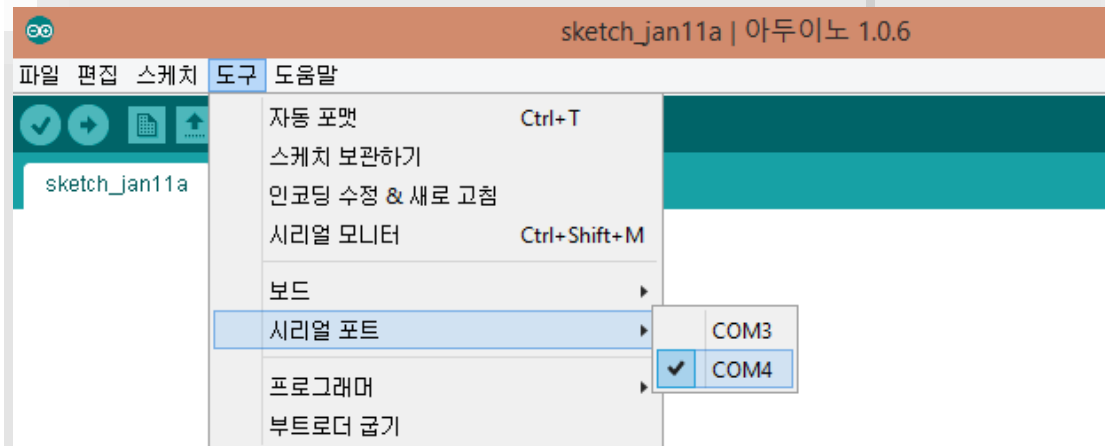
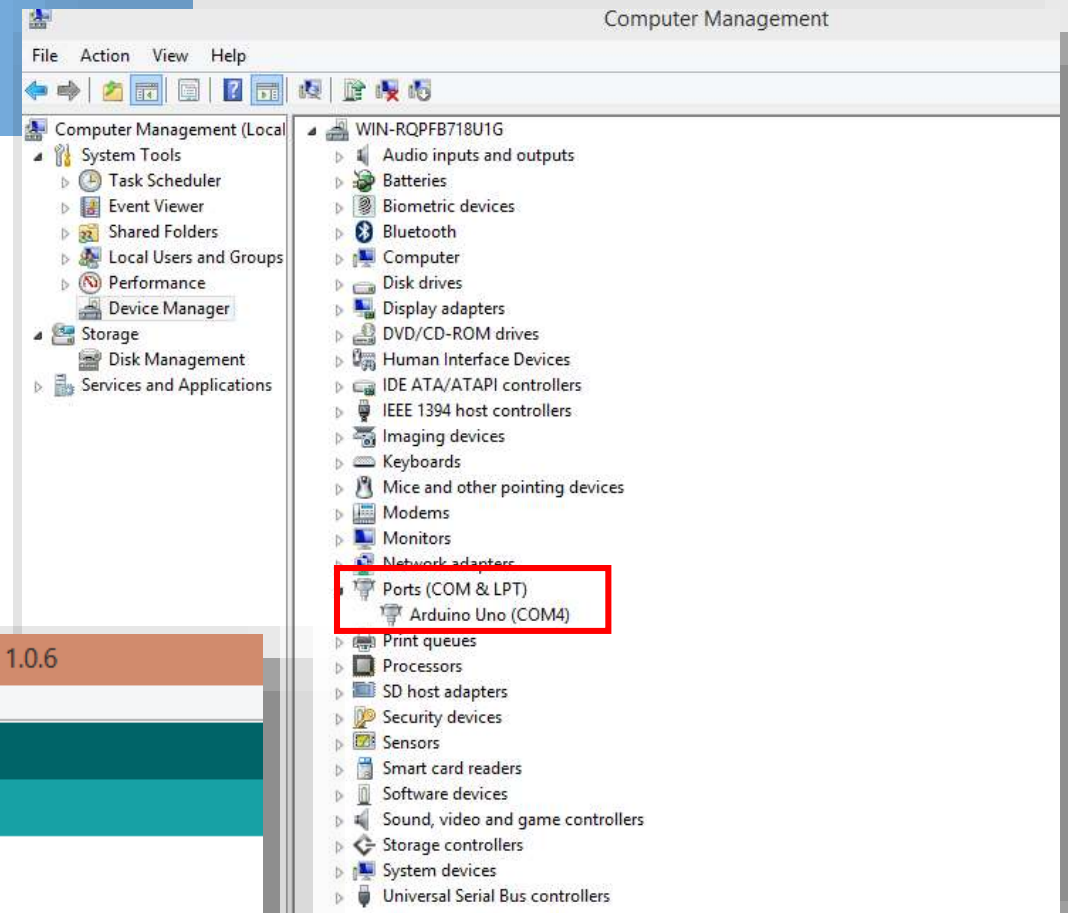
Arduino IDE 설치

1. Intel Website에서 IDE를 다운로드 한다.
(<http://www.arduino.cc/>)
2. COM 포트를 설정한다.
3. IDE를 실행한다.



Arduino IDE COM 포트 설정

1. Arduino를 PC와 연결한다.
2. 본인 PC에서 Arduino의 COM Port를 확인한다.
3. Arduino IDE에서 COM 포트를 설정한다.



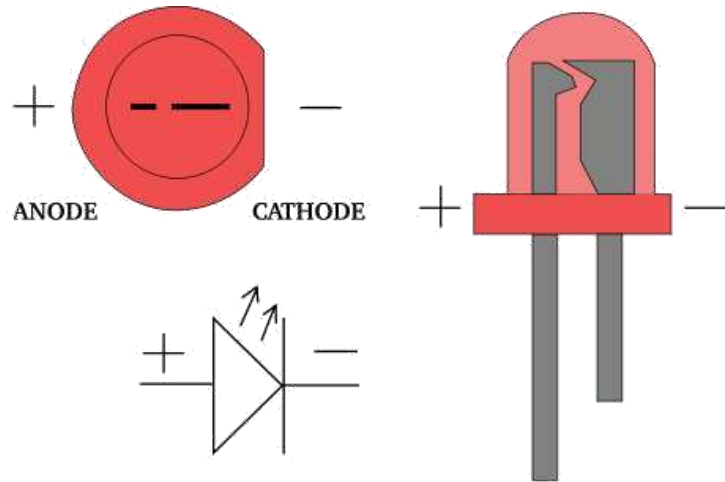
Arduino IDE



1. Sketch programming
2. Compiling
3. Upload
4. Test

Arduino 첫 번째 샘플

- 첫 번째 샘플 LED 점멸
 - File > Examples > Digital > Blink
 - 13번 Pin과 GND를 연결한다.



www.instructables.com



Break time