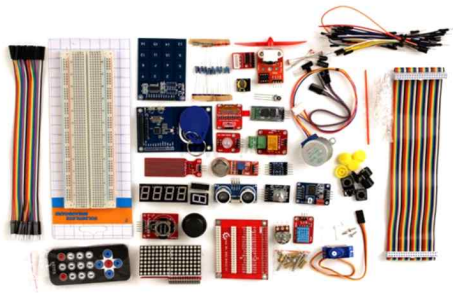


23-1학기 임베디드시스템응용

라즈베리파이 센서 사용하기 - 1

라즈베라파이 고급키트

- NFC, RFID, 블루투스, 각종 센서모듈 등 40종 포함 키트
- <https://www.eleparts.co.kr/goods/view?no=4190268>

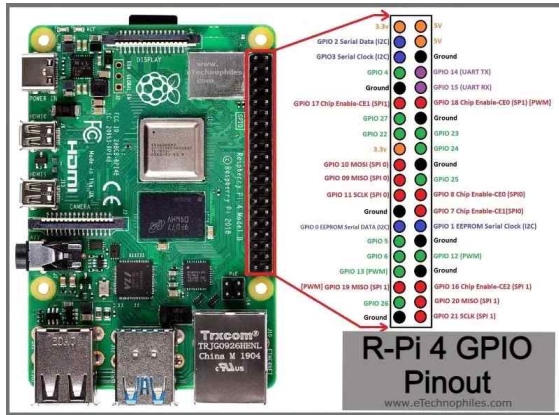


라즈베리파이 헤더 핀맵(4B, 400)

Pin#	NAME		NAME	Pin#
01	3.3v DC Power		DC Power 5v	02
03	GPIO02 (SDA1, I ² C)		DC Power 5v	04
05	GPIO03 (SCL1, I ² C)		Ground	06
07	GPIO04 (GCLK0)		(TXD0, UART) GPIO14	08
09	Ground		(RXD0, UART) GPIO15	10
11	GPIO17		(PWM0) GPIO18	12
13	GPIO27		Ground	14
15	GPIO22		GPIO23	16
17	3.3v DC Power		GPIO24	18
19	GPIO10 (SPI0_MOSI)		Ground	20
21	GPIO09 (SPI0_MISO)		GPIO25	22
23	GPIO11 (SPI0_CLK)		(SPI0_CE0_N) GPIO08	24
25	Ground		(SPI0_CE1_N) GPIO07	26
27	GPIO00 (SDA0, I ² C)		(SCL0, I ² C) GPIO01	28
29	GPIO05		Ground	30
31	GPIO06		(PWM0) GPIO12	32
33	GPIO13 (PWM1)		Ground	34
35	GPIO19		GPIO16	36
37	GPIO26		GPIO20	38
39	Ground		GPIO21	40

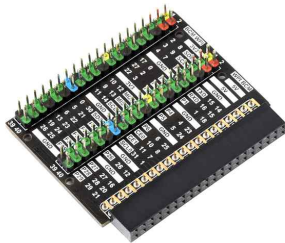
GPIO#	NAME		NAME	GPIO#
	3.3 VDC Power		5.0 VDC Power	2
8	GPIO 8 SDA1 (I ² C)		5.0 VDC Power	4
9	GPIO 9 SCL1 (I ² C)		Ground	6
7	GPIO 7 GCLK0		GPIO 15 Tx0 (UART)	15
	Ground		GPIO 16 Rx0 (UART)	16
0	GPIO 0		GPIO 1 PCM_CLK/PWM0	1
2	GPIO 2		Ground	14
3	GPIO 3		GPIO 4	4
	3.3 VDC Power		GPIO 5	5
12	GPIO 12 MOSI (SPI)		Ground	20
13	GPIO 13 MISO (SPI)		GPIO 6	6
14	GPIO 14 SCLK (SPI)		GPIO 10 CE0 (SPI)	10
	Ground		GPIO 11 CE1 (SPI)	11
30	SDA0 (I ² C ID EEPROM)		SCL0 (I ² C ID EEPROM)	31
21	GPIO 21 GCLK1		Ground	30
22	GPIO 22 GCLK2		GPIO 28 PWM0	26
23	GPIO 23 PWM1		Ground	34
24	GPIO 24 PCM_FS/PWM1		GPIO 27	27
25	GPIO 25		GPIO 28 PCM_DIN	28
	Ground		GPIO 29 PCM_DOUT	29

라즈베리파이 헤더 핀맵(4B, 400)



샘플 코드 다운로드 / 확장보드 장착

- Github 저장소에서 샘플 코드 다운로드 (git이 이미 설치되어 있음)
 - cd Desktop
 - git clone <https://github.com/Yoonkyo/raspi-AdvancedKit>
- 더블형 확장보드 장착



BOARD vs BCM

- GPIO.BOARD: 배열된 순서대로 핀 이름을 부르겠다는 의미
- GPIO.BCM: Broadcom SOC 칩에서 사용하는 핀이름을 사용하겠다는 의미.
 - BCM: Broadcom chip-specific pin numbers의 약자
- 일반적으로 BCM을 사용

참고 명령어

- gpio 확인 명령어
 - raspi-gpio get

```
pi@raspberrypi:~/Desktop $ raspi-gpio get
BANK0 (GPIO 0 to 27):
GPIO 0: level=1 fsel=0 func=INPUT pull=UP
GPIO 1: level=1 fsel=0 func=INPUT pull=UP
GPIO 2: level=1 fsel=0 func=INPUT pull=UP
GPIO 3: level=1 fsel=0 func=INPUT pull=UP
GPIO 4: level=1 fsel=0 func=INPUT pull=UP
GPIO 5: level=1 fsel=0 func=INPUT pull=UP
GPIO 6: level=1 fsel=0 func=INPUT pull=UP
GPIO 7: level=1 fsel=0 func=INPUT pull=UP
GPIO 8: level=1 fsel=0 func=INPUT pull=UP
GPIO 9: level=0 fsel=0 func=INPUT pull=DOWN
GPIO 10: level=0 fsel=0 func=INPUT pull=DOWN
GPIO 11: level=0 fsel=0 func=INPUT pull=DOWN
GPIO 12: level=0 fsel=0 func=INPUT pull=DOWN
GPIO 13: level=0 fsel=0 func=INPUT pull=DOWN
GPIO 14: level=1 fsel=0 func=INPUT pull=NONE
GPIO 15: level=1 fsel=0 func=INPUT pull=UP
```

참고 명령어

- 라즈베리파이 pinmap 확인 명령어
 - pinout

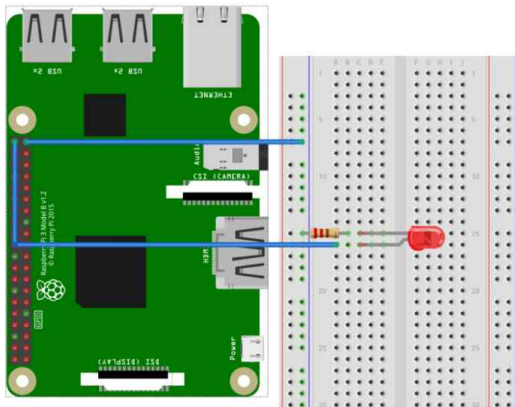
```
pi@raspberrypi:~/Desktop $ pinout
```

Raspberry Pi 400 Rev 1.1

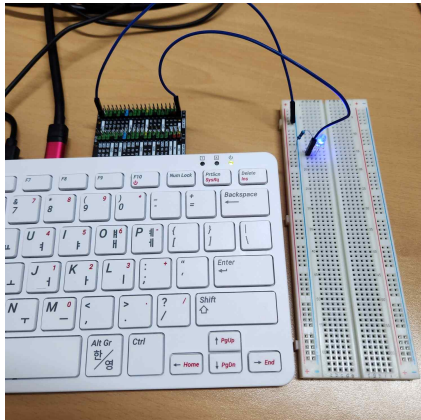
```
J8:
```

3V3	(1)	(2)	5V
GPIO2	(3)	(4)	5V
GPIO3	(5)	(6)	GND
GPIO4	(7)	(8)	GPIO14
GND	(9)	(10)	GPIO15
GPIO17	(11)	(12)	GPIO18
GPIO27	(13)	(14)	GND
GPIO22	(15)	(16)	GPIO23
3V3	(17)	(18)	GPIO24
GPIO18	(19)	(20)	GND
GPIO9	(21)	(22)	GPIO25
GPIO11	(23)	(24)	GPIO8
GND	(25)	(26)	GPIO7
GPIO0	(27)	(28)	GPIO1
GPIO5	(29)	(30)	GND
GPIO6	(31)	(32)	GPIO12
GPIO13	(33)	(34)	GND
GPIO19	(35)	(36)	GPIO16
GPIO26	(37)	(38)	GPIO20
GND	(39)	(40)	GPIO21

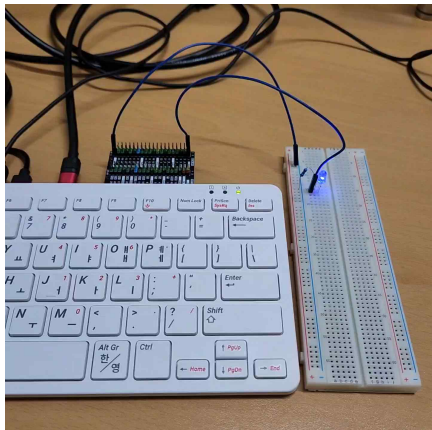
1. LED 제어하기



1. LED 제어하기: 완성 결과

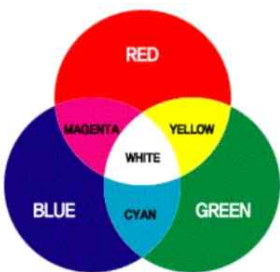


1. LED 제어하기: 예시 영상



2. RGB LED 모듈

- 모듈 안에 빨강, 파랑, 초록 3가지 색의 LED 포함
 - 밝기와 색을 조합해서 새로운 색을 만들 수 있음



2. RGB LED 모듈: 준비물



확장보드



브레드 보드

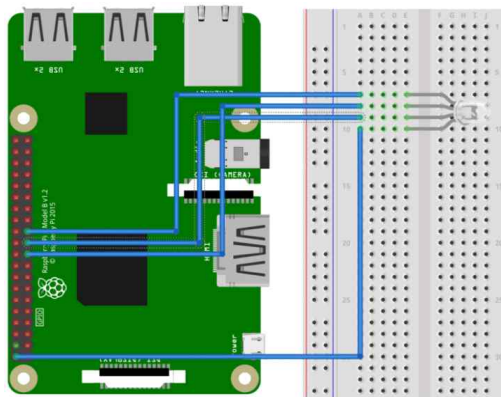


RGB 모듈



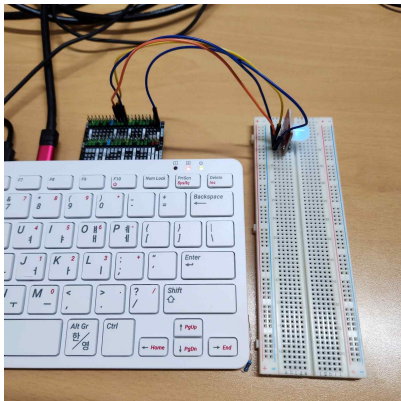
점퍼선

2. RGB LED 모듈: 회로 구성

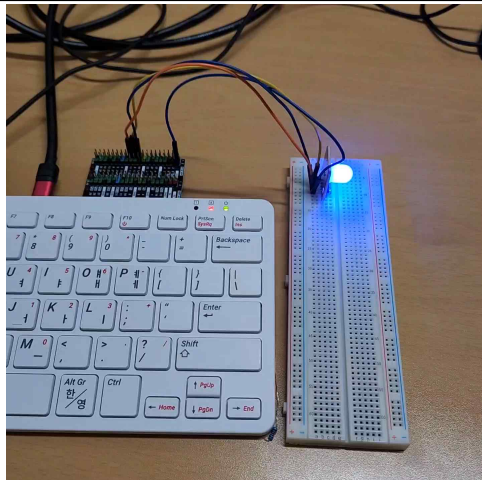


2. RGB LED 모듈: 코드 실행

- clone한 코드에서 RGB LED 코드 파일 실행

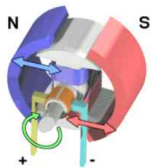


2. RGB LED 모듈: 예시 영상



3. 서보모터

- 지정한 각도만큼 회전할 수 있는 모터
 - 일반 DC 모터 보다 정밀한 제어 가능



DC모터 내부 구조



일반 DC모터

SERVO MOTOR SG90

DATA SHEET



Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.

3. 서보모터: 준비물



확장보드



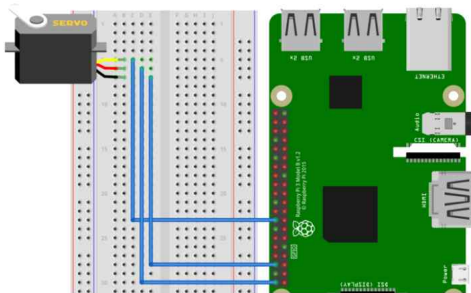
서보 모터




M/F 점퍼선

3. 서보모터: 회로 연결

- 색에 맞게 선 연결

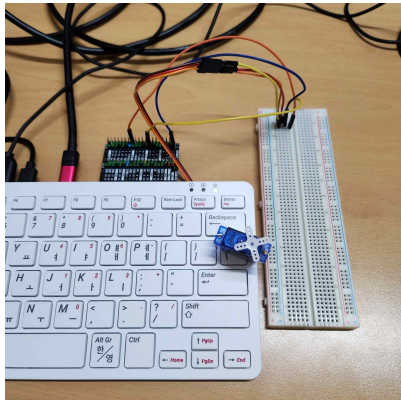


PWM=Orange (PWM)
Vcc=Red (+)
Ground=Brown (-)

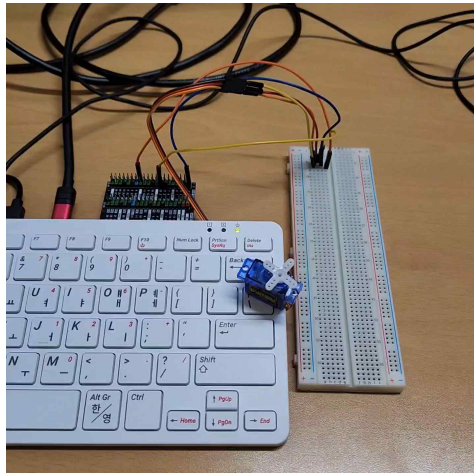


3. 서보모터: 코드 실행

- clone한 코드에서 서보모터 코드 파일 실행



3. 서보모터: 예시 영상



Thanks