"수업자료는 여기"

부저(output), 키입력 (input) 실험

부저(피에조)



- 능동부저 : 전원을 공급하면 단음(삐) 소리가 출력
- 수동부저 : 진동을 만들어 특정 주파수의 소리를 출력(다양한 소리를 출력 할 수 있음, 멜로디)

멜로디 주파수

(단위 : Hz) 옥타브 3 5 6 8 4 음계 C(도) 32,7032 65.4064 130.8128 261.6256 523.2511 1046,502 2093.005 4186,009 34.6478 69.2957 138.5913 277.1826 554.3653 1108.731 2217.461 C# 4434.922 73.4162 146.8324 293.6648 587.3295 D(레) 36,7081 1174.659 2349.318 4698.636 622.2540 D#38.8909 77.7817 155.5635 311.1270 1244.508 2489.016 4978.032 E(n]) 41.2034 82.4069 164.8138 329.6276 659.2551 1318.510 2637.020 5274.041 F(과) 43.6535 87.3071 174.6141 349.2282 698.4565 1396.913 2793.826 5587.652 F#46.2493 92.4986 184.9972 369.9944 739.9888 1479.978 2959.955 5919.911 G(含) 48.9994 97.9989 195,9977 391.9954 783.9909 1567.982 3135,963 6271.927 G# 51.9130 103.8262 207.6523 415.3047 830.6094 1661.219 3322.438 6644.875 A(라) 55.0000 110.0000 220.0000 440.0000 880.0000 1760.000 3520,000 7040.000 58.2705 116.5409 233.0819 932.3275 3729.310 466.1638 1864.655 Α# 7458.620 B(시) 61.7354 123.4708 246.9417 493.8833 987.7666 1975.533 3951.066 7902.133

도레미파솔라시도

• 도 : 261.6256 Hz

• 레 : 293.1826 Hz

• □ : 329.6276 Hz

• 파 : 349.2282 Hz

• 솔 : 391.9954 Hz

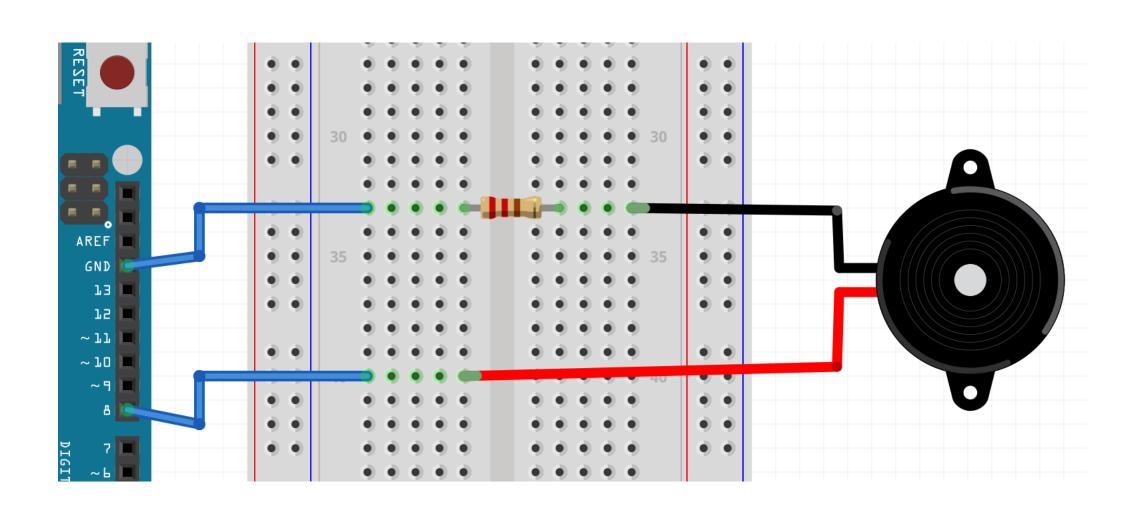
• 라 : 440.0000 Hz

• 人:466.1638 Hz

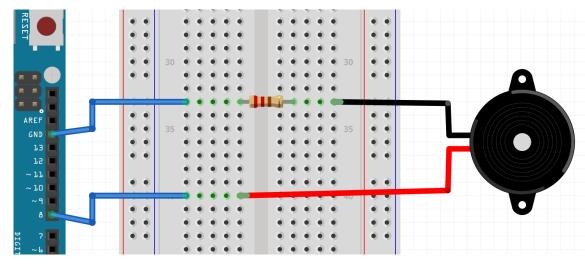
• 도 : 523.2511 Hz

(단위 : Hz) 옥타브 8 음계 130.8128 261.6256 523.2511 1046,502 C(도) 32,7032 65,4064 2093.005 4186,009 69.2957 34.6478 138,5913 277.1826 554.3653 1108.731 2217.461 4434.922 C# 36.7081 73.4162 146.8324 293.6648 587.3295 2349.318 4698.636 1174.659 D(레) 155.5635 311.1270 622.2540 38,8909 77.7817 1244.508 2489.016 4978.032 D# 1318.510 E(n]) 41.2034 82,4069 164.8138 329.6276 659.2551 2637.020 5274.041 F(과) 43.6535 87,3071 174.6141 349.2282 698.4565 1396,913 2793,826 5587.652 92,4986 184.9972 369.9944 739.9888 1479,978 2959.955 5919.911 F#46.2493 G(舎) 48.9994 97.9989 195.9977 391.9954 783.9909 1567.982 3135.963 6271.927 51.9130 103.8262 207.6523 415.3047 830.6094 1661.219 3322.438 6644.875 G# 55.0000 110.0000 220.0000 A(라) 440.0000 880.0000 1760.000 3520.000 7040,000 58,2705 116.5409 233.0819 466.1638 932.3275 1864.655 3729.310 7458.620 Α# 123.4708 246.9417 493.8833 987.7666 1975.533 3951.066 7902.133 B(시) 61.7354

부저 테스트



부저 테스트



```
• 도: 261.6256 Hz
```

• 레 : 293.1826 Hz

• □ : 329.6276 Hz

• 파 : 349.2282 Hz

• 솔: 391.9954 Hz

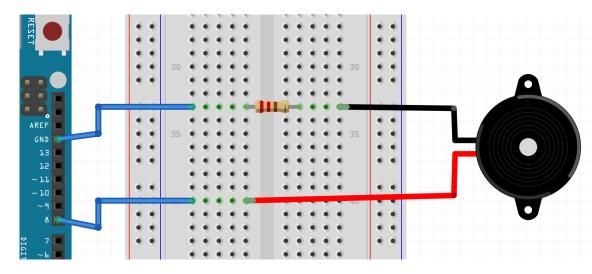
• 라 : 440.0000 Hz

• 시: 466.1638 Hz

• 도 : 523.2511 Hz

```
void setup() {
  pinMode(8, OUTPUT);
void loop() {
 tone(8, 262, 500);
 delay(500);
  tone(8, 293, 500);
 delay(500);
  tone(8, 330, 500);
 delay(500);
  tone(8, 349, 500);
 delay(500);
  tone(8, 392, 500);
 delay(500);
  tone(8, 440, 500);
 delay(500);
  tone(8, 466, 500);
 delay(500);
  tone(8, 523, 500);
 delay(500);
```

부저 테스트



```
• 도: 261.6256 Hz
```

• 레 : 293.1826 Hz

• □ : 329.6276 Hz

• 파: 349.2282 Hz

• 솔: 391.9954 Hz

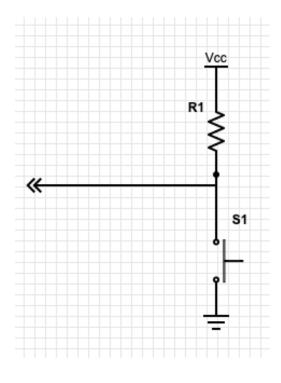
• 라 : 440.0000 Hz

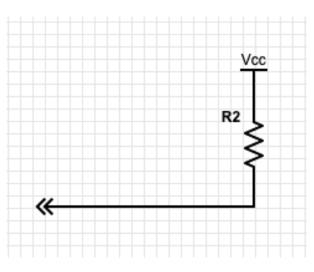
• 시: 466.1638 Hz

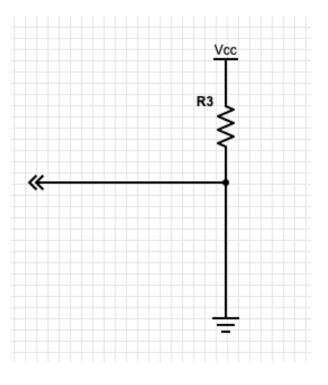
• 도 : 523.2511 Hz

```
int melody[8] = \{262, 293, 330, 34\}
9, 392, 440, 466, 523};
void setup() {
  pinMode(8, OUTPUT);
void loop() {
  int i = 0;
  for( i=0; i<8; i++)
    tone(8, melody[i], 500);
    delay(500);
```

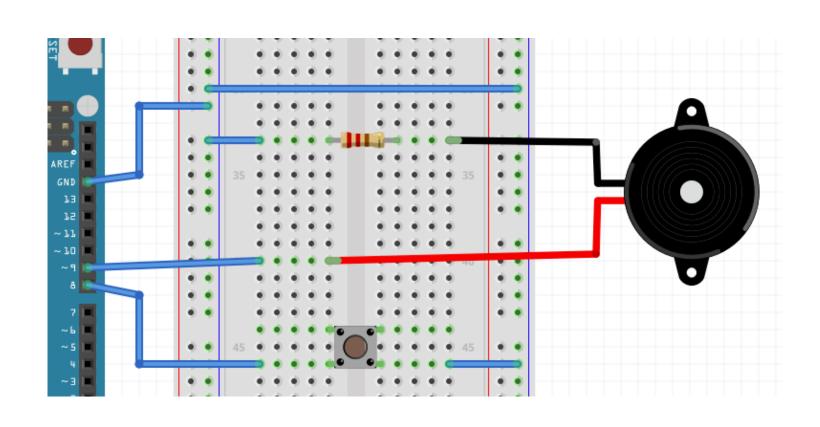
부저+버튼 테스트

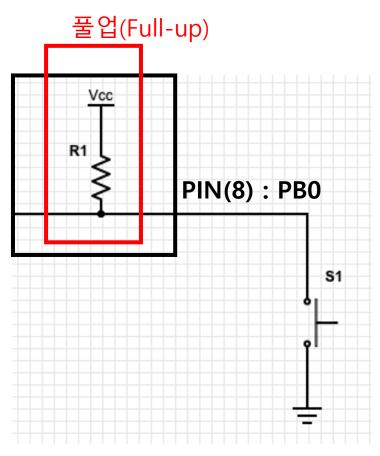






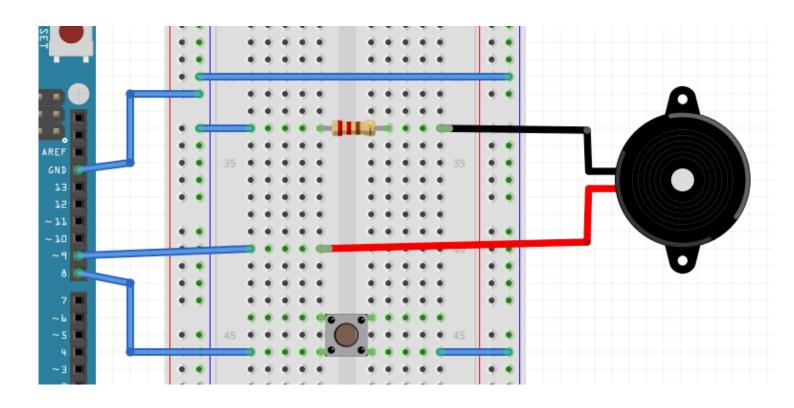
부저+버튼 테스트



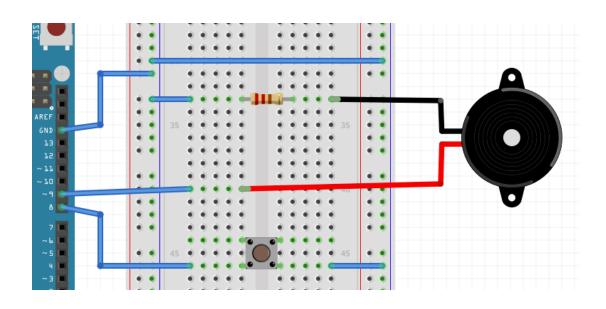


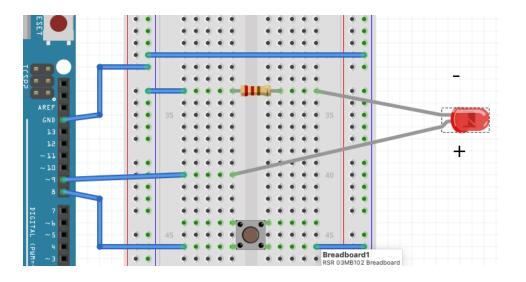
부저+버튼 테스트

```
void setup() {
  pinMode(9, OUTPUT);
  pinMode(8, INPUT_PULLUP);
void loop() {
  if (digitalRead(8) == LOW)
     tone(8, 262, 500);
     delay(500);
```



LED+버튼 테스트





LED+버튼 퀴즈

```
void setup() {
  pinMode(9, OUTPUT);
  pinMode(8, INPUT_PULLUP);
void loop() {
  if (digitalRead(8) == LOW)
     //LED ON
  else
    //LED OFF
```

