

부저(output), 키 입력
(input) 실험

“수업자료는 여기”



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 음계	1	2	3	4	5	6	7	8
C(도)	32.7032	65.4064	130.8128	261.6256	523.2511	1046.502	2093.005	4186.009
C#	34.6478	69.2957	138.5913	277.1826	554.3653	1108.731	2217.461	4434.922
D(레)	36.7081	73.4162	146.8324	293.6648	587.3295	1174.659	2349.318	4698.636
D#	38.8909	77.7817	155.5635	311.1270	622.2540	1244.508	2489.016	4978.032
E(미)	41.2034	82.4069	164.8138	329.6276	659.2551	1318.510	2637.020	5274.041
F(파)	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(솔)	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
A#	58.2705	116.5409	233.0819	466.1638	932.3275	1864.655	3729.310	7458.620
B(시)	61.7354	123.4708	246.9417	493.8833	987.7666	1975.533	3951.066	7902.133

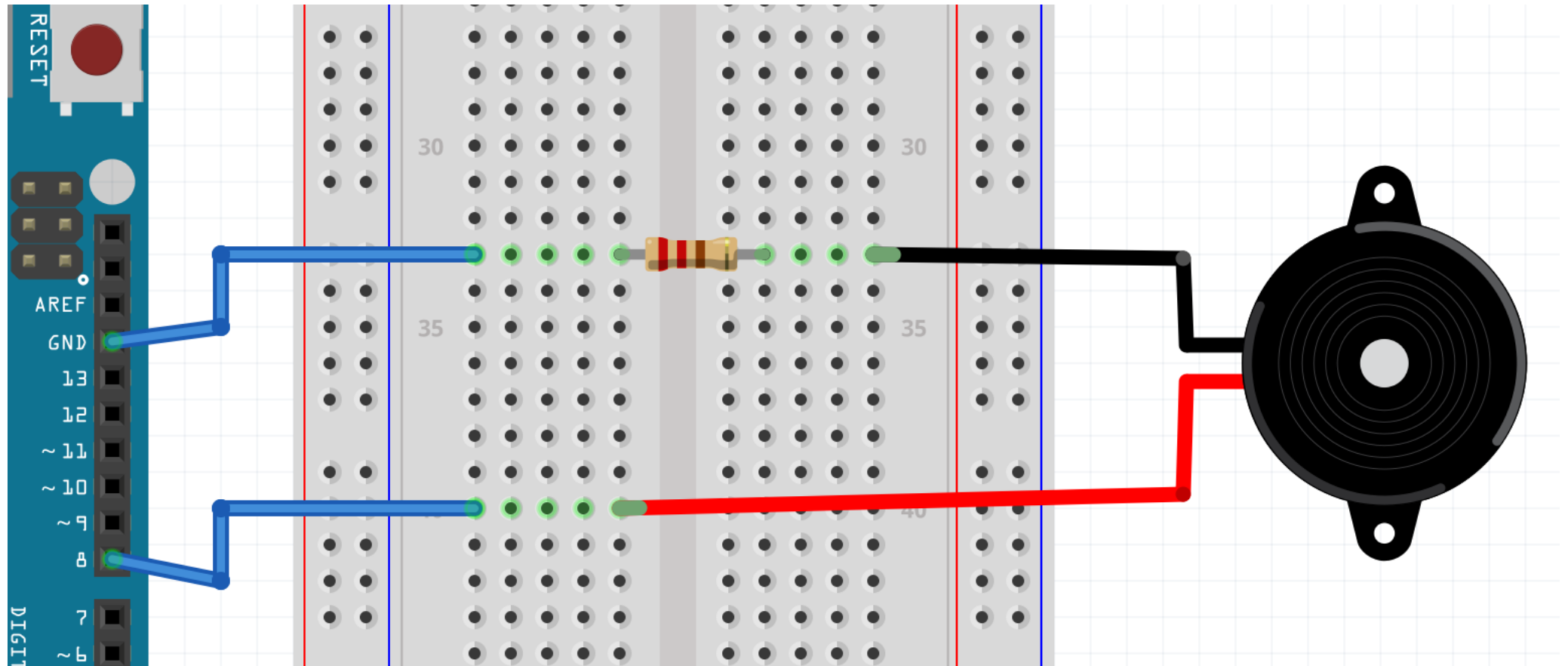
도레미파솔라시도

- 도 : 261.6256 Hz
- 레 : 293.1826 Hz
- 미 : 329.6276 Hz
- 파 : 349.2282 Hz
- 솔 : 391.9954 Hz
- 라 : 440.0000 Hz
- 시 : 466.1638 Hz
- 도 : 523.2511 Hz

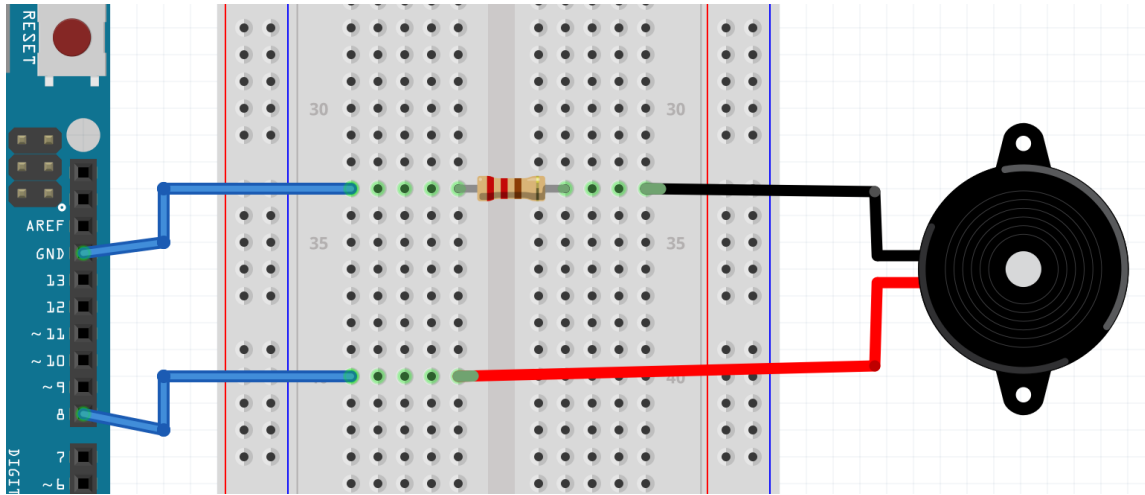
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부저 테스트



부저 테스트

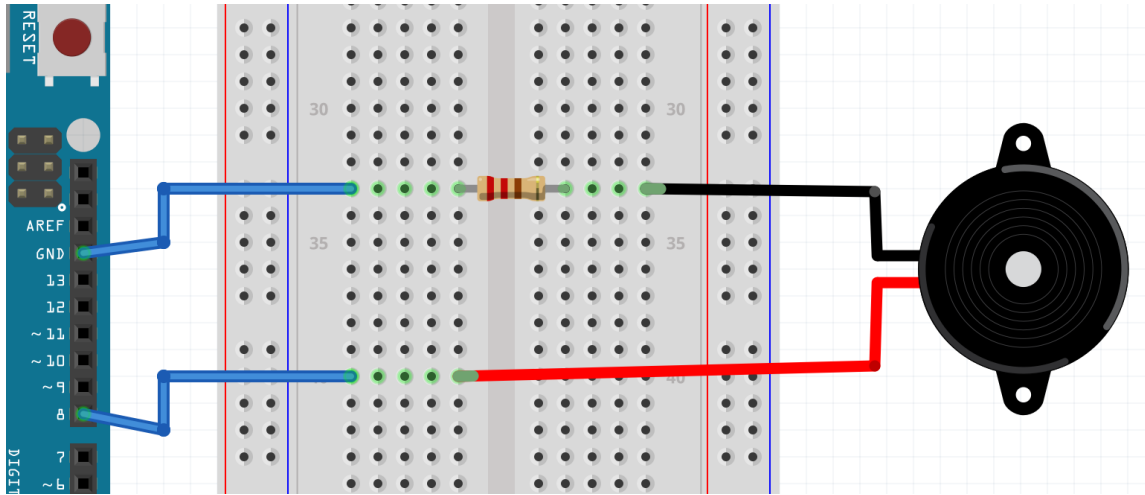


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- 라 : 440.0000 Hz
- 시 : 466.1638 Hz
- 도 : 523.2511 Hz

```
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



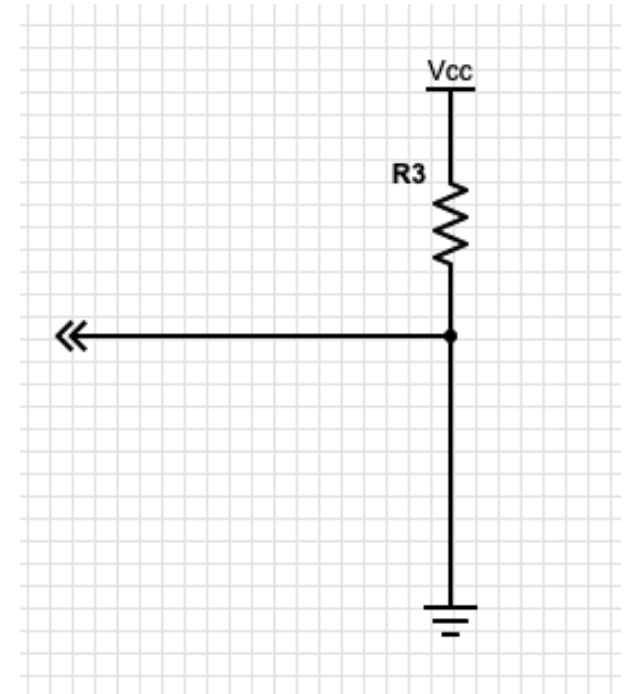
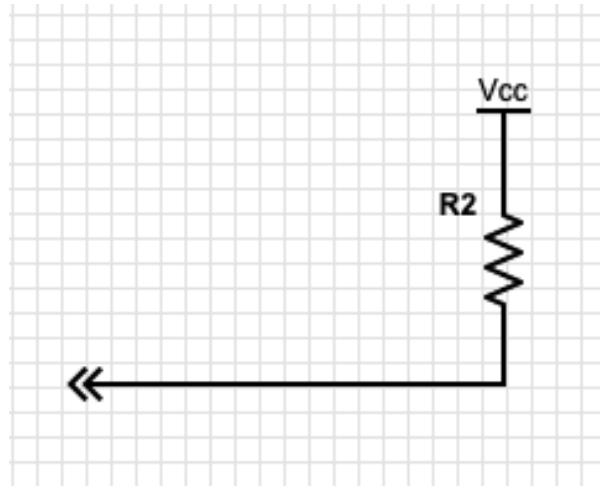
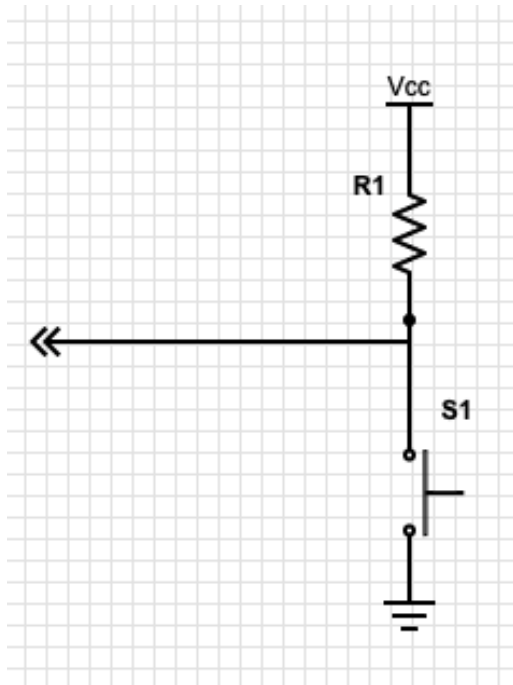
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- 시 : 466.1638 Hz
- 도 : 523.2511 Hz

```
int melody[8] = {262, 293, 330, 349, 392, 440, 466, 523};
```

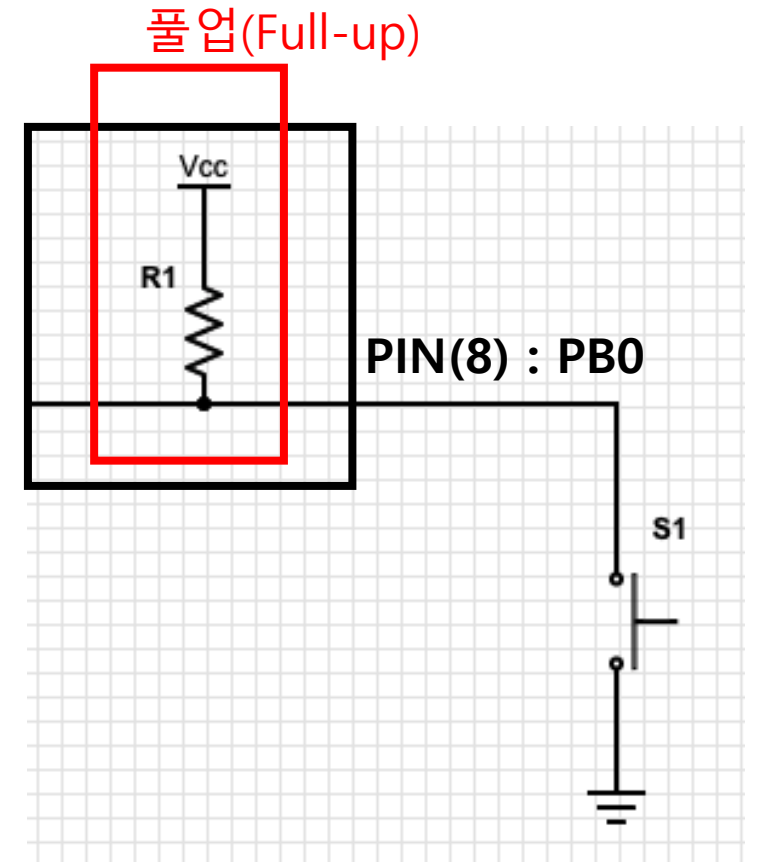
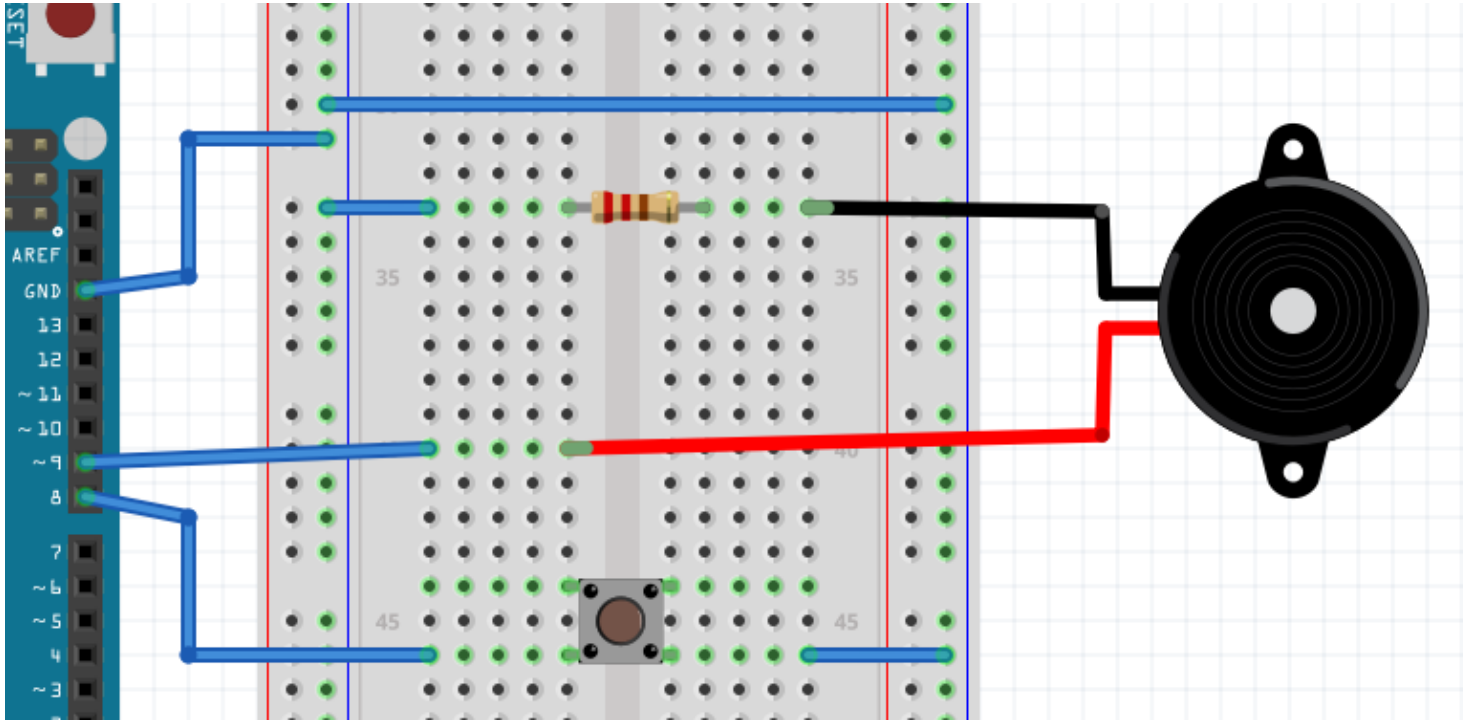
```
void setup() {  
  pinMode(8, OUTPUT);  
}
```

```
void loop() {  
  int i = 0;  
  for( i=0 ; i<8 ; i++ )  
  {  
    tone(8, melody[i], 500);  
    delay(500);  
  }  
}
```

부저 + 버튼 테스트

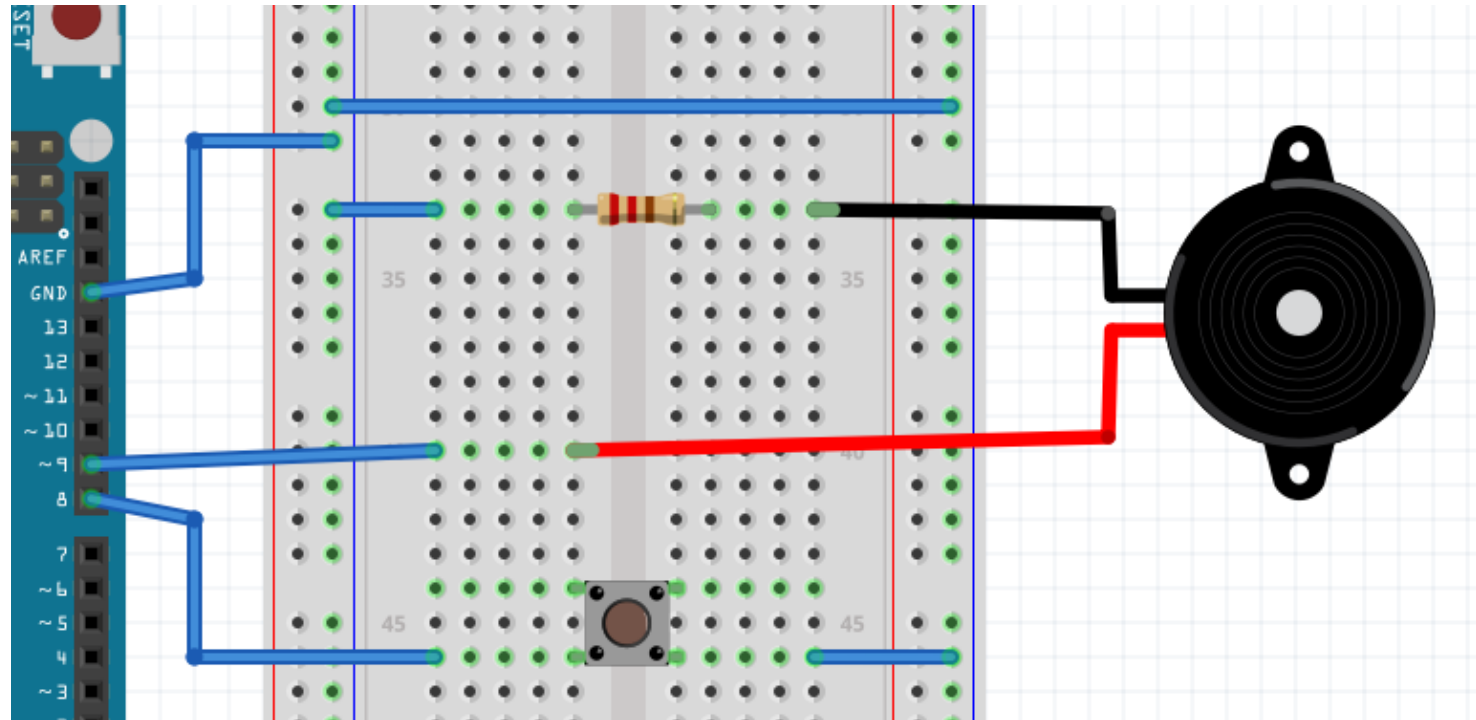


부저 + 버튼 테스트

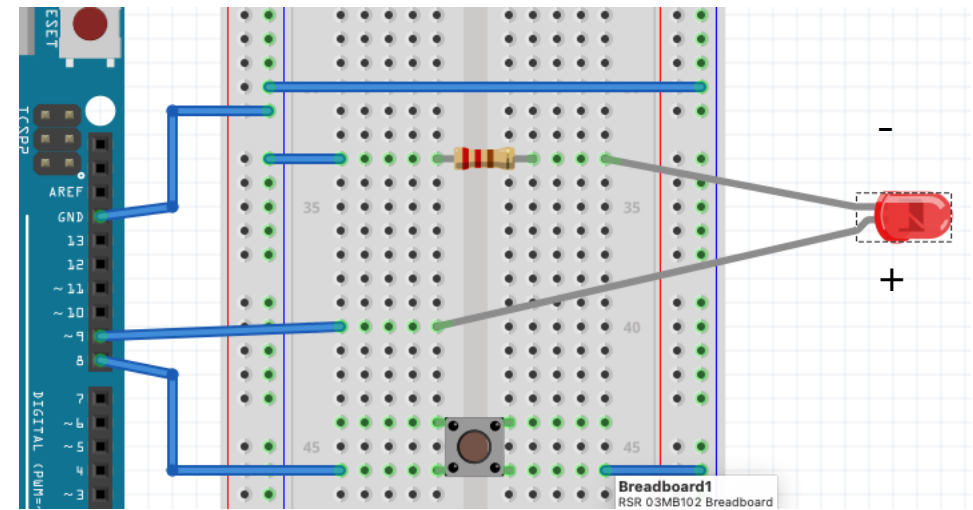
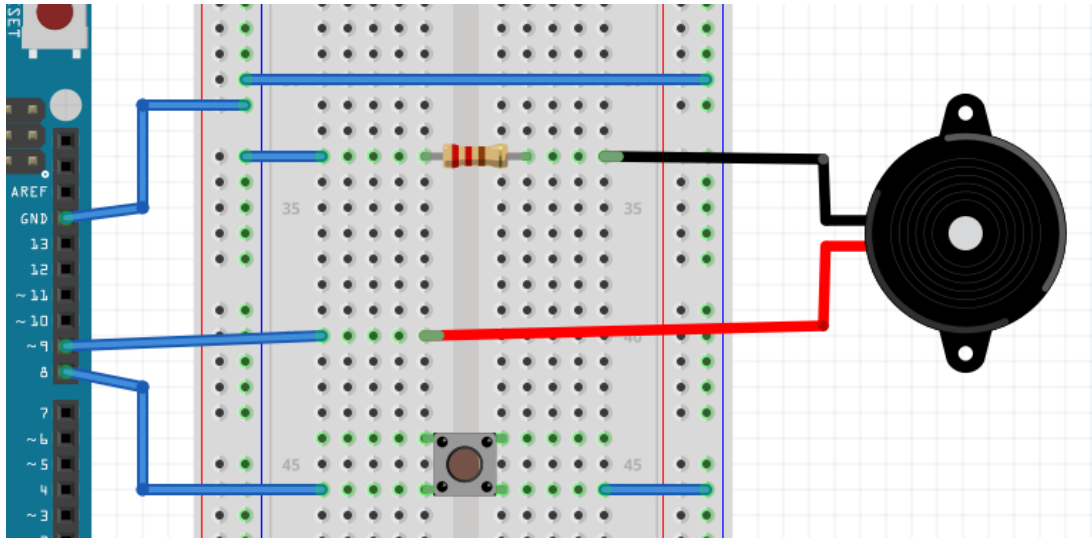


부저 + 버튼 테스트

```
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  
  }  
}
```

