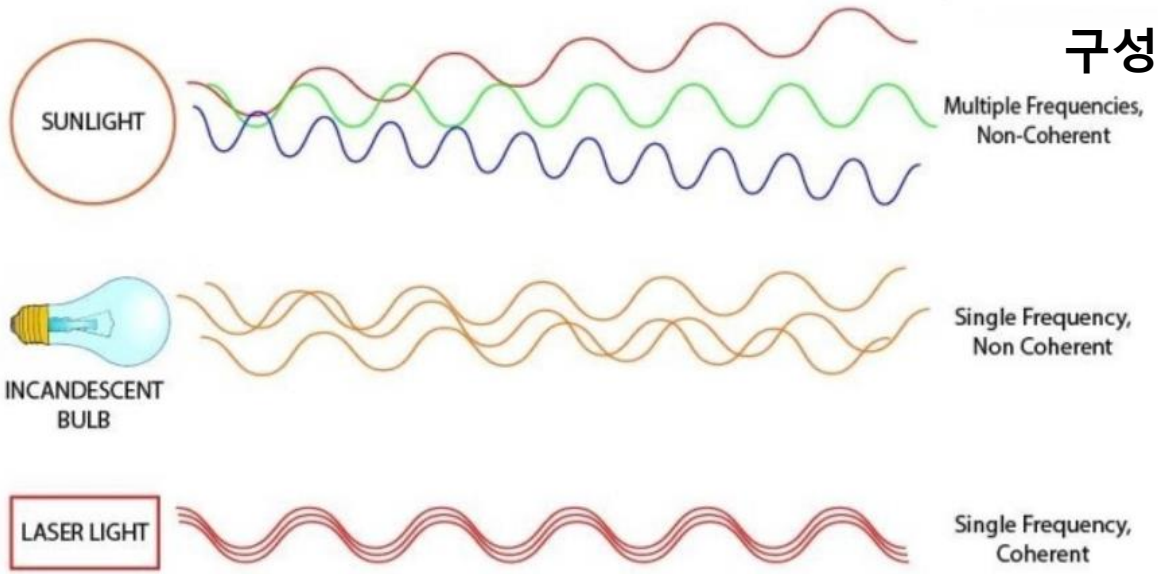
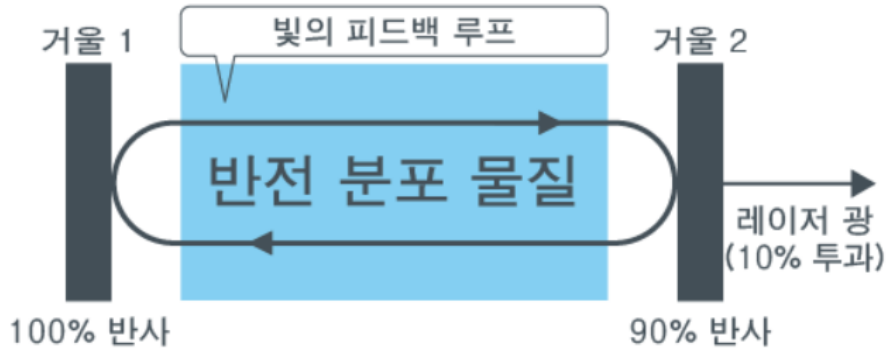
레이저 발광 모듈

LASER(Light Amplification by Stimulated Emission of Radiation)



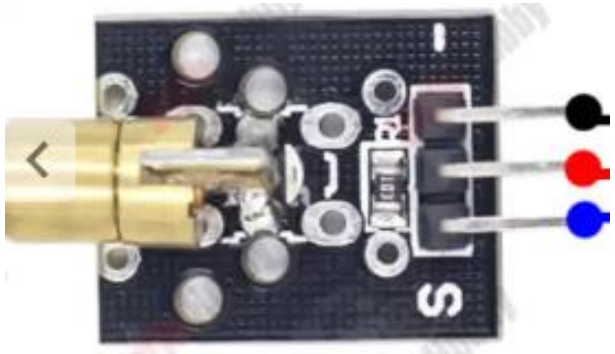
구성요소

레이저 다이오드 : 파장, 위상 등이 동일하게 빛을 출력



발신 전용 회로

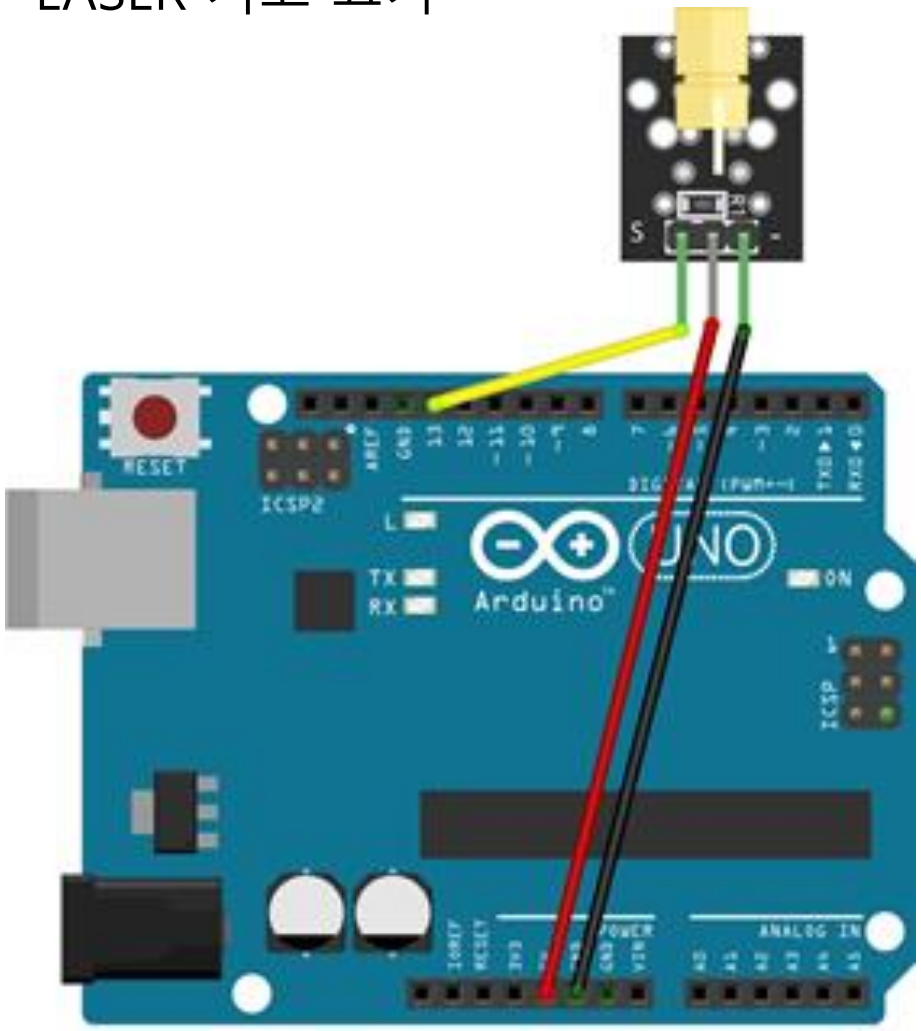
S : Signal
+ : VCC
- : GND



집광부

레이저 발광 모듈

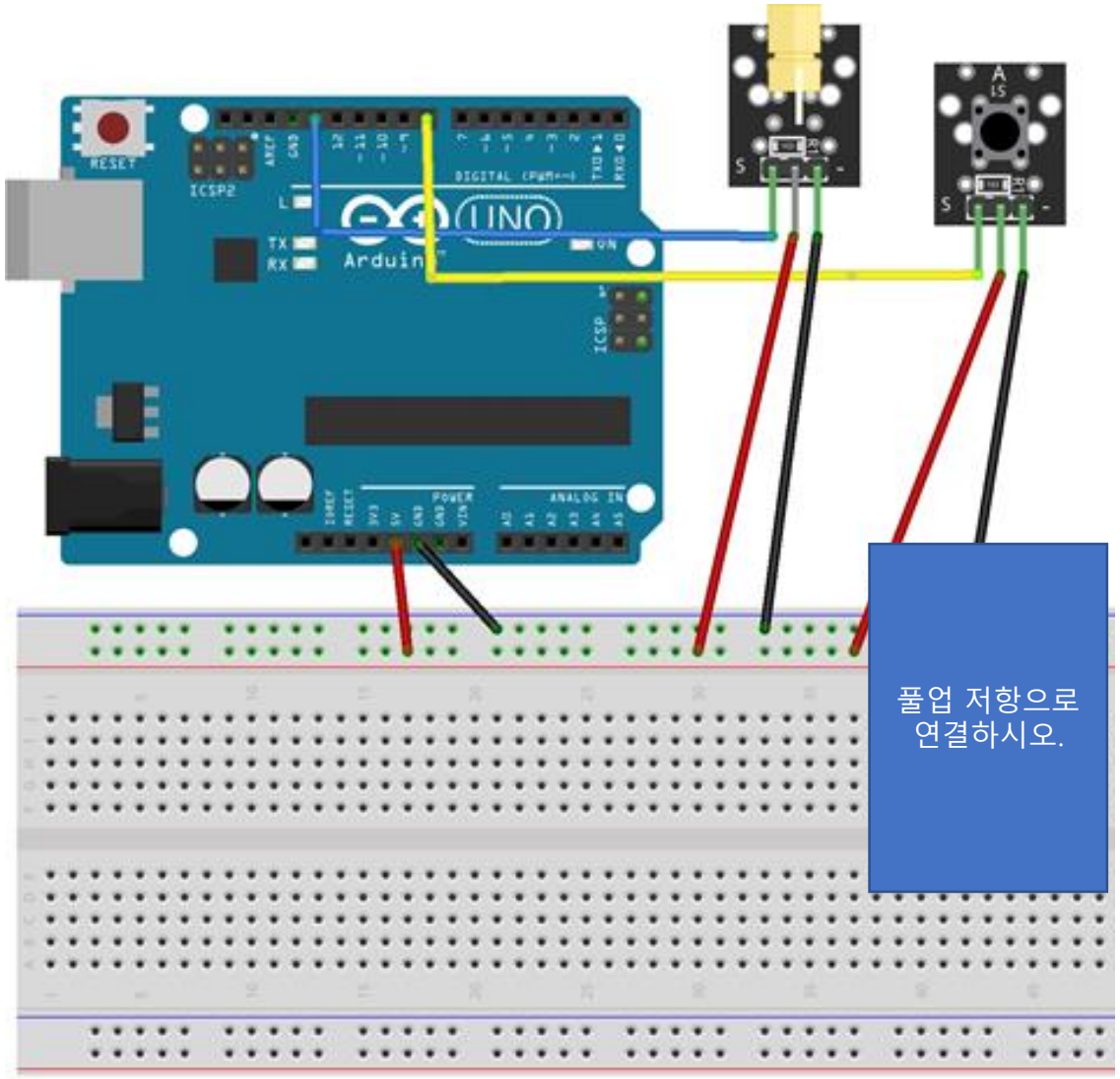
LASER 켜고 끄기




```
int pin_Laser = 13;

void setup() {
  Serial.begin(9600);
  pinMode(pin_Laser, OUTPUT);
}

void loop() {
  digitalWrite(pin_Laser, HIGH);
  delay(500);
  digitalWrite(pin_Laser, LOW);
  delay(500);
}
```

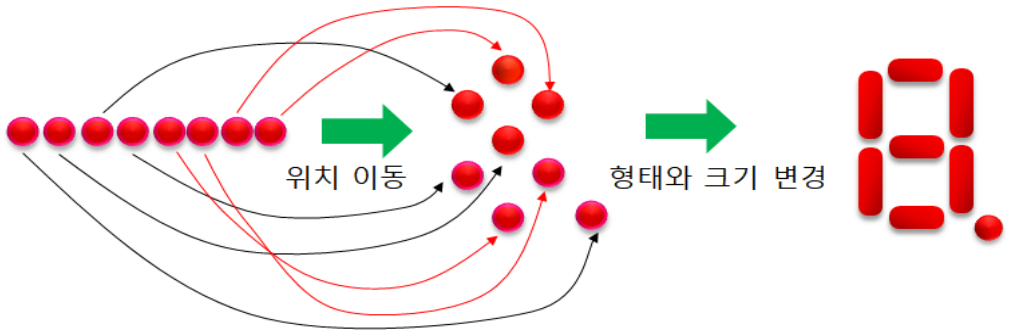
레이저 발광 모듈

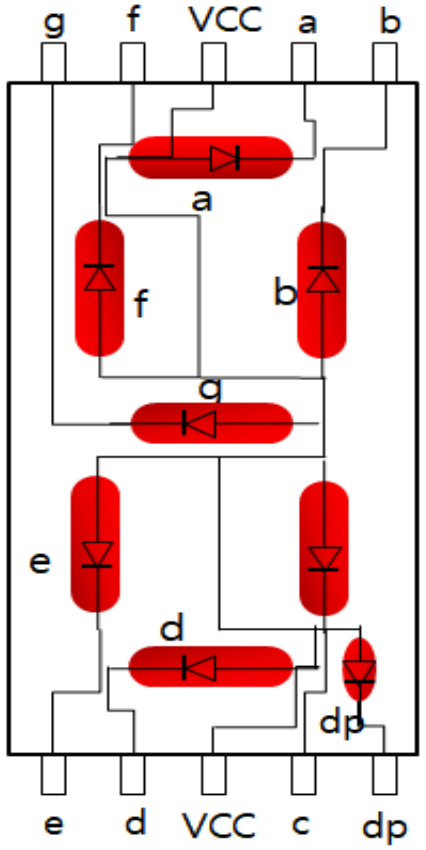
벗어날 위험있음, LASER 켜고 끄기

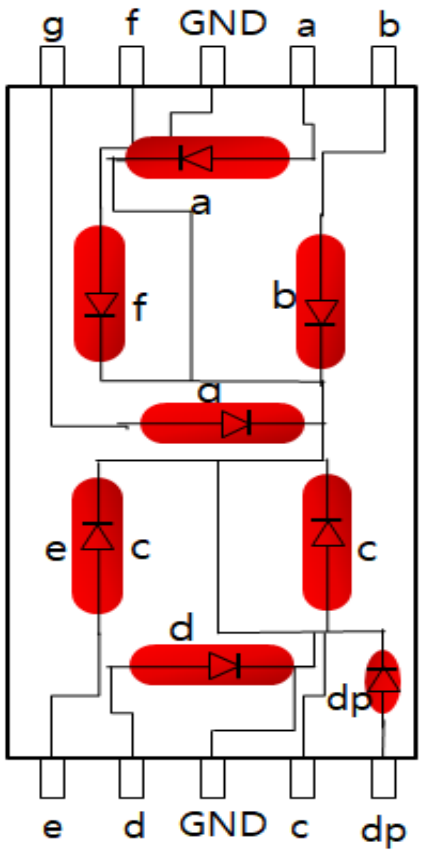


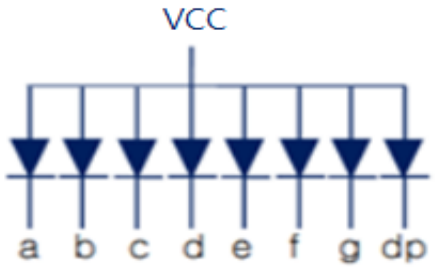

```
void setup() {
  Serial.begin(9600);
  pinMode(pin_Laser, OUTPUT);
  pinMode(pin_Button, INPUT_PULLUP);
}

void loop() {
  int val = digitalRead(pin_Button);
  Serial.println(val);
  delay(100);
  if(val == LOW){
    digitalWrite(pin_Laser, HIGH);
  }
  else{
    digitalWrite(pin_Laser, LOW);
  }
}
```

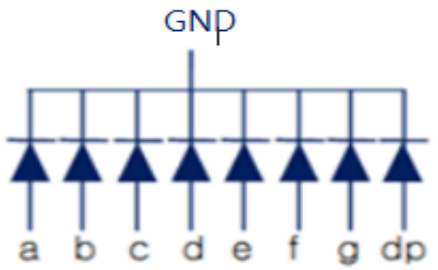
FND(Flexible Numeric Display)





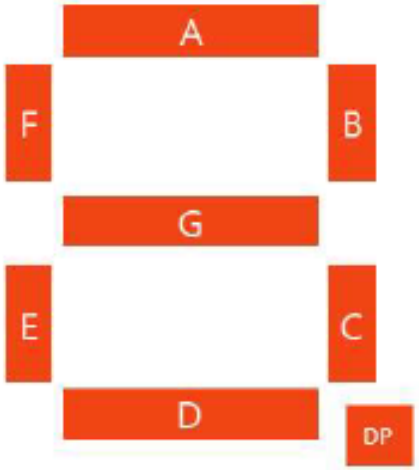




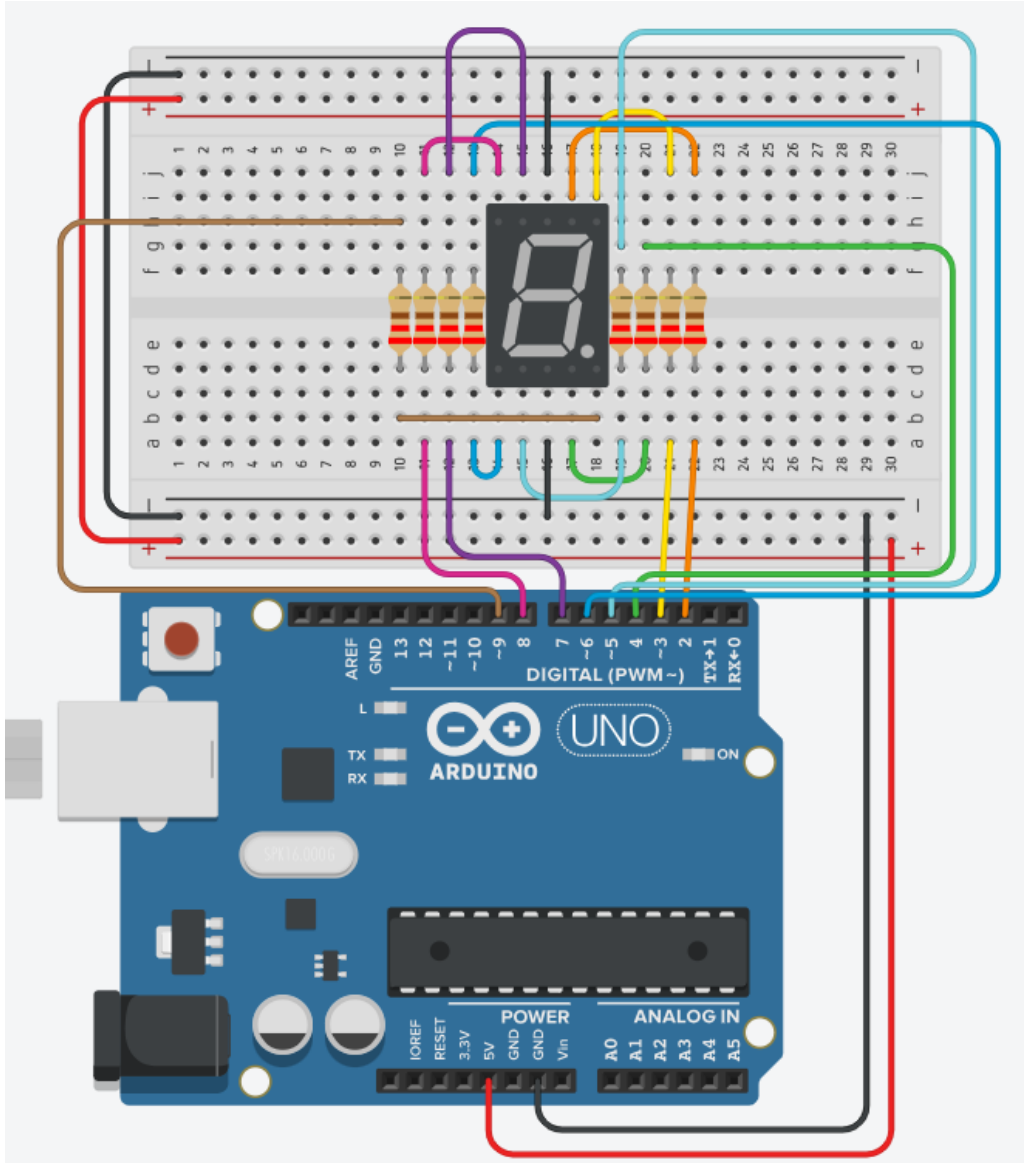


FND(Flexible Numeric Display)

No.	D2	D3	D4	D5	D6	D7	D8	D9	점찍고 싶으면
	A	B	C	D	E	F	G	DP	
0	1	1	1	1	1	1	0	0	11111101
1									
2									
3									
4									
5									
6									
7									
8									
9									

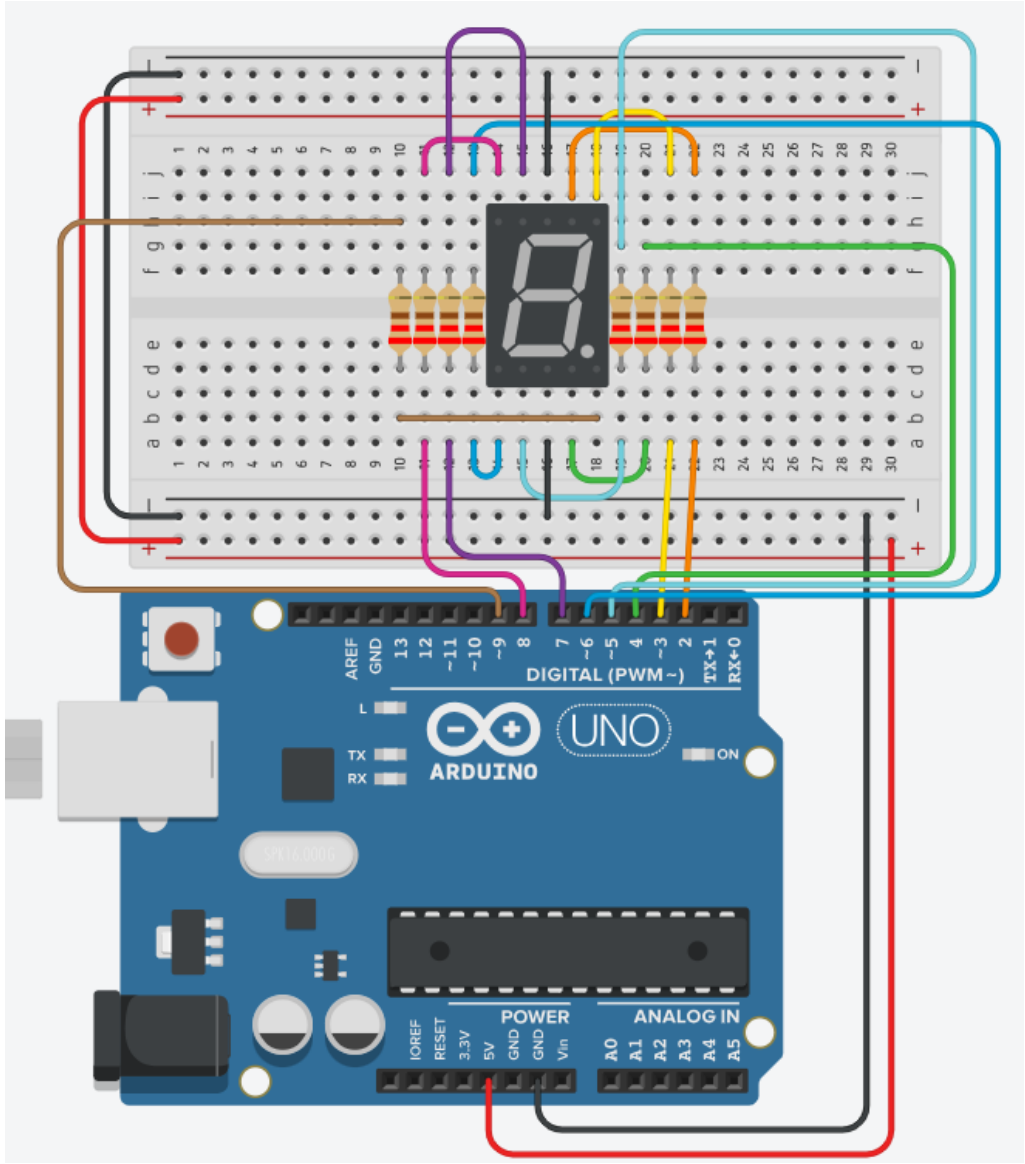


FND(Flexible Numeric Display)



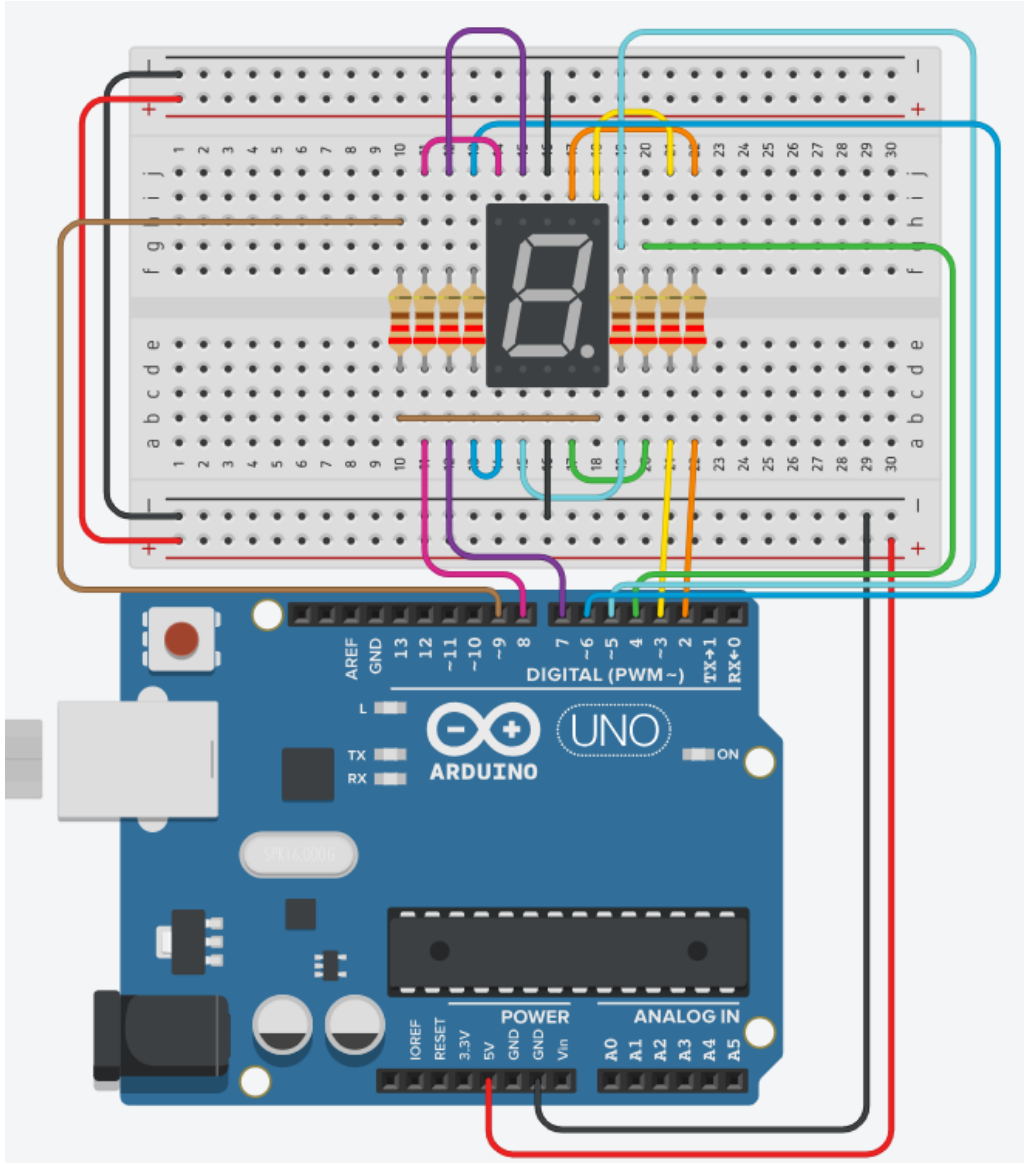

```
#define pin_A 2
#define pin_B 3
#define pin_C 4
#define pin_D 5
#define pin_E 6
#define pin_F 7
#define pin_G 8
#define pin_DP  9
void setup( ){
  Serial.begin(9600);
  pinMode(pin_A, OUTPUT);
  pinMode(pin_B, OUTPUT);
  pinMode(pin_C, OUTPUT);
  pinMode(pin_D, OUTPUT);
  pinMode(pin_E, OUTPUT);
  pinMode(pin_F, OUTPUT);
  pinMode(pin_G, OUTPUT);
  pinMode(pin_DP, OUTPUT);
}
void loop( ){
  digitalWrite(pin_A, HIGH);
  digitalWrite(pin_B, HIGH);
  digitalWrite(pin_C, HIGH);
  digitalWrite(pin_D, HIGH);
  digitalWrite(pin_E, HIGH);
  digitalWrite(pin_F, HIGH);
  digitalWrite(pin_G, LOW);
  digitalWrite(pin_DP, HIGH);
}
```

FND(Flexible Numeric Display)




```
#define pin_A 2
#define pin_B 3
#define pin_C 4
#define pin_D 5
#define pin_E 6
#define pin_F 7
#define pin_G 8
#define pin_DP  9
void setup( ){
  Serial.begin(9600);
  pinMode(pin_A, OUTPUT);
  pinMode(pin_B, OUTPUT);
  pinMode(pin_C, OUTPUT);
  pinMode(pin_D, OUTPUT);
  pinMode(pin_E, OUTPUT);
  pinMode(pin_F, OUTPUT);
  pinMode(pin_G, OUTPUT);
  pinMode(pin_DP, OUTPUT);
}
void loop( ){
  FND(1,1,1,1,1,1,0,1);
  delay(500);
  FND(0,1,1,0,0,0,0,1);
  delay(500):
}
void FND(int A, int B, int C, int D, int E, int F, int G, int DP){
  digitalWrite(pin_A, A);
  digitalWrite(pin_B, B);
  digitalWrite(pin_C, C);
  digitalWrite(pin_D, D);
  digitalWrite(pin_E, E);
  digitalWrite(pin_F, F);
  digitalWrite(pin_G, G);
  digitalWrite(pin_DP, DP);
}
```

FND(Flexible Numeric Display)




```
int ON = LOW;
int OFF = HIGH;
int digits[10][8] = {
    {OFF, OFF, OFF, OFF, OFF, OFF, ON, ON},
    {ON, ON, ON, ON, ON, ON, ON, OFF},
    {OFF, OFF, ON, OFF, OFF, ON, OFF, OFF},
    {OFF, OFF, OFF, OFF, ON, ON, OFF, OFF},
    {ON, OFF, OFF, ON, ON, OFF, OFF, OFF},
    {OFF, ON, OFF, OFF, ON, OFF, OFF, ON},
    {OFF, ON, OFF, OFF, OFF, OFF, OFF, ON},
    {OFF, OFF, OFF, ON, ON, ON, ON, ON},
    {OFF, OFF, OFF, OFF, OFF, OFF, OFF, ON},
    {OFF, OFF, OFF, OFF, ON, OFF, OFF, ON}
};
int pins[ ] = {2, 3, 4, 5, 6, 7, 8, 9};

void setup( ){
    for(int i = 0; i  < 8; i++){
        pinMode(pins[i], OUTPUT);
    }
}

void loop( ){
    for(int i = 0; i <= 9; i++){
        for(int j = 0; j < 8; j++){
            digitalWrite(pins[j], digits[i][j]);
        }
        delay(1000);
    }
}
```

숫자 패턴을 모두 채우시오.