

## H.W.: Photodiode &amp; 7-segment LED

```

/*
Val. | A B C D  E F G DP.
0   | 1 1 1 1  1 1 0 0
1   | 0 1 1 0  0 0 0 0
2   | 1 1 0 1  1 0 1 0
3   | 1 1 1 1  0 0 1 0
4   | 0 1 1 0  0 1 1 0
5   | 1 0 1 1  0 1 1 0
6   | 1 0 1 1  1 1 1 0
7   | 1 1 1 0  0 0 0 0
8   | 1 1 1 1  1 1 1 0
9   | 1 1 1 1  0 1 1 0
.   | 0 0 0 0  0 0 0 1
*/
#define A 11
#define B 10
#define C 7
#define D 8
#define E 9
#define F 12
#define G 13
#define DP 6

#define PHOTO_D A0
#define DELAY_TIME 1000

void setup() {
    for (int i = 6; i <= 13; i++)
    {
        pinMode(i, OUTPUT);
    }
    pinMode(PHOTO_D, INPUT);
    Serial.begin(115200);
}

void loop() {
    int light = analogRead(PHOTO_D);
    // Serial.println(light);
    // min (not off / not zero) is
    // approximately 70
    // max val of light is
    // approximately 85
    light = map(light, 70, 85, 0, 9);

```

```

    Serial.println(light);
    set7seg(light);
    delay(DELAY_TIME);
}

void set7seg(char val){
    switch (val)
    {
        case (0):
            zero();
            break;
        case (1):
            one();
            break;
        case (2):
            two();
            break;
        case (3):
            three();
            break;
        case (4):
            four();
            break;
        case (5):
            five();
            break;
        case (6):
            six();
            break;
        case (7):
            seven();
            break;
        case (8):
            eight();
            break;
        case (9):
            nine();
            break;
        default:
            zero();
            break;
    }
}

```

```

void zero()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, LOW);
    digitalWrite(DP, LOW);
}

```

```

void one()
{
    digitalWrite(A, LOW);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, LOW);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, LOW);
    digitalWrite(DP, LOW);
}

```

```

void two()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, LOW);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, LOW);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

void three()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, HIGH);
}

```

```

    digitalWrite(DP, LOW);
}

```

```

void four()
{
    digitalWrite(A, LOW);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, LOW);
    digitalWrite(E, LOW);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

void five()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, LOW);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

void six()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, LOW);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

void seven()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, LOW);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, LOW);
    digitalWrite(DP, LOW);
}

```

```

void eight()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

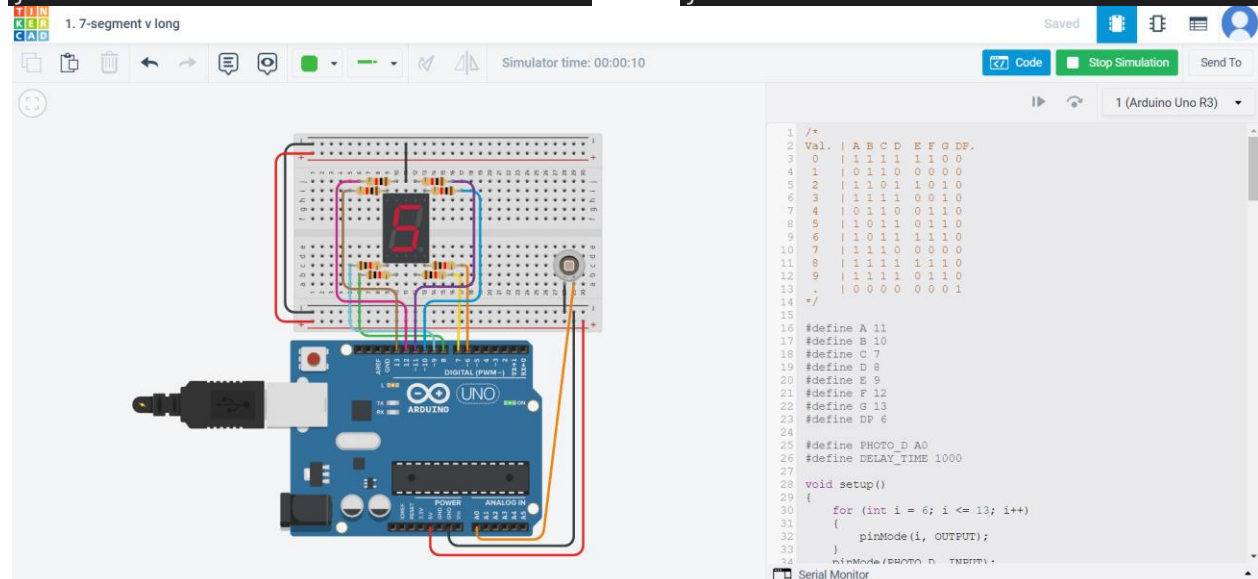
void nine()
{
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(DP, LOW);
}

```

```

void dot()
{
    digitalWrite(A, LOW);
    digitalWrite(B, LOW);
    digitalWrite(C, LOW);
    digitalWrite(D, LOW);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, LOW);
    digitalWrite(DP, HIGH);
}

```



## Advanced Exercise

```

#define PIR 13
#define PHOTO_D A0
#define LED 2
#define DELAY_TIME 500

void setup()
{
    pinMode(PIR, INPUT);
    pinMode(PHOTO_D, INPUT);
    pinMode(LED, OUTPUT);
}

void loop()
{
    int light = analogRead(PHOTO_D);
    // min (not off / not zero) is approximately 70
    // max val of light is approximately 85
    if (light > 80)
        return;
    bool pir = digitalRead(PIR);
    if (pir)
        digitalWrite(LED, HIGH);
    else
        digitalWrite(LED, LOW);
    delay(DELAY_TIME);
}

```

Magnificent Tumelo

Simulator time: 00:00:08

PIR Sensor

Name	Target X	Target Y
1	-15.87	-107.55
		-224.58

```

1 #define PIR 13
2 #define PHOTO_D A0
3 #define LED 2
4 #define DELAY_TIME 500
5
6 void setup()
7 {
8     pinMode(PIR, INPUT);
9     pinMode(PHOTO_D, INPUT);
10    pinMode(LED, OUTPUT);
11 }
12
13 void loop()
14 {
15     int light = analogRead(PHOTO_D);
16     // min (not off / not zero) is approximately 70
17     // max val of light is approximately 85
18     if (light > 80)
19         return;
20     bool pir = digitalRead(PIR);
21     if (pir)
22         digitalWrite(LED, HIGH);
23     else
24         digitalWrite(LED, LOW);
25     delay(DELAY_TIME);
26 }

```

1 (Arduino Uno R3)

Serial Monitor