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**Aim**: To count numbers from 0 to 9 using a push button and display it on a 7-segment display

**Equipment**: Breadboard, Arduino Uno, 7-segment display, 330 Ω resistor, 10 kΩ resistor, Push Button, Connecting wires

## Schematic:

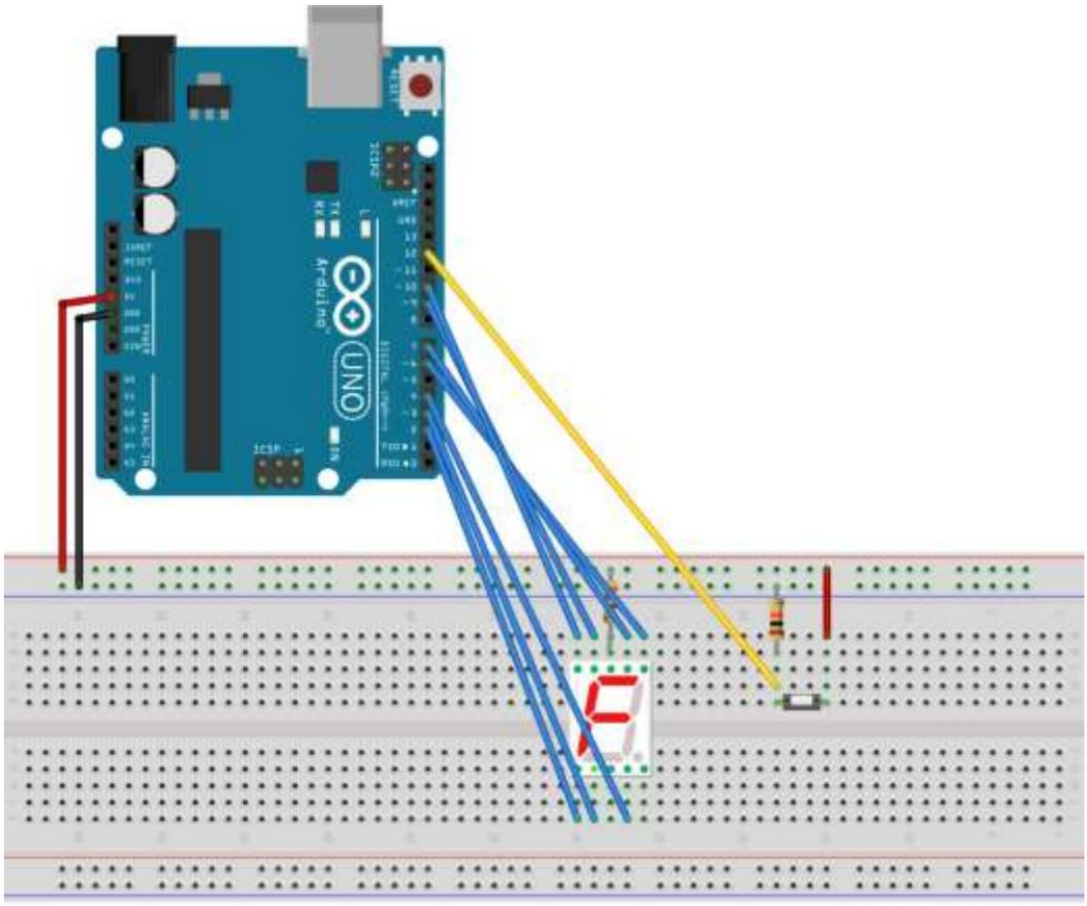

*Figure 1*

## Working:

LCD Type:

First of all the7-segment display is checked, to determine whether it is a CC type or a CA type. From my experiment by connecting the COM pin to ground and the segment pin to the positive terminal, the 7-segment display lit up, which confirms that the display is a CC type.

Setup:

The circuit is set up according to the schematic in figure 1. The 7-segment display is connected to a resistor to prevent it from being burned out due to high voltage. My configuration for the pins is as such: Pin 12-6 of the arduino is connected to pins A-G of the 7-segment display and are set as output pins. Pin 2 of the arduino is connected to the push button, and is set up as an input pin.

Working:

The arduino code is written to perform simple functionality. On the start-up of the arduino board, the 7-segment displays 0, and keeps track of the number of button pushes. Whenever the push button is pressed, the counter is incremented by 1 and the new number is displayed on the 7-segment display. For example if the 7-segment display was showing 2, and the button was pressed, the display will then show 3. It can count up to 9, after which it goes back to 0 since we cannot display number 10 on one single display.

Code:

```
#define SWITCH 2

#define A 12

#define B 11

#define C 10

#define D 9

#define E 8

#define F 7

#define G 6

#define DP 5


int counting = 0;


//display number 1

void display1(void) {

  digitalWrite(B, HIGH);

  digitalWrite(C, HIGH);

}

//display number 2

void display2(void) {

  digitalWrite(A, HIGH);

  digitalWrite(B, HIGH);

  digitalWrite(G, HIGH);

  digitalWrite(E, HIGH);

  digitalWrite(D, HIGH);

}

// display number 3

void display3(void) {
```

```
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);

  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(G, HIGH);
}
// display number 4
void display4(void) {
  digitalWrite(F, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(C, HIGH);
}
// display number 5
void display5(void) {
  digitalWrite(A, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
}
// display number 6
void display6(void) {
  digitalWrite(A, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
}
// display number 7
void display7(void) {
```

```
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
}
// display number 8
void display8(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
}
// display number 9
void display9(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(F, HIGH);
}
// display number 0
void display0(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
}
void clearDisplay(void) {
```

```
  digitalWrite(A, LOW);
  digitalWrite(B, LOW);
  digitalWrite(G, LOW);
  digitalWrite(C, LOW);
  digitalWrite(D, LOW);
  digitalWrite(E, LOW);
  digitalWrite(F, LOW);
}



void buttonPush() {

  static unsigned long last_interrupt_time = 0;
  unsigned long interrupt_time = millis();
  // If interrupts come faster than 200ms, assume it's a bounce and ignore
  if (interrupt_time - last_interrupt_time > 200)
  {
    //Increment the counting number.
    counting += 1;
    if (counting >= 10)
      counting = 0;

    displayNumber(counting);
  }
  last_interrupt_time = interrupt_time;
}

//Display the number on the 7-segment display according to the number in count.
void displayNumber(int number) {
  clearDisplay();
  switch (number) {
    case 0:
      display0();
```

```
      break;
    case 1:
      display1();
      break;
    case 2:
      display2();
      break;
    case 3:
      display3();
      break;
    case 4:
      display4();
      break;
    case 5:
      display5();
      break;
    case 6:
      display6();
      break;
    case 7:
      display7();
      break;
    case 8:
      display8();
      break;
    case 9:
      display9();
      break;
  }
}

void setup() {
```

```
  int i;
  //Setup the a-g pins as output
  for (i = 5; i <= 12; i++)
    pinMode(i, OUTPUT);

  //Set the push button pin as input, and make it an external interupt.
  pinMode(SWITCH, INPUT);
  attachInterrupt(digitalPinToInterrupt(SWITCH), buttonPush, RISING);


  displayNumber(counting);
}

void loop() {

}
```