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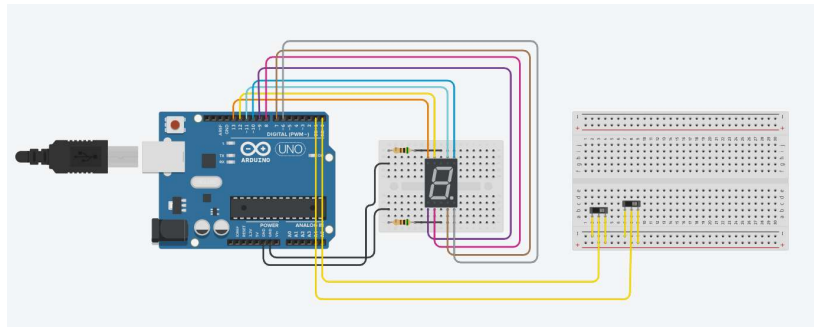
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## EMBEDDED SYSTEMS LAB EXAM

Aim: To write a embedded C code to read two different slide switches connected at digital IO pin of Arduino UNO board and display the respective HEX number of switch on 7-Segment LED connected with I/O pin of Arduino UNO board. Interface switch with PULL\_UP configuration. Perform the experiment using Tinkercad.

Flow Chat/ Algorithm:

1. Design the circuit as shown below. Setup the pin modes with respect to input/output pins.



2. The slide switches connected with pins 0 and 1 act as input considering the high and low states of these buttons, we can generate the required output 7-Segment LED.
3. Now according to question given we can align these states as mentioned below:

```
4. if (buttonState1 == HIGH && buttonState2 == HIGH)
5. {
6.     four();
7. }
8.
9. if (buttonState1 == HIGH && buttonState2 == LOW)
10. {
11.
12.     two();
13. }
14. if (buttonState1 == LOW && buttonState2 == HIGH)
15. {
16.     one();
17. }
18. if (buttonState1 == LOW && buttonState2 == LOW)
19. {
20.     zero();
21. }
```

### Theory:

The emission of photons from a 7-segment display occurs when the diode junction of each segment is forward biased by an external voltage allowing current to flow across its junction, and in Electronics we call this process electroluminescence.

The actual colour of the visible light emitted by an LED, ranging from blue to red to orange, is decided by the spectral wavelength of the emitted light which itself is dependent upon the mixture of the various impurities added to the semiconductor materials used to produce it.

Light emitting diodes have many advantages over traditional bulbs and lamps, with the main ones being their small size, long life, various colours, cheapness and are readily available, as well as being easy to interface with various other electronic components and digital circuits.

### Code:

```
unsigned const int A = 13;
unsigned const int B = 12;
unsigned const int C = 11;
unsigned const int D = 10;
unsigned const int E = 9;
unsigned const int F = 8;
unsigned const int G = 7;
unsigned const int H = 6;
const int buttonPin1 = 0;
const int buttonPin2 = 1;
int buttonState1 = 0;
int buttonState2 = 0;
void setup()
{
  Serial.begin(9600);
  pinMode(0, INPUT_PULLUP);
  pinMode(1, INPUT_PULLUP);
  pinMode(A, OUTPUT);
  pinMode(B, OUTPUT);
  pinMode(C, OUTPUT);
  pinMode(D, OUTPUT);
  pinMode(E, OUTPUT);
  pinMode(F, OUTPUT);
  pinMode(G, OUTPUT);
  pinMode(H, OUTPUT);
}
```

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

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

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

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

void loop(void)
{
    delay(1000);
```

```

buttonState1 = digitalRead(buttonPin1);
buttonState1 = digitalRead(buttonPin2);

if (buttonState1 == HIGH && buttonState2 == HIGH)
{
    four();
}
if (buttonState1 == HIGH && buttonState2 == LOW)
{
    two();
}
if (buttonState1 == LOW && buttonState2 == HIGH)
{
    one();
}
if (buttonState1 == LOW && buttonState2 == LOW)
{
    zero();
}
}

```

Result:

