Laboratory # 4: 7 Segment Display

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Program: BSIT -3L
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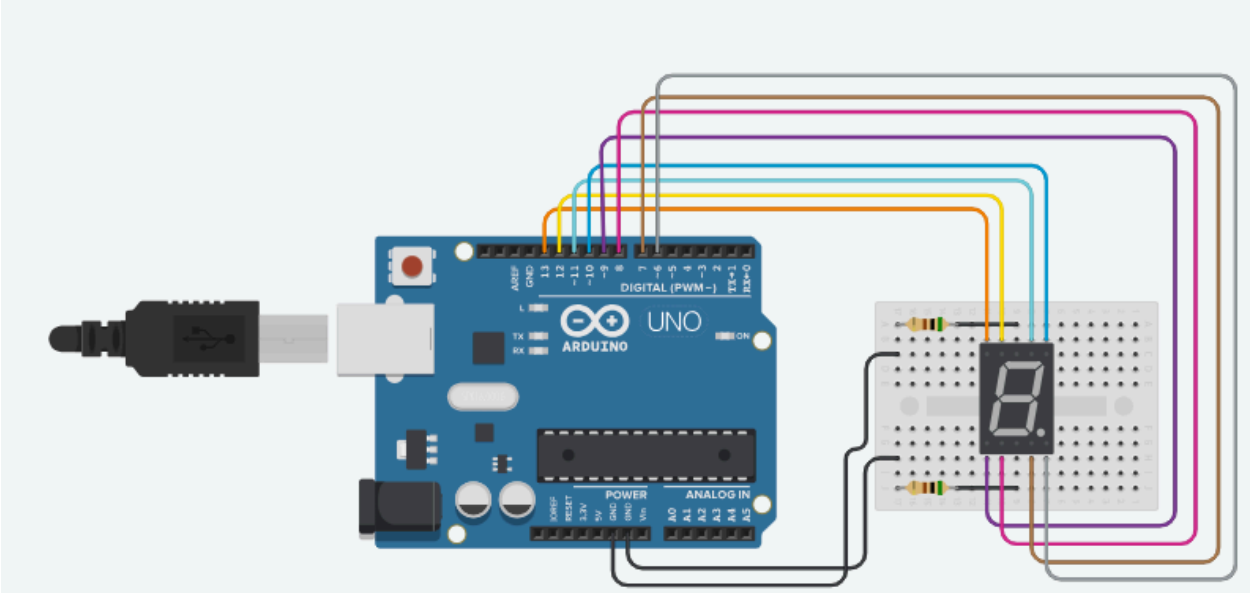
Objective: To create and simulate a simple Arduino application using Tinkercad simulation.
To be able to apply the principle of 7-Segment Display.
To be able to understand the concept of real life application of programming.



Sample 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;


void setup(void)
{
  pinMode(A, OUTPUT);
  pinMode(B, OUTPUT);
  pinMode(C, OUTPUT);
  pinMode(D, OUTPUT);
  pinMode(E, OUTPUT);
  pinMode(F, OUTPUT);
  pinMode(G, OUTPUT);
  pinMode(H, OUTPUT);
}

//My Functions

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

```
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

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

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

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

void nine(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, LOW);
```

```
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

// Start
void loop(void)
{
  zero();
  delay(1000);

  one();
  delay(1000);

  two();
  delay(1000);

  three();
  delay(1000);

  four();
  delay(1000);

  five();
  delay(1000);

  six();
  delay(1000);

  seven();
  delay(1000);

  eight();
  delay(1000);

  nine();
  delay(1000);
}
```

Laboratory Output Requirements.

Code

```
const unsigned int pins[] = {13, 12, 11, 10, 9, 8, 7, 6};

void setup() {
  for (int i = 0; i < 8; i++) { // Iterate over all 8 pins
    pinMode(pins[i], OUTPUT);
    digitalWrite(pins[i], LOW); // Ensure all pins are off initially
  }
}

void clearDisplay() {
  for (int i = 0; i < 8; i++) { // Iterate over all 8 pins
    digitalWrite(pins[i], LOW);
  }
}

void displayDigit(int digit) {
   const byte digitStates[10][8] = {
    {LOW, HIGH, HIGH, HIGH, HIGH, HIGH, HIGH, LOW},  // 0
    {LOW, LOW, LOW, HIGH, LOW, LOW, HIGH, LOW},      // 1
    {HIGH, LOW, HIGH, HIGH, HIGH, HIGH, LOW, LOW},  // 2
    {HIGH, LOW, HIGH, HIGH, LOW, HIGH, HIGH, LOW},  // 3
    {HIGH, HIGH, LOW, HIGH, LOW, LOW, HIGH, LOW},    // 4
    {HIGH, HIGH, HIGH, LOW, LOW, HIGH, HIGH, LOW},  // 5
    {HIGH, HIGH, HIGH, LOW, HIGH, HIGH, HIGH, LOW}, // 6
    {LOW, LOW, HIGH, HIGH, LOW, LOW, HIGH, LOW},     // 7
    {HIGH, HIGH, HIGH, HIGH, HIGH, HIGH, HIGH, LOW},// 8
    {HIGH, HIGH, HIGH, HIGH, LOW, HIGH, HIGH, LOW}  // 9
  };

  clearDisplay(); // Clear current state
  for (int i = 0; i < 8; i++) { // Iterate over all 8 pins
    digitalWrite(pins[i], digitStates[digit][i]);
  }
}

void loop() {
  for (int i = 0; i < 10; i++) {
    displayDigit(i);
    delay(1000);
```

```
  }
}
```

Video Link:

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Screenshot
Code, Circuit (Including Time and Date of the Desktop)