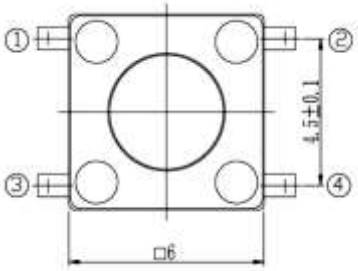
EE 2305 – Introduction to C Programming
Hardware Project 02

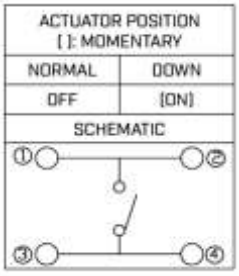
7-Segment Display

Project Features: Digital Input and Digital Output.

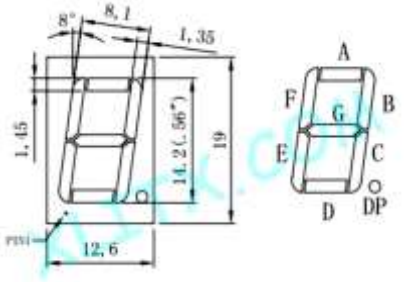
Program an Arduino board to accept a 4-bit binary input and display the numerical value (0 to 9) on a 7-Segment LED display.

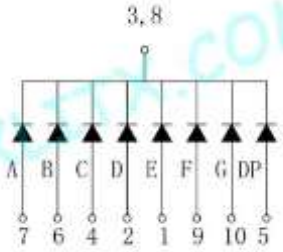
Use the pushbutton for the digital input:

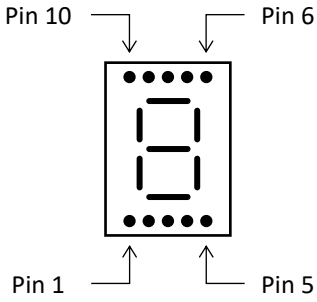




Use the 7-Segment LED Display:

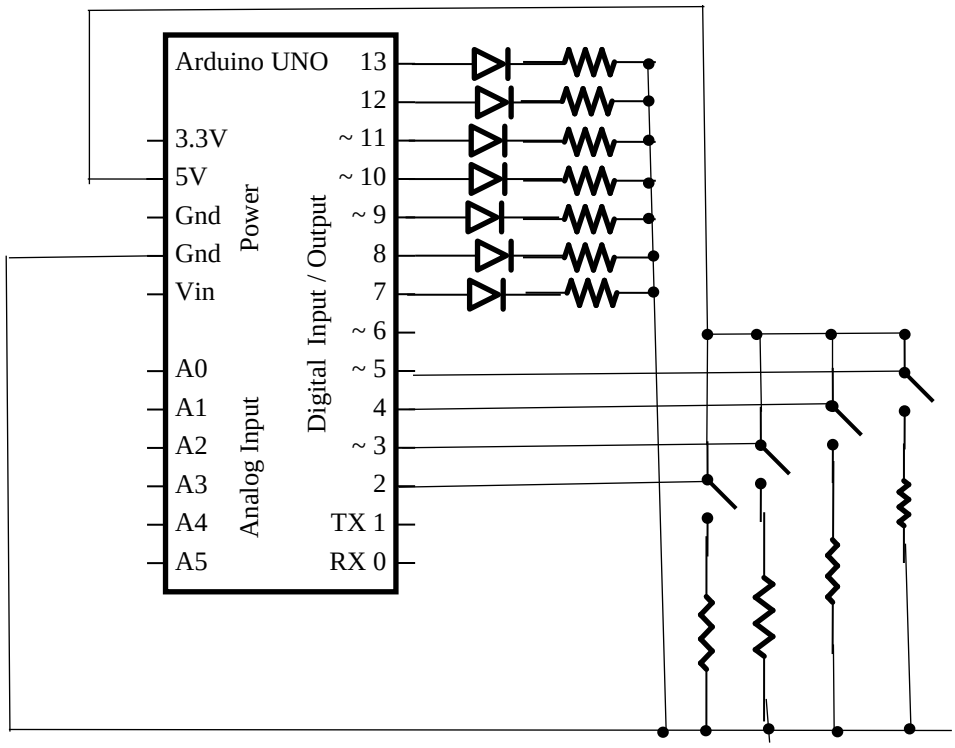






To document your program, create a document and include the following sections in the document. Provide a brief description of the system and how you are designing it to operate,

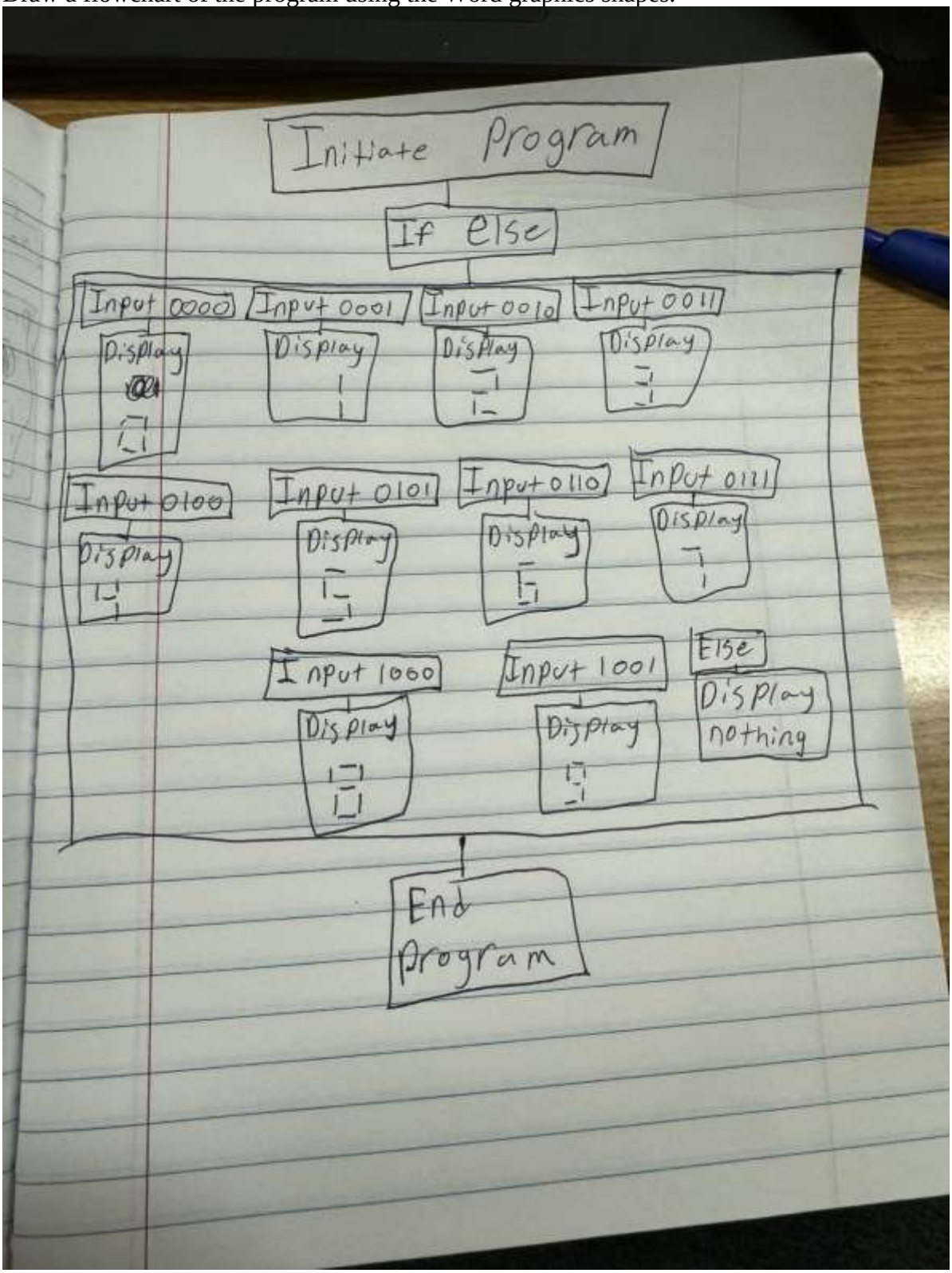
A. Hardware Diagram:
Provide a hardware diagram of the components.



Hardware Diagram

B. Program Flowchart:

Draw a flowchart of the program using the Word graphics shapes.



C. Arduino Source Code

Insert the Arduino Source Code into the document.

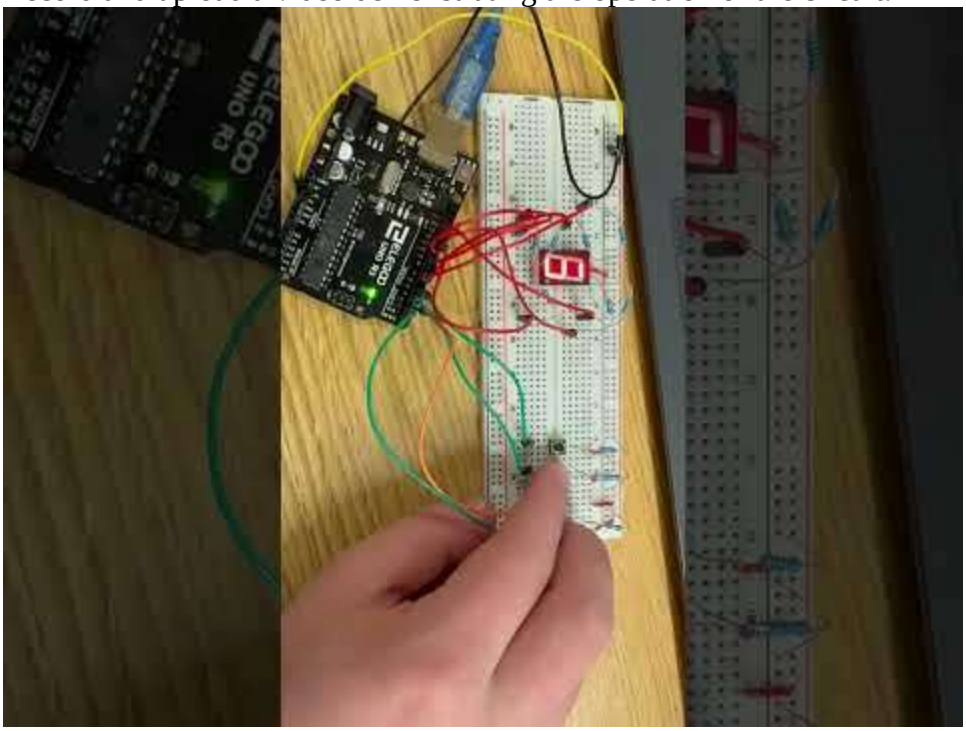
```
void setup() {
  // put your setup code here, to run once:
  pinMode (13, OUTPUT);
  pinMode (12, OUTPUT);
  pinMode (11, OUTPUT);
  pinMode (10, OUTPUT);
  pinMode (9, OUTPUT);
  pinMode (8, OUTPUT);
  pinMode (7, OUTPUT);
  pinMode (5, INPUT);
  pinMode (4, INPUT);
  pinMode (3, INPUT);
  pinMode (2, INPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
  if (!digitalRead(5) & !digitalRead(4) & !digitalRead(3) & !digitalRead(2))//0
  {
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, LOW);
  }
else if (!digitalRead(5) & !digitalRead(4) & !digitalRead(3) & digitalRead(2))//1
{
digitalWrite(13, HIGH);
digitalWrite(12, LOW);
digitalWrite(11, HIGH);
digitalWrite(10, LOW);
digitalWrite(9, LOW);
digitalWrite(8, LOW);
digitalWrite(7, LOW);
}
else if (!digitalRead(5) & !digitalRead(4) & digitalRead(3) & !digitalRead(2))//2
{
  digitalWrite(13, HIGH), digitalWrite(12, HIGH), digitalWrite(11, LOW), digitalWrite(10, HIGH), digitalWrite(9, HIGH), digitalWrite(8, LOW), digitalWrite(7, HIGH);
}
else if (!digitalRead(5) & !digitalRead(4) & digitalRead(3) & digitalRead(2))//3
{
  digitalWrite(13, HIGH), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, HIGH), digitalWrite(9, LOW), digitalWrite(8, LOW), digitalWrite(7, HIGH);
}
else if (!digitalRead(5) & digitalRead(4) & !digitalRead(3) & !digitalRead(2))//4
{
  digitalWrite(13, HIGH), digitalWrite(12, LOW), digitalWrite(11, HIGH), digitalWrite(10, LOW), digitalWrite(9, LOW), digitalWrite(8, HIGH), digitalWrite(7, HIGH);
}
else if (!digitalRead(5) & digitalRead(4) & !digitalRead(3) & digitalRead(2))//5
{
  digitalWrite(13, LOW), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, HIGH), digitalWrite(9, LOW), digitalWrite(8, HIGH), digitalWrite(7, HIGH);
}
else if (!digitalRead(5) & digitalRead(4) & digitalRead(3) & !digitalRead(2))//6
{
  digitalWrite(13, LOW), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, HIGH), digitalWrite(9, HIGH), digitalWrite(8, HIGH), digitalWrite(7, HIGH);
}
```

```
else if (!digitalRead(5) & digitalRead(4) & digitalRead(3) & digitalRead(2))//7
{
  digitalWrite(13, HIGH), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, LOW), digitalWrite(9, LOW), digitalWrite(8, LOW), digitalWrite(7, LOW);
}
else if (digitalRead(5) & !digitalRead(4) & !digitalRead(3) & !digitalRead(2))//8
{
  digitalWrite(13, HIGH), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, HIGH), digitalWrite(9, HIGH), digitalWrite(8, HIGH), digitalWrite(7, HIGH);
}
else if (digitalRead(5) & !digitalRead(4) & !digitalRead(3) & digitalRead(2))//9
{
  digitalWrite(13, HIGH), digitalWrite(12, HIGH), digitalWrite(11, HIGH), digitalWrite(10, HIGH), digitalWrite(9, LOW), digitalWrite(8, HIGH), digitalWrite(7, HIGH);
}
else
{
  digitalWrite(13, LOW), digitalWrite(12, LOW), digitalWrite(11, LOW), digitalWrite(10, LOW), digitalWrite(9, LOW), digitalWrite(8, LOW), digitalWrite(7, LOW);
}
}
```

D. Demonstration Video

Record and upload a video demonstrating the operation of the circuit.



Save the document as a *PDF* file and submit the *PDF* document to *Blackboard*.