

EE 2305 – Introduction to C Programming Hardware Project 03

Digital VU Meter

Project Features: Analog Input and Digital Output.

Program an Arduino board to accept an analog input voltage and display the magnitude of the voltage using a 10 LED display.

● ● ● ● ● ● ● ● ● ●
Input voltage = 0% of maximum (all LEDS off)

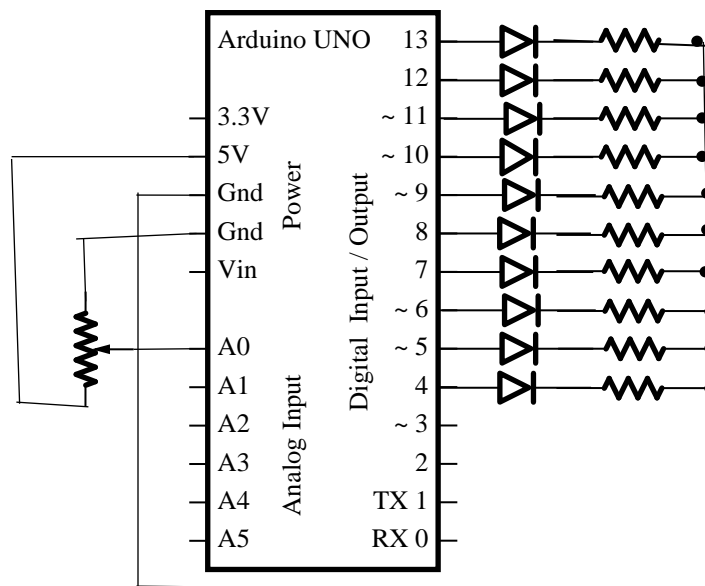
○ ○ ○ ● ● ● ● ● ● ●
Input voltage = 30% of maximum

○ ○ ○ ○ ○ ○ ○ ● ● ●
Input voltage = 70% of maximum

Document your program and include the following sections. 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.

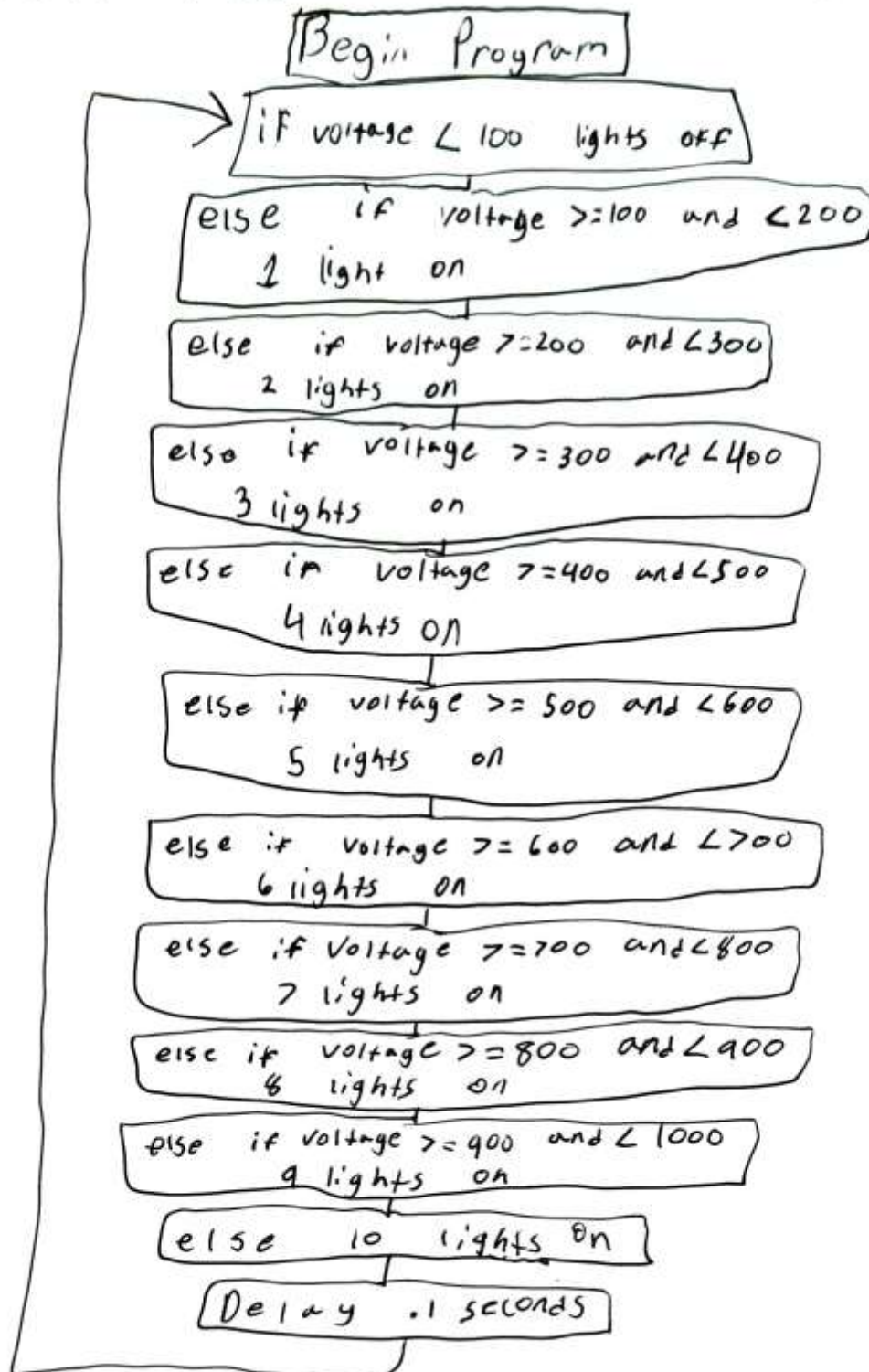


B. Program Flowchart:

Draw a flowchart of the program.

Hardware Project 3 Flow Chart

3/21/2024



C. Arduino Source Code

Insert the Arduino Source Code into the document.

```
sketch_mar21a$  
  
const int td = 10;  
int analogVoltage = 0;  
  
void setup()  
{  
  Serial.begin(9600);  
  pinMode (13, OUTPUT);  
  pinMode (12, OUTPUT);  
  pinMode (11, OUTPUT);  
  pinMode (10, OUTPUT);  
  pinMode (9, OUTPUT);  
  pinMode (8, OUTPUT);  
  pinMode (7, OUTPUT);  
  pinMode (6, OUTPUT);  
  pinMode (5, OUTPUT);  
  pinMode (4, OUTPUT);  
}  
void loop()  
{  
  analogVoltage = analogRead(A0);  
  Serial.print(analogVoltage);  
  
  Serial.print("\n");  
}
```

```
if(analogVoltage < 100)
{
    digitalWrite(13, LOW);
    digitalWrite(12, LOW);
    digitalWrite(11, LOW);
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
else if(analogVoltage >= 100 & analogVoltage < 200)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, LOW);
    digitalWrite(11, LOW);
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
```

```
else if(analogVoltage >= 200 & analogVoltage < 300)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, LOW);
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}

else if(analogVoltage >= 300 & analogVoltage < 400)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, LOW);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
```

```
else if(analogVoltage >= 400 & analogVoltage < 500)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, LOW);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
else if(analogVoltage >= 500 & analogVoltage < 600)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, LOW);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
```

```
else if(analogVoltage >= 600 & analogVoltage < 700)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
else if(analogVoltage >= 700 & analogVoltage < 800)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, HIGH);
    digitalWrite(6, LOW);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
```



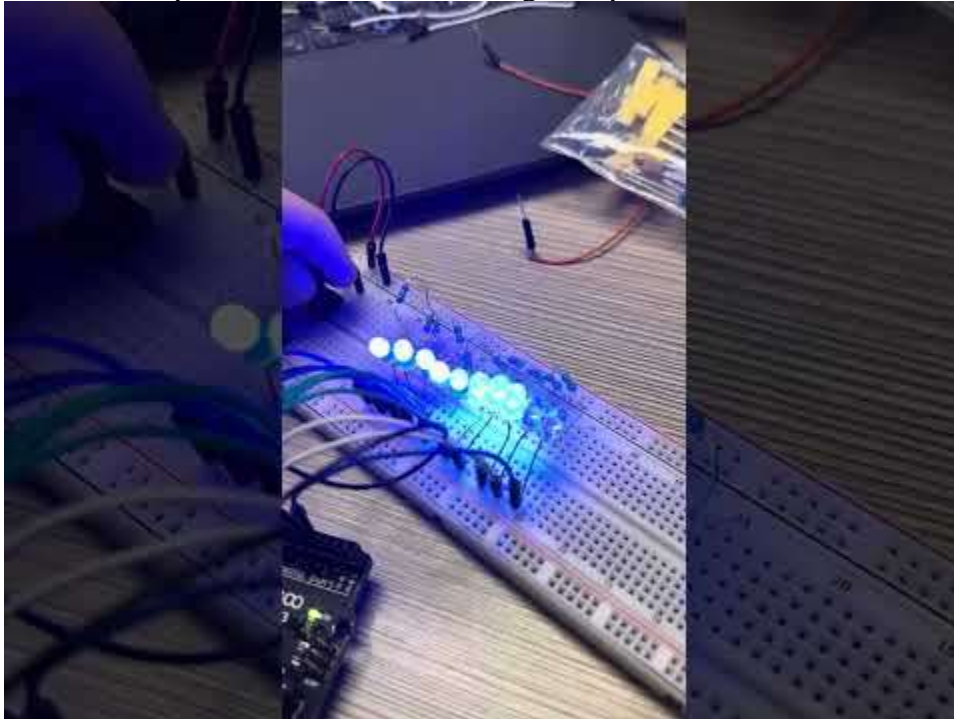
```
else if(analogVoltage >= 800 & analogVoltage < 900)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, HIGH);
    digitalWrite(6, HIGH);
    digitalWrite(5, LOW);
    digitalWrite(4, LOW);
}
else if(analogVoltage >= 900 & analogVoltage < 1000)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, HIGH);
    digitalWrite(6, HIGH);
    digitalWrite(5, HIGH);
    digitalWrite(4, LOW);
}
```

```
else if(analogVoltage >= 1000)
{
    digitalWrite(13, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(11, HIGH);
    digitalWrite(10, HIGH);
    digitalWrite(9, HIGH);
    digitalWrite(8, HIGH);
    digitalWrite(7, HIGH);
    digitalWrite(6, HIGH);
    digitalWrite(5, HIGH);
    digitalWrite(4, HIGH);
}

delay(td);
```

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*.