AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

Faculty of Engineering

LAB REPORT

Experiment Name:	Building a decade counter using Arduino Uno and a 7 segment display.

Experiment No:	8	Date of Submission:	25 March 2022
Course Title:	Microprocessor and Embedded Systems		
Course Code:	Click here to enter text.	Section:	F
Semester:	Spring 2021-22	Course Teacher:	**Dr. Nadia Anam**

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6			Choose an item.	
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FACULTYCOMMENTS	**Marks Obtained**	
	Total Marks	

Title:

Building a decade counter using Arduino Uno and a 7-segment display.

Introduction:

The objective of this experiment is to interface a 7-segment display with Arduino Uno.

Theory & Methodology:

Arduino is an open-source platform that may be used to make interactive electronics projects. Arduino is made up of a programmable microcontroller and IDE (Integrated Development Environment) software that runs on your computer and is used to create and upload computer code to the microcontroller board. To load new code into the board, the Arduino Uno does not require a hardware circuit (programmer/burner). Using a USB cord and the Arduino IDE (which utilizes a simplified version of C++ to create code), we can quickly load a code into the board.

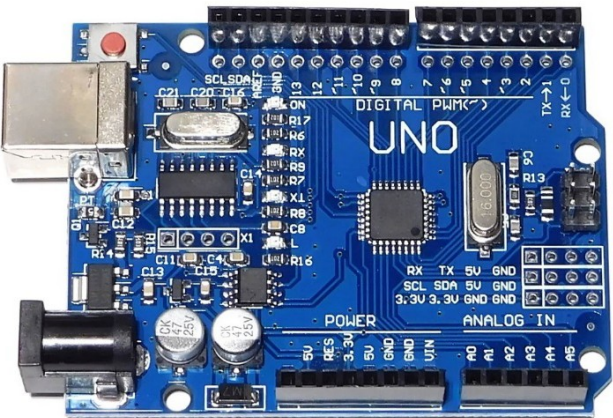**Pin configuration of the board (Arduino Uno R3)**
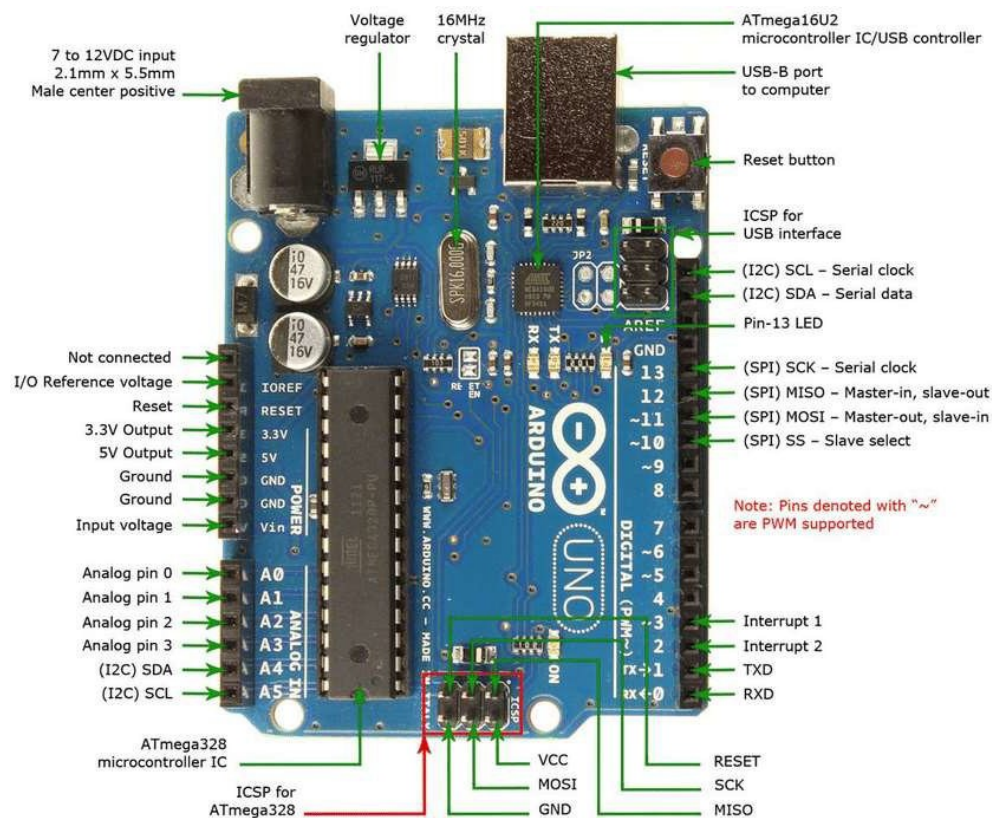
Basis of a 7 segment display:

A seven-segment display is made up of seven LEDs/segments that are all organized in the shape of the number "8." The majority of the segment display is made up of eight parts (with a dot at the right side of the digit representing the decimal point). The seven segments are called in alphabetical order, from "A" to "G," with "DP" representing the decimal point. And, much like a standard LED, each section may be controlled independently.
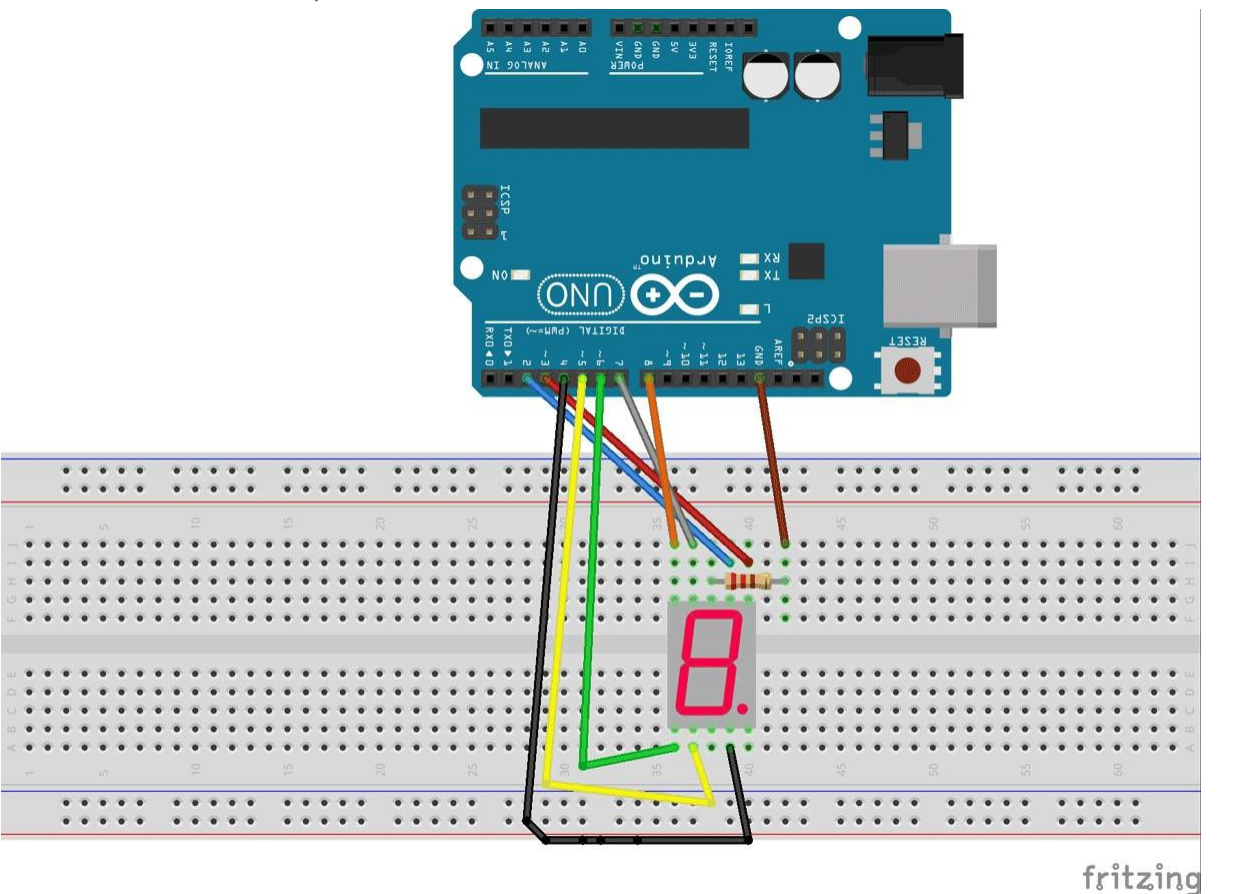

SSD Configuration
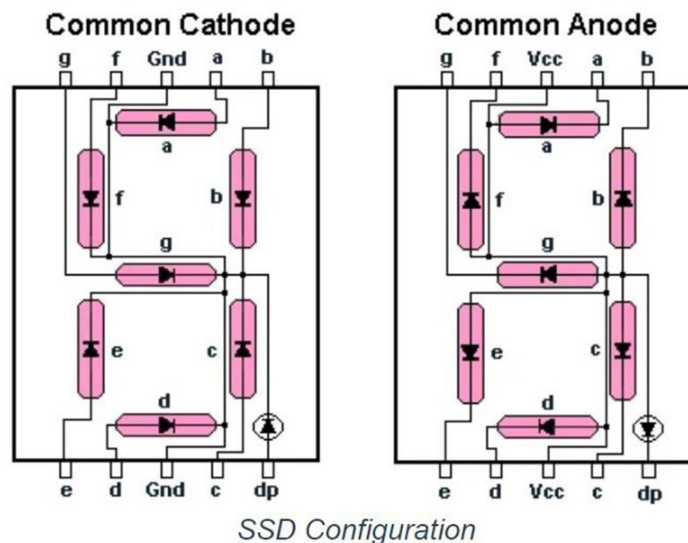
Apparatus:

1. Arduino IDE	(Any version of the software)
2. Arduino UNO R3	

3. 7 segment display (HDSP5503).	

Setting up the 7 segment display with the Arduino Uno board: (for common cathode)

Using Arduino IDE to write code:

```
#define segA 2
#define segB 3
#define segC 4
#define segD 5
#define segE 6
#define segF 7
#define segG 8
```

```
int COUNT=0; void setup()
{
for (int i=2;i<9;i++)
{
pinMode(i, OUTPUT);
}
}
void loop()
{
switch (COUNT)
{
  case 0:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE, HIGH);
digitalWrite(segF, HIGH);
digitalWrite(segG, LOW);
break;
case 1:
digitalWrite(segA, LOW);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, LOW);
digitalWrite(segE, LOW);
digitalWrite(segF, LOW);
digitalWrite(segG, LOW);
break;
case 2:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, LOW);
digitalWrite(segD, HIGH);
digitalWrite(segE, HIGH);
digitalWrite(segF, LOW);
digitalWrite(segG, HIGH);
break;
case 3:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE, LOW);
```

```
digitalWrite(segF, LOW);
digitalWrite(segG, HIGH);
break;
case 4:
digitalWrite(segA,  LOW);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD,  LOW);
digitalWrite(segE,  LOW);
digitalWrite(segF,  HIGH);
digitalWrite(segG, HIGH);
break;
case 5:
digitalWrite(segA, HIGH);
digitalWrite(segB, LOW);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE, LOW);
digitalWrite(segF, HIGH);
digitalWrite(segG, HIGH);
break;
case 6:
digitalWrite(segA, HIGH);
digitalWrite(segB,  LOW);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE,  HIGH);
digitalWrite(segF,  HIGH);
digitalWrite(segG, HIGH);
break;
case 7:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, LOW);
digitalWrite(segE, LOW);
digitalWrite(segF, LOW);
digitalWrite(segG, LOW); break;
case 8:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE, HIGH);
```

```
digitalWrite(segF,  HIGH);
digitalWrite(segG, HIGH);
break;
case 9:
digitalWrite(segA, HIGH);
digitalWrite(segB, HIGH);
digitalWrite(segC, HIGH);
digitalWrite(segD, HIGH);
digitalWrite(segE, LOW);
digitalWrite(segF, HIGH);
digitalWrite(segG, HIGH);
break;
break;
}
if (COUNT<10)
{
COUNT++; delay(1000);
}
if (COUNT==10)
{
COUNT=0; delay(1000);
}
}
```
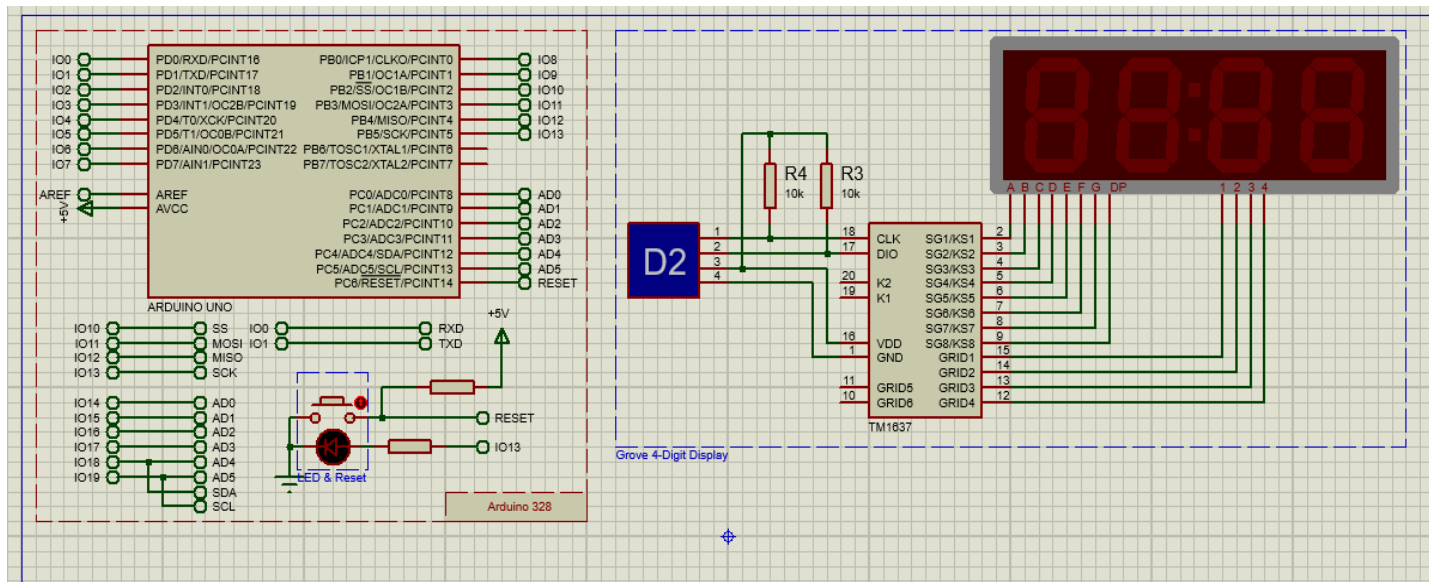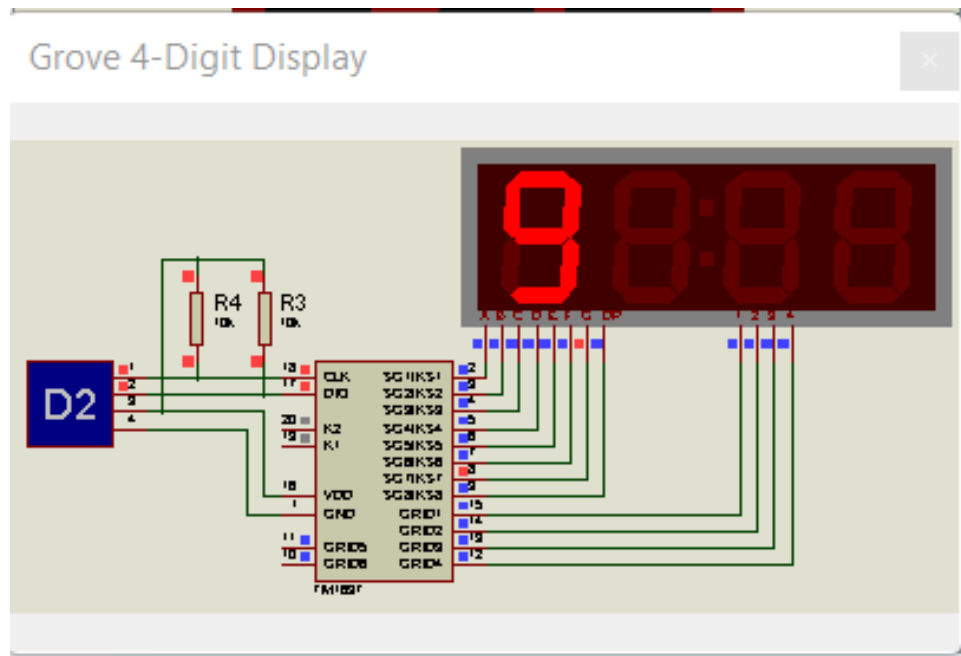
Flowchart:
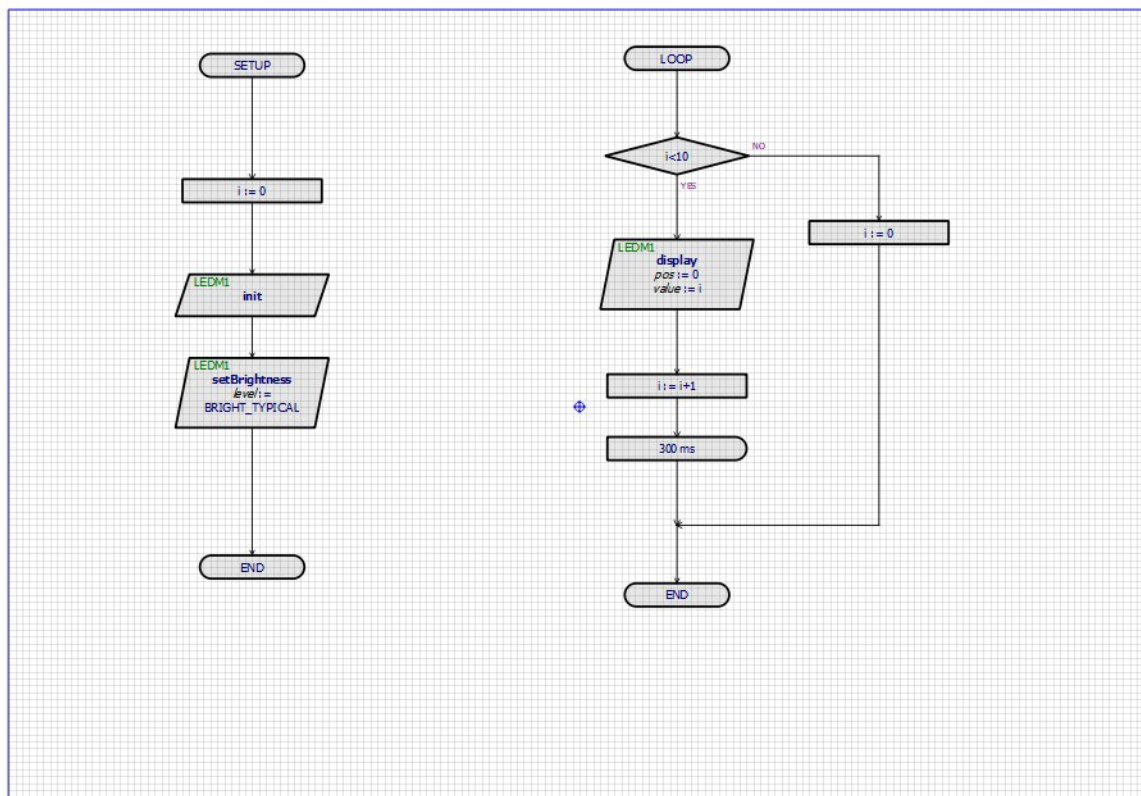
Schematic:

Simulation:

Discussion:

In this work, the Arduino UNO was used to acquaint the microcontroller and a 7-segment diplsay was used to develop a decade counter. Our course teacher outlined the entire procedure, so we have applied it with a minimum of effort.

We had a few issues with adding various libraries to the proteus program while working on the project, but with the support of our course teacher, we were able to add our library and complete the project successfully.

Reference(s):

1. https://www.arduino.cc/.
2. HDSP5503 Datasheet.