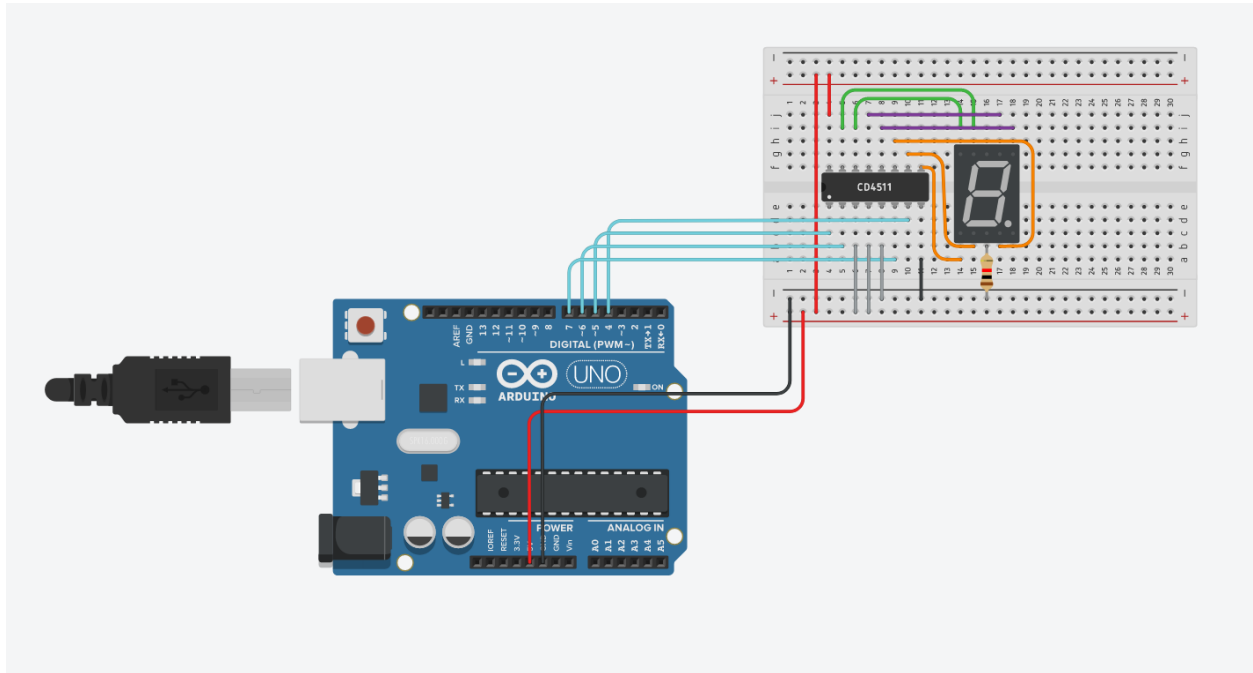# LAB REPORT 7

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(Date) 4/17

Screenshot + components:

segment display: a display with 7 LEDs that can show numbers and some characters.
segment decoder: simplifies the programming of a segment display by only having to use 4 pins instead of 7.

Summary:

The purpose of this lab was to display numbers 0 to 9 in a segment display using an arduino, resistor and segment decoder. Making the circuit was overall simple as all I had to do was to copy the one shown in the instructions. After putting all the wires and parts in the correct places I then moved on to the code. My first attempt was to just use a brute force method where I would have an if statement for each number to display. However, I decided to instead convert the numbers into binary and then use each bit to make the appropriate decoder. This made the code much more simplified and worked just as good as the brute force method.

Results:
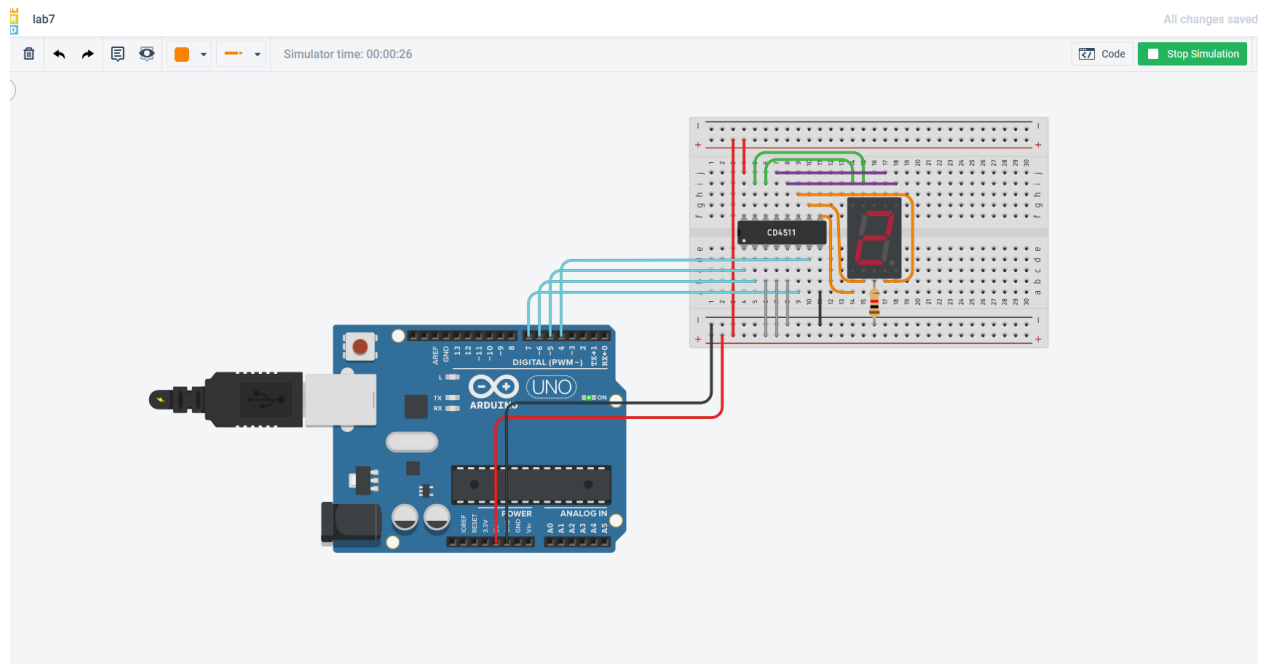
Conclusions:

I learned that a segment display could be programmed more efficiently using a segment decoder. I learned that a segment display has 7 LEDS.

The main mistake that I did was when I was trying to write a universal approach for the coding part. I had to do a bit of trial and error when using the binary bits of the numbers to make the decoder for them. Eventually I was able to figure it out.

Code:

```
int bits[] = {4,5,6,7}; //bit zero is bits[0]

void setup()
{
   Serial.begin(9600);
   for(int i = 4; i<= 7; i++) {    //initalize pins [4,7]
         pinMode(i, OUTPUT);
   }
}

void loop()
{
   for(int i = 0; i < 10; i++) {    // displaying numbers 0 to 9
         int b[4];                                          // store HIGH or LOW
         int index = 0;
         int r, d;                                          // remainder, dividend
         d = i;
         while (index != 4) {                 // loop through # of bits
         r = d % 2;                                      // get remainder & set HIGH or LOW
         if (r == 1) {
         b[index] = HIGH;
         }
         else {
         b[index] = LOW;
         }
         d = d / 2;                                      // new dividend
         index++;                                        // increase index
         }
         for (int j = 0; j < 4; j++) {    // display numbers
         digitalWrite(bits[j], b[j]);
         }

/* here you will need to add logic to figure out what bits to turn on and off
 * refer to the table in the instructions to know what bits to turn on and off*/

/* example of turning 0 bit on : digitalWrite(bits[0], HIGH);
 * example of turning 0 bit off: digitalWrite(bits[0], LOW ); */


         delay(500); //1/2 a second delay so that we can see the numbers changing
   }
}
```

Rubric:

Each lab is graded out of 10. Labs are due at midnight a week after they are assigned. Labs turned in late receive a max of 7 points:

Item	Points worth
Code correctness	3
Submission form correct	3
Report contains accurate information	2
Some effort put into report*	2

*No answer is too short to properly address the lab report section and I can tell you tried at least just a little.