Microprocessor Systems and Interfacing

Lab Report

Lab03

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Class	Microprocessor Systems and Interfacing CPE342 (**BCE-6B**)
Instructor's Name	Dr. Omer Ahmad

Pre-Lab Tasks

Task-1

Students are required to read the theory section in detail. They are encouraged to address any queries with regards to the theory during your theory session.

Task-2

Please fill out the following table, explaining what each value for DDRx means.

#	DDRx	Meaning
1	DDRB = 0b1010 1010	Pins 0, 2, 4 and 6 of port B will be inputs while pins 1, 3, 5 and 7 will act as outputs
2	DDRD = 255 0b11111111	Pins 0,1,2,3,4,5,6,7 all are set as output.
3	DDRB = 0x0B 0b00001011	Pins 0,1,3 are set as output and pins 2,4,5,6,7 are set as input.
4	DDRD = 0x45 0b01000101	Pins 0,2,6 are set as output and pins 1,3,4,5,6 are set as input.
5	DDRC = 45 0b00101101	Pins 0,2,3,5 are set as output and pins 1,4,6,7 are set as input.
6	DDRB = 0b1100 0110	Pins 0,3,4,5 are set as input and pins 1,2,6,7 are set as output.

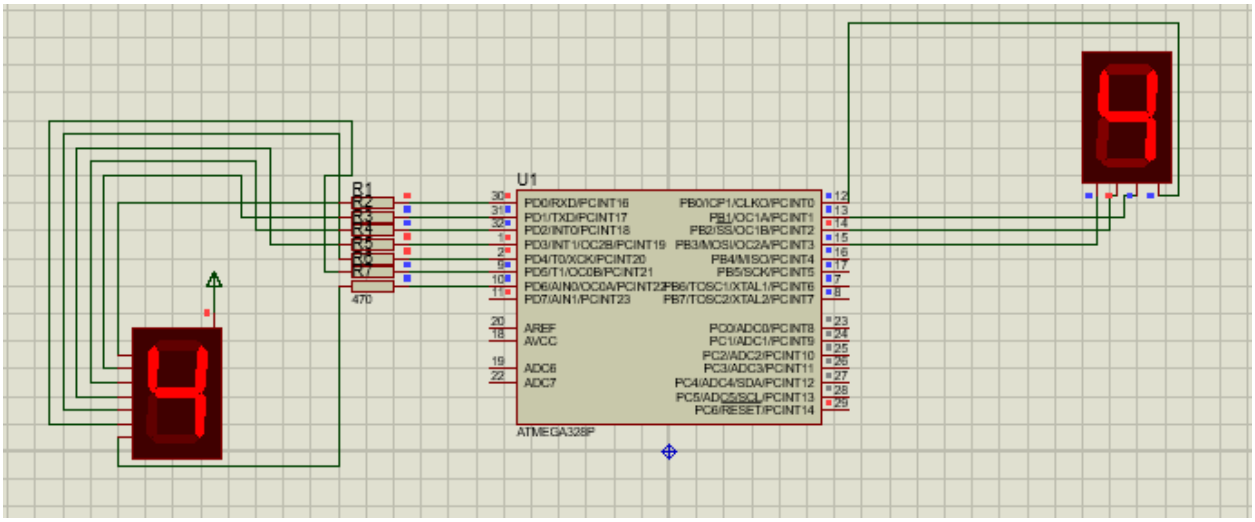
Task-3

Imagine a 7-segment display is connected to 8 pins of Port-B of an ATmega328p. The students are required to complete the contents of the following look-up table so that the numbers mentioned in the table are displayed. The task may be completed on the manual itself.

Digit to be displayed	H	G	F	E	D	C	B	A	
	PB7	**PB6**	**PB5**	**PB4**	**PB3**	**PB2**	**PB1**	**PB0**	**Hex**
0	1	1	0	0	0	0	0	0	0xC0
1	1	1	1	1	1	0	0	1	0xF9
2	1	0	1	0	0	1	0	0	0xA4
3	1	0	1	1	0	0	0	0	0xB0
4	1	0	0	1	1	0	0	1	0x99
5	1	0	0	1	0	0	1	0	0x92
6	1	0	0	0	0	0	1	0	0x82
7	1	1	1	1	1	0	0	0	0xF8
8	1	0	0	0	0	0	0	0	0x80
9	1	0	0	1	0	0	0	0	0x90

Task-4

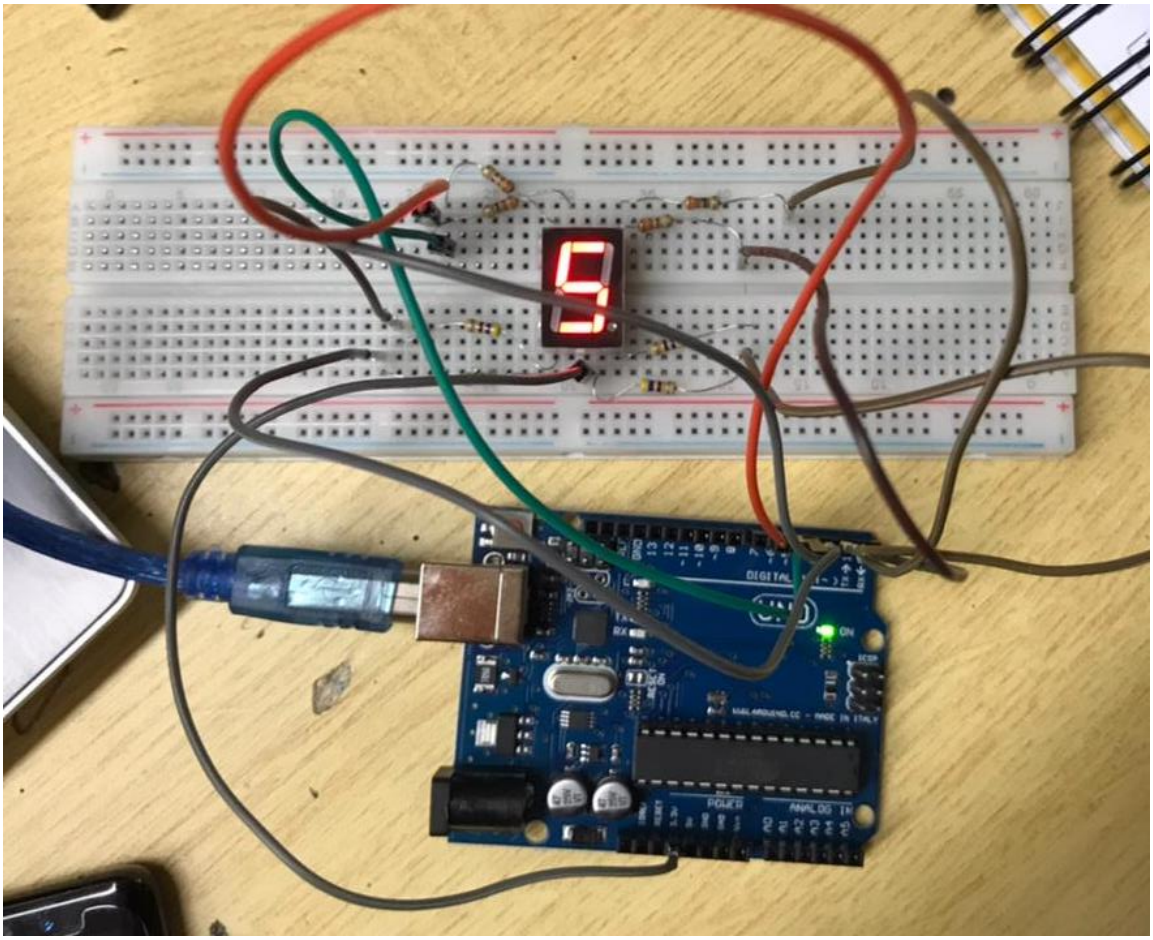
Once the code in Task-3 is up and running, the students are required to simulate it in Proteus after connecting 2 7-Segment displays to your ATmega328p as shown in Figure 3.7.



In Lab Tasks

Task 1:

In this task we made our circuit on the breadboard, we used PORTD and GND of Arduino Uni, the picture is given below.



Post Lab Tasks

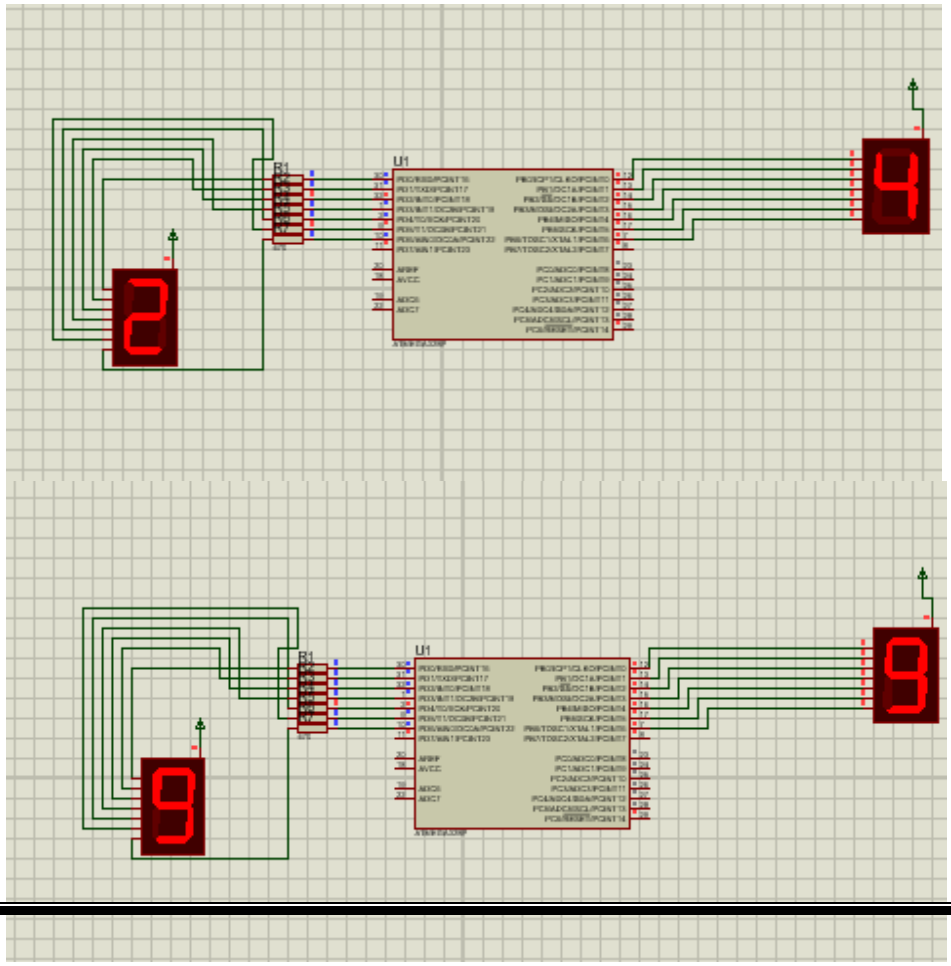
Task 1:

In this task, first I made the circuit on proteus and upon successful simulation I implemented the circuit on breadboard.

In the code I have used a simple nested for loop, both the inner and outer loops go from 0-9 respectively, for each value of outer loop the inner loop completes 0-9.

Port D is controlled through inner nested loop and Port C (In simulation I used PortB but on Arduino I used PortC) through outer nested for loop.

Simulation:



Code:

```
int main(void){

    DDRC=0xFF;
    DDRD=0xFF;

    unsigned char lookUpTable[10]={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90};

    while(1) {  // Infinite loop; define here the

        for(int i=0; i<10;i++)
        {
            PORTC=lookUpTable[i];
        for(int j=0;j<10;j++)
        {
            PORTD= lookUpTable [j];
        _delay_ms(400);

        }
        }
    }
    return 0;
}
```

Circuit: (I used PortC and PortD)