

Embedded Systems Project

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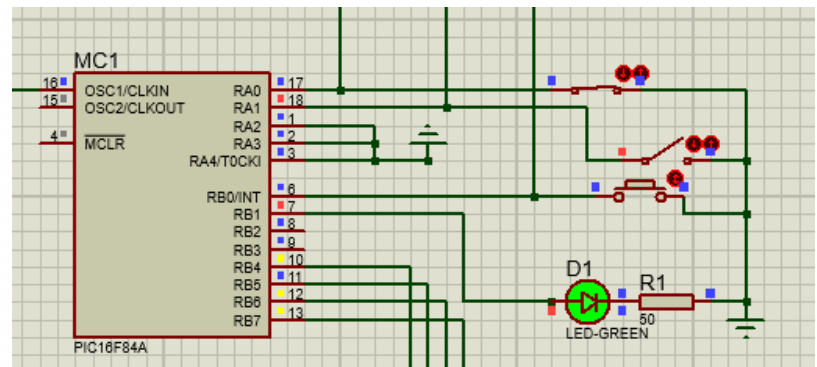
DR. Iyad Jafar



MC 1

We connected the 2 switches to RA0/RA1 and the Button to RB0, when the button is pushed an interrupt happens which means that the microcontroller will go from state 1 to state 2 and start sending the output of RB4-RB7 of MC1 to RA0-RA3 of MC2.

Firstly, we configured the input and output of each port (A/B) then we enabled the external interrupt flag and the global interrupt and then we set the LED to ON while its in state 1. Then we test if the State is = 0, if it's not flashing this means that there was no interrupt that happened to change the state, if an interrupt happened then the ISR will flip the state to 1, then we call a delay so the flashing can be for 0.5 seconds, after that we call the lookup table to get the value depending on the switches set, and finally we save the values in the memory using indirect accessing.



We used the subroutine method to create a time delay of 0.5 seconds for MC1.

Switches	Output
OFF OFF	0011
OFF ON	1001
ON OFF	0110
ON ON	1100

And according to this table the input to RA0-RA3 to MC2 is the one that decides between turning on the ODD or EVEN number of LEDs.

MC2

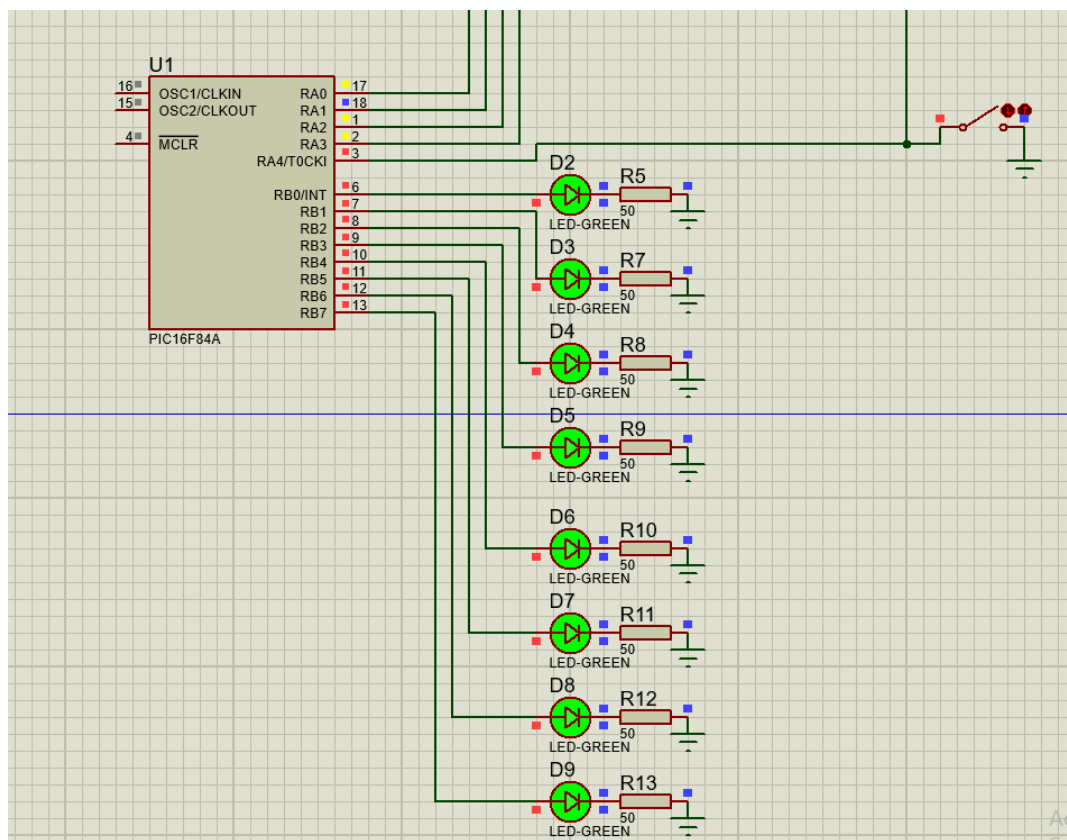
In state 1 of MC2 when the switch is 0 MC2 will read from the ports RA0-RA4. We firstly configured the inputs and outputs of MC2 for each port, we initialized EVEN and ODD as numbers so we can move them to the port when needed, we checked for the most significant bit in the RA inputs, if its set then this means the number is larger than 7 which means that the EVEN numbered bits should light up. Then we call the 0.25 delay and the OFF number so it can start flashing.

```
BTFSS PORTA,3  
MOVLW ODD
```

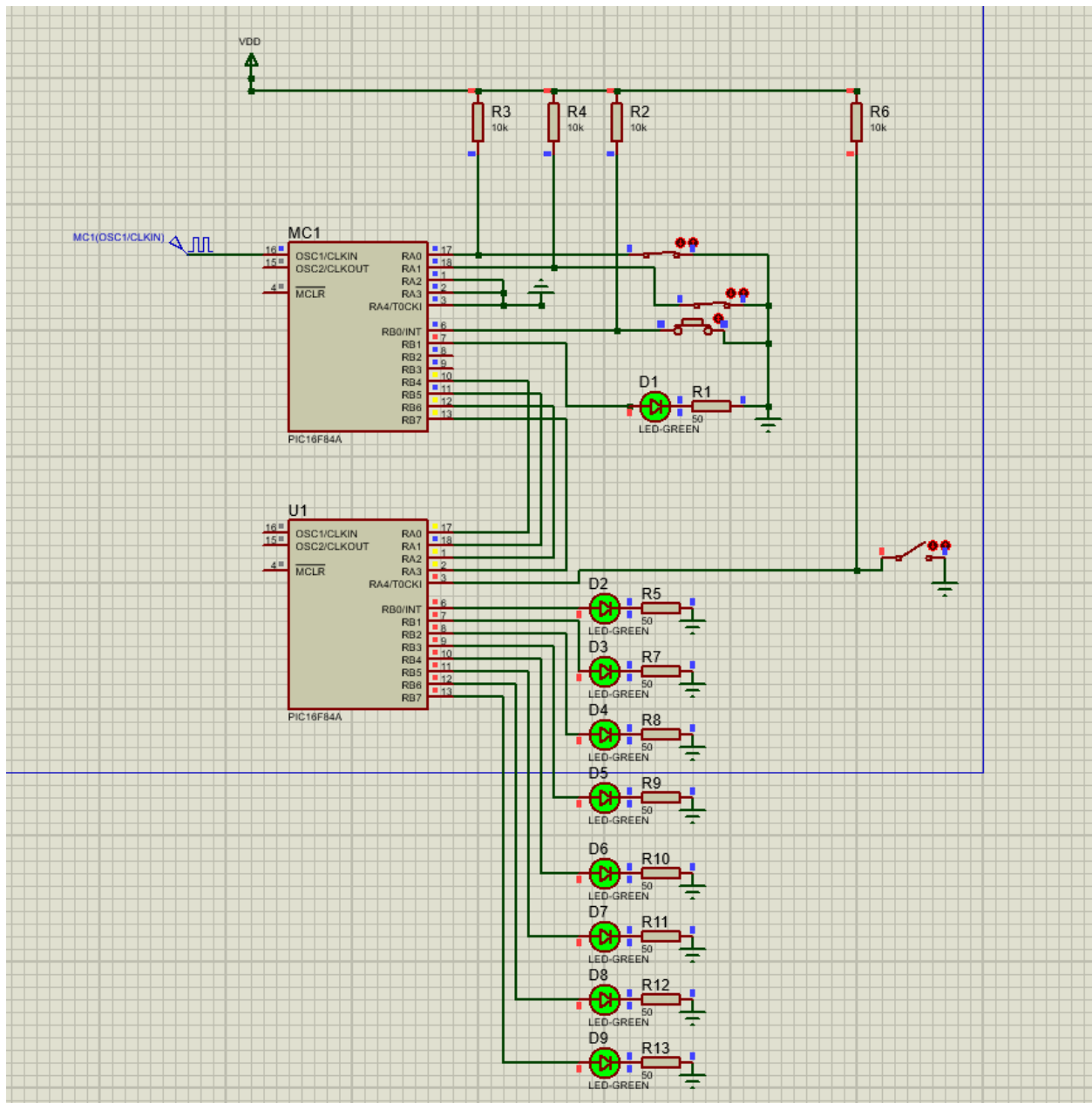
```
BTFSC PORTA,3  
MOVLW EVEN
```

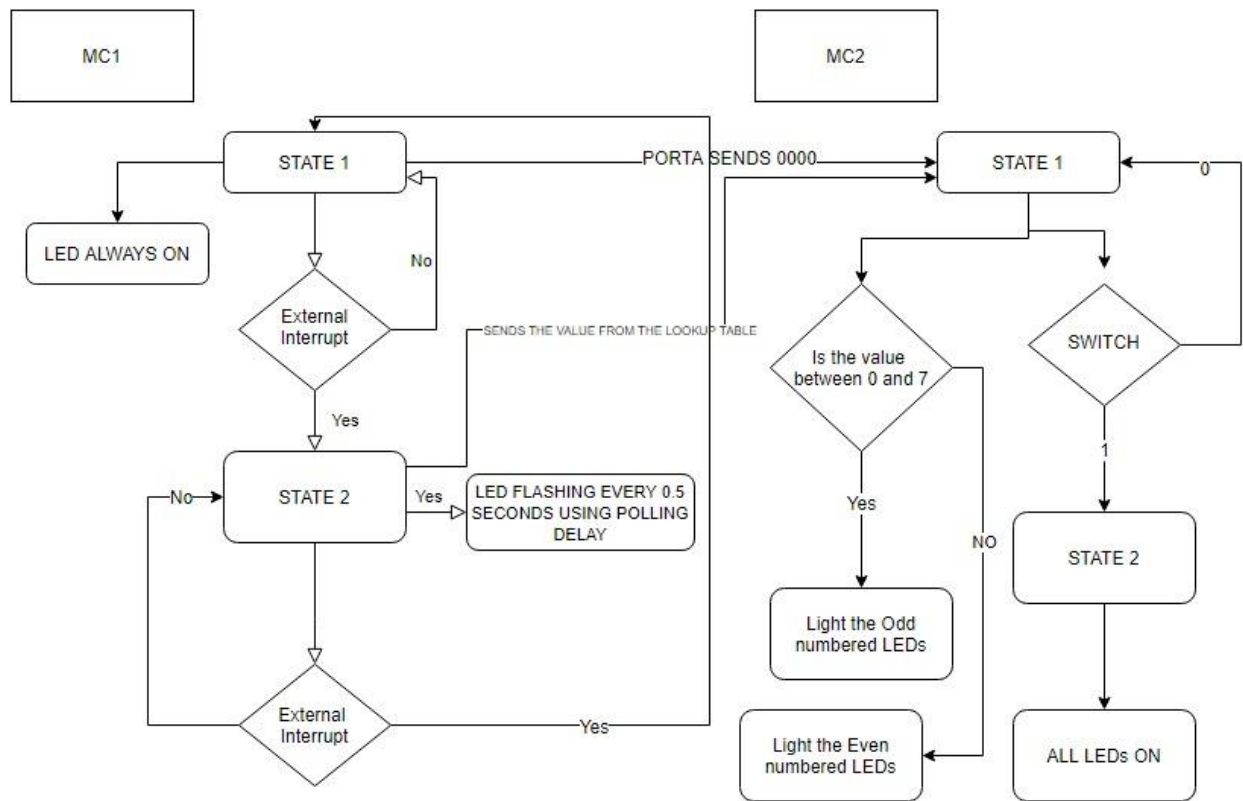
In state 2 of MC2 when the switch is 1 then all the LEDs will light up all the time unless we change the switch.

We used the subroutine method to create a time delay of 0.25 seconds for MC2.



The Final Circuit and The Flowcharts





THE END