BECS 31421
EXPERIMENT 03

DATE 4/4/2024

Microcontroller-Implemented LED Chaser

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Source Code

```
void knightrider(void){

       int i;
       TRISB = 0x00;
       PORTB=0x01;
       for( i =1 ; i<=7 ;i++){
         PORTB = (PORTB <<1);
         Delay_ms(100);
       }
       for( i =7 ; 7>=i ;i--){
         PORTB = (PORTB >>1);
         Delay_ms(100);
       }
}
void main(){

     CMCON = 0x07;
     TRISA = 0xff;
     while(1)
     knightrider();
}
```


```
void knightrider(void) {

       int i;
       TRISB = 0x00;
       PORTB=0x01;
       for( i =1 ; i<=7 ;i++){
         PORTB = (PORTB <<1);
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}

void main(){

     CMCON = 0x07;
     TRISA = 0xff;
     while (1)
     knightrider();
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```

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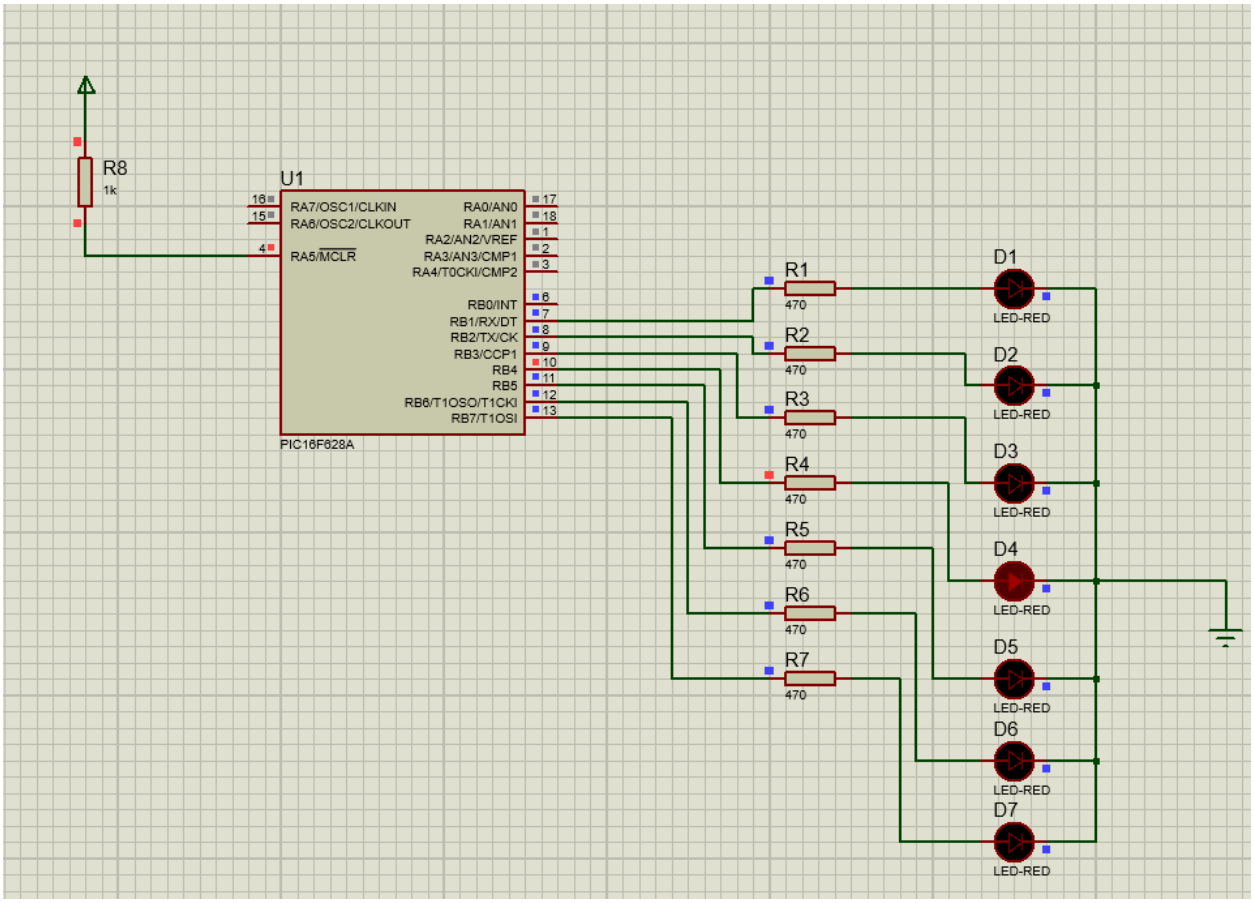
Circuit



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Discussion

The LED chaser circuit implemented using a microcontroller demonstrates fundamental embedded system concepts such as timing control, digital output, and loop iteration. The code utilizes a for loop with an integer variable i to shift a single high bit across PORTB, creating a visual scanning effect across eight LEDs. The Delay_ms(100) function introduces a 100 ms delay between each LED transition, making the motion visually perceivable and aesthetically pleasing. The use of bitwise shifting operations (<< and >>) efficiently manipulates LED positions without complex logic. However, a logical flaw exists in the reverse loop condition for(i = 7; 7 >= i; i--), which does not execute due to the condition being false at the start. Correcting this to i >= 1 ensures complete back-and-forth motion. The initialization steps, such as setting TRISB = 0x00 and disabling the comparator module with CMCON = 0x07, are crucial for proper pin configuration and to prevent unexpected behavior.