EE2016 Experiment-5

Group-3 EE23B027, EE23B033, EE23b039

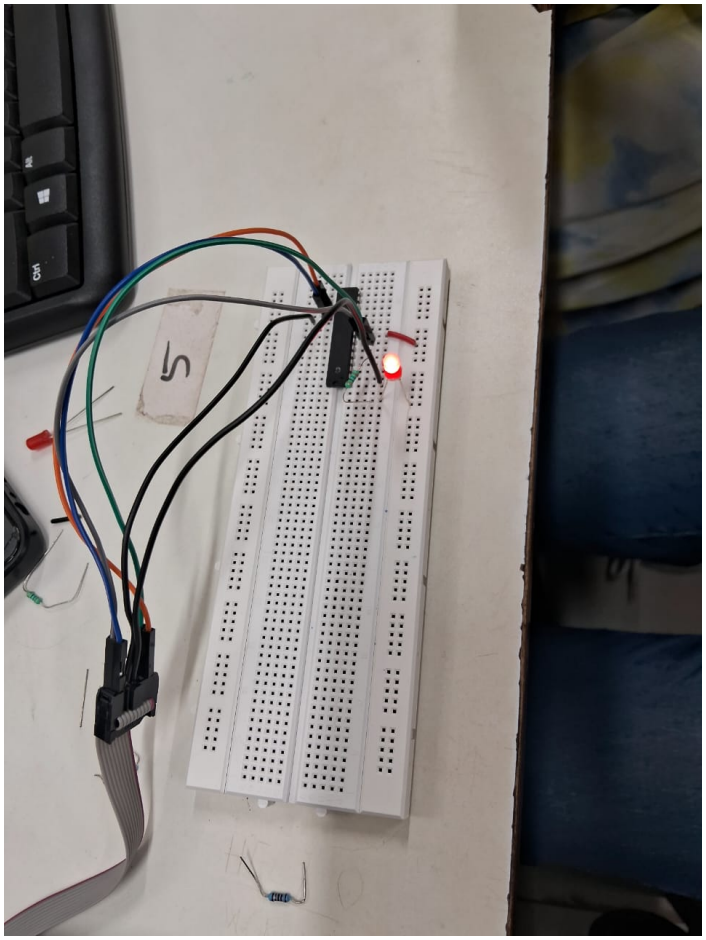
Task 3

To Turn LED permanently connected at PORTD

```
#include <avr/io.h>


int main (void)
{
DDRD = 0x01;
PORTD = 0x01;
while(1){}
}
```

Debugging



Task 4

To cause the LED to blink with about 1 second gap

```
#include <avr/io.h>
#include <util/delay.h>
int main (void)
```

```
{ DDRD = 0x01;
while (1) {
PORTD = 0x01;
_delay_ms(1000);
PORTD = 0x00;
_delay_ms(1000); }
}
```

Task 5

To make the two LEDs connected at PORTD blink alternately

```
#include <avr/io.h>
#include <util/delay.h>
int main (void)
{ DDRD = 0x03;
while (1) {
PORTD = 0x01;
_delay_ms(1000);
PORTD = 0x02;
_delay_ms(1000);
}
}
```

Task 6

To make the two LEDs produce the following sequence: 00, 01, 10, 11, 00, ...

```
#include <avr/io.h>
#include <util/delay.h>
int main (void)
{ DDRD = 0x03;
while (1) {
PORTD = 0x00;
_delay_ms(1000);
PORTD = 0x01;
_delay_ms(1000);
PORTD = 0x02;
_delay_ms(1000);
PORTD = 0x03;
_delay_ms(1000);
}
}
```

Task 7

2 bit number addition and result representation in LED

```
#include <avr/io.h>
#include <util/delay.h>
int main (void)
{ DDRD = 0x03;
   uint8_t A = 0x01;
   uint8_t B = 0x03;
   uint8_t result = A + B;
   PORTD = result;
while (1) {}
}
```

Task 8

3 bit Johnson Counter

```
#include <avr/io.h>
#include <util/delay.h>

#define BITS 4
Johnson counter
#define DELAY_TIME 500

int main(void) {
    DDRD = 0xFF;

    unsigned int johnson_counter = 0;

    while (1) {
        for (int i = 0; i < (2 * BITS); i++) {
            PORTD = johnson_counter;
            _delay_ms(DELAY_TIME);


            johnson_counter = ((johnson_counter << 1) | (~(johnson_counter >> (BITS - 1)) & 1)) & ((1 << BITS) -
                 1);
        }
    }

    return 0;
}
```

Task 9

Changing from PORTD to PORTC

```
//Task 7
#include <avr/io.h>
#include <util/delay.h>
int main (void)
{ DDRC = 0x03;
   uint8_t A = 0x01;
   uint8_t B = 0x03;
   uint8_t result = A + B;
   PORTC = result;
while (1) {}
}
```

```
//Task 8
#include <avr/io.h>
#include <util/delay.h>

#define BITS 4
#define DELAY_TIME 500

int main(void) {
    DDRC = 0xFF;

    unsigned int johnson_counter = 0;

    while (1) {
        for (int i = 0; i < (2 * BITS); i++) {
            PORTC = johnson_counter;
            _delay_ms(DELAY_TIME);


            johnson_counter = ((johnson_counter << 1) | (~(johnson_counter >> (BITS - 1)) & 1)) & ((1 << BITS) -
                 1);
        }
    }

    return 0;
}
```

Task 10

Add two 4 bit number and output represented on LED

```
#include <avr/io.h>
#include <util/delay.h>
int main (void)
{ DDRC = 0x1F;
   uint8_t A = 0x08;
   uint8_t B = 0x09;
   uint8_t result = A + B;
   PORTC = result;
while (1) {}
}
```

Errors and Corrections

While doing the experiment the error we faced is the reduced brightness of LED which was corrected by changing the Voltage of USBASP from 3.3V to 5V