Interfacing button with MSP430 microcontroller and polling based Night rider
Lab03

Spring 2025

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Class Section: **A**

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Mohsin Sajjad

Student Signature: ______________

Submitted to:

Engr. Faheem Jan

Month Day, Year (02 03, 2025)

Department of Computer Systems Engineering

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LAB No 3

TASKS:

TASK1:

write a program which monitor a switch if it is pressed then toggle LED attach with P1.0

CODE:

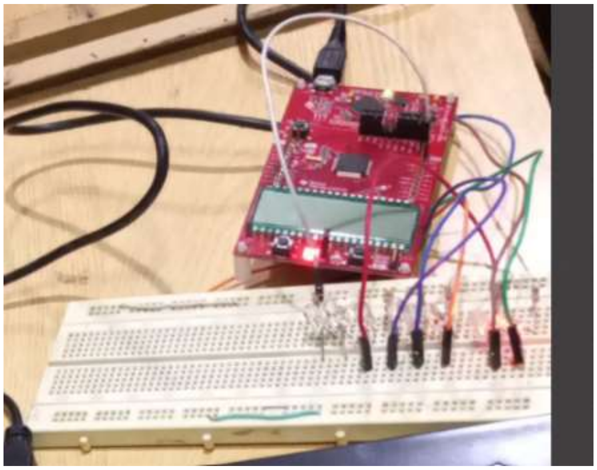
```
int main(void) {
    WDTCTL = WDTPW | WDTHOLD;   // Stop watchdog timer
    PM5CTL0 &= ~LOCKLPM5;       // Enable GPIOs


    P1DIR |= 0x01;              // Set P1.0 as output (LED)
    P1DIR &= ~0x04;             // Set P1.2 as input (Switch)
    P1OUT |= 0x04;              // Pull-up resistor on P1.2
    P1REN |= 0x04;              // Enable resistor on P1.2


    while(1) {
        if (!(P1IN & 0x04)) {   // If switch is pressed mean condition P1.2 goes low and condtion will
true
            P1OUT ^= 0x01;      // Toggle LED on P1.0
            __delay_cycles(100000);


        }
    }
}
```

OUTPUT:



TASK2: write a program which monitor a switch if it is not pressed then toggle LED attach with P1.0 if it is pressed then stop toggling.

#include <msp430.h>

CODE:

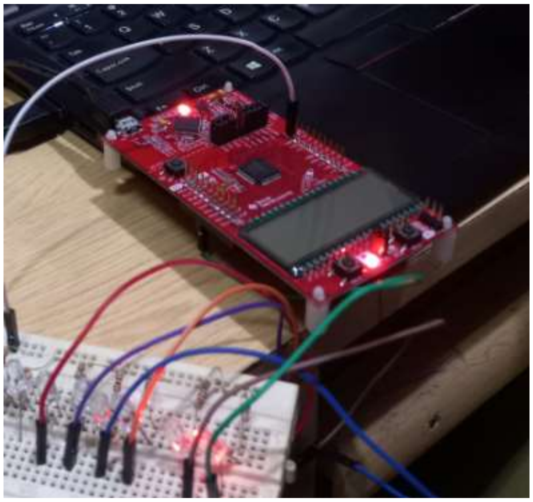
```
#include <msp430.h>


int main(void) {
    WDTCTL = WDTPW | WDTHOLD;   // Stop watchdog timer
    PM5CTL0 &= ~LOCKLPM5;       // Enable GPIOs


    P1DIR |= 0x01;              // Set P1.0 as output (LED)
    P1DIR &= ~0x04;             // Set P1.2 as input (Switch)
    P1OUT |= 0x04;              // Pull-up resistor on P1.2
    P1REN |= 0x04;              // Enable resistor on P1.2


    while(1) {
        if (P1IN & 0x04) {      // If switch is NOT pressed mean P1.2 will high
            P1OUT ^= 0x01;      // Toggle LED on P1.0
            __delay_cycles(100000); // Toggle speed
        }
    }
}
```

OUTPUT:



TASK3: write a program which monitor a switch if the switch is pressed the LED if on should off and if off should ON.

#include <msp430.h>

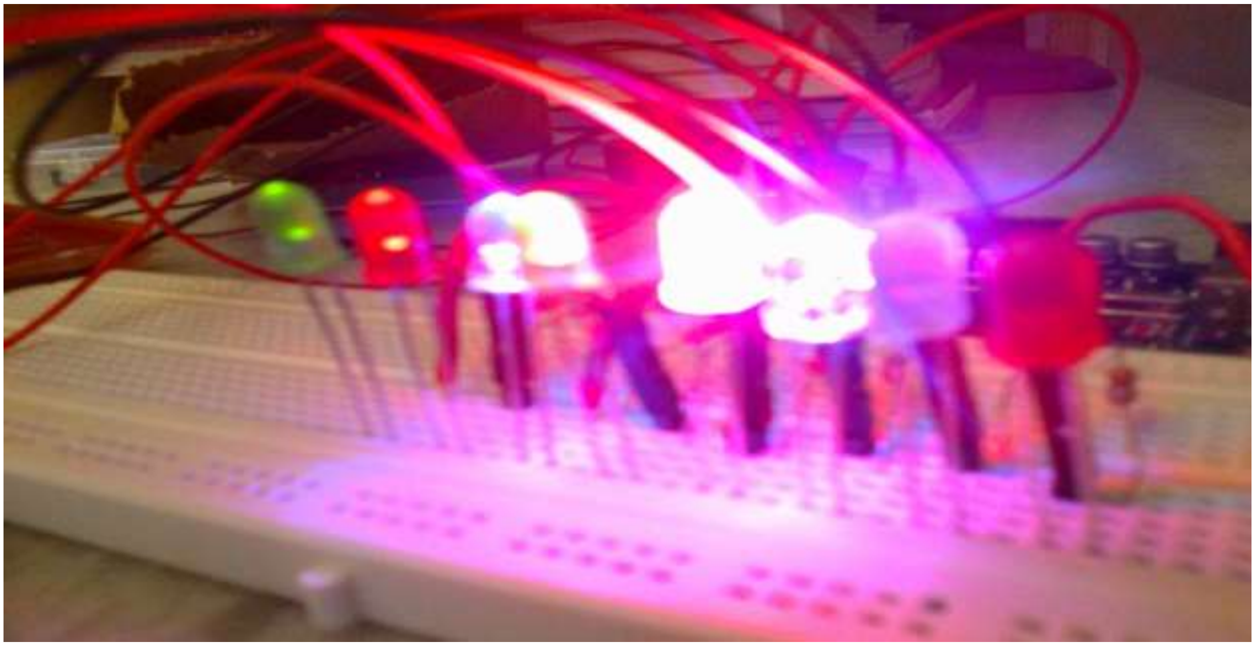
CODE:

```
int main(void) {
    WDTCTL = WDTPW | WDTHOLD;   // Stop watchdog timer
    PM5CTL0 &= ~LOCKLPM5;       // Enable GPIOs

    P1DIR |= 0x01;              // Set P1.0 as output (LED)
    P1DIR &= ~0x04;             // Set P1.2 as input (Switch)
    P1OUT |= 0x04;              // Pull-up resistor on P1.2
    P1REN |= 0x04;              // Enable resistor on P1.2

    while(1) {
        if (!(P1IN & 0x04)) {   // If switch is pressed
            P1OUT ^= 0x01;      // Toggle LED on P1.0
            while (!(P1IN & 0x04)); // Wait for switch release
            __delay_cycles(100000); // Debounce delay
        }
    }
}
```

OUTPUT:



TASK4: Write a program which monitors a switch. If it is not pressed, then toggle the LED attached with P1.0. If it is pressed, then stop toggling.

CODE:

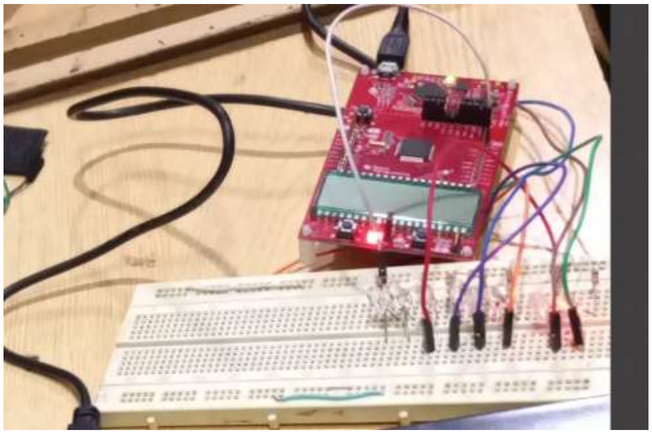
```
#include <msp430.h>


int main(void) {
    WDTCTL = WDTPW | WDTHOLD;   // Stop watchdog timer
    PM5CTL0 &= ~LOCKLPM5;       // Enable GPIOs


    P1DIR |= 0x01;              // Set P1.0 as output (LED)
    P1DIR &= ~0x04;              // Set P1.2 as input (Switch)
    P1OUT |= 0x04;             // Pull-up resistor on P1.2
    P1REN |= 0x04;             // Enable resistor on P1.2


    while(1) {
        if (P1IN & 0x04) {      // If switch is NOT pressed
            P1OUT ^= 0x01;      // Toggle LED on P1.0
            __delay_cycles(100000);
        }
        // If the switch is pressed, do nothing (stop toggling)
    }
}
```

OUTPUT:



Task 05:

NIGHT RIDER

CODE:

```
#include <msp430.h>


int main(void) {
    WDTCTL = WDTPW | WDTHOLD;  // Stop watchdog timer
    PM5CTL0 &= ~LOCKLPM5;
    P8DIR |= 0xFF;             // Set all 8 pins of Port 8 as output
    P1DIR &= ~0x04;            // Set P1.2 as input (Switch)
    P8OUT = 0x00;              // Start with all LEDs off
    P1REN |= 0x04;             // Enable pull-up resistor on P1.2
    P1OUT |= 0x04;             // Pull-up resistor active

    unsigned char pattern = 0x01;  // Start with the first LED

    while (1) {
        if (!(P1IN & 0x04)) {      // If switch is pressed
            __delay_cycles(100000);  // Debounce delay
            P8OUT = pattern;       // Turn on current LED
            __delay_cycles(100000); // Blink delay
            P8OUT = 0x00;          // Turn off all LEDs
            __delay_cycles(100000); // Off delay
            pattern <<= 1;         // Shift pattern to the next LED

            if (pattern == 0x00) { // If pattern goes beyond P8.7
                pattern = 0x01;    // Reset to the first LED
            }
        } else {
            P8OUT = 0x00;          // Turn off all LEDs when switch is not pressed
        }
    }

    return 0;
}
```

Output: