Experiment No: 07

BECS 31421

IMPLEMENTING A PIC MICROCONTROLLER-BASED QUIZ BUZZER

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DISCUSSION

In this lab, we implemented a buzzer game using the PIC16F628A microcontroller. The goal was to detect the first button press among players and activate a buzzer and LED to indicate the winner. Once triggered, the system locked further inputs until a reset button was pressed.

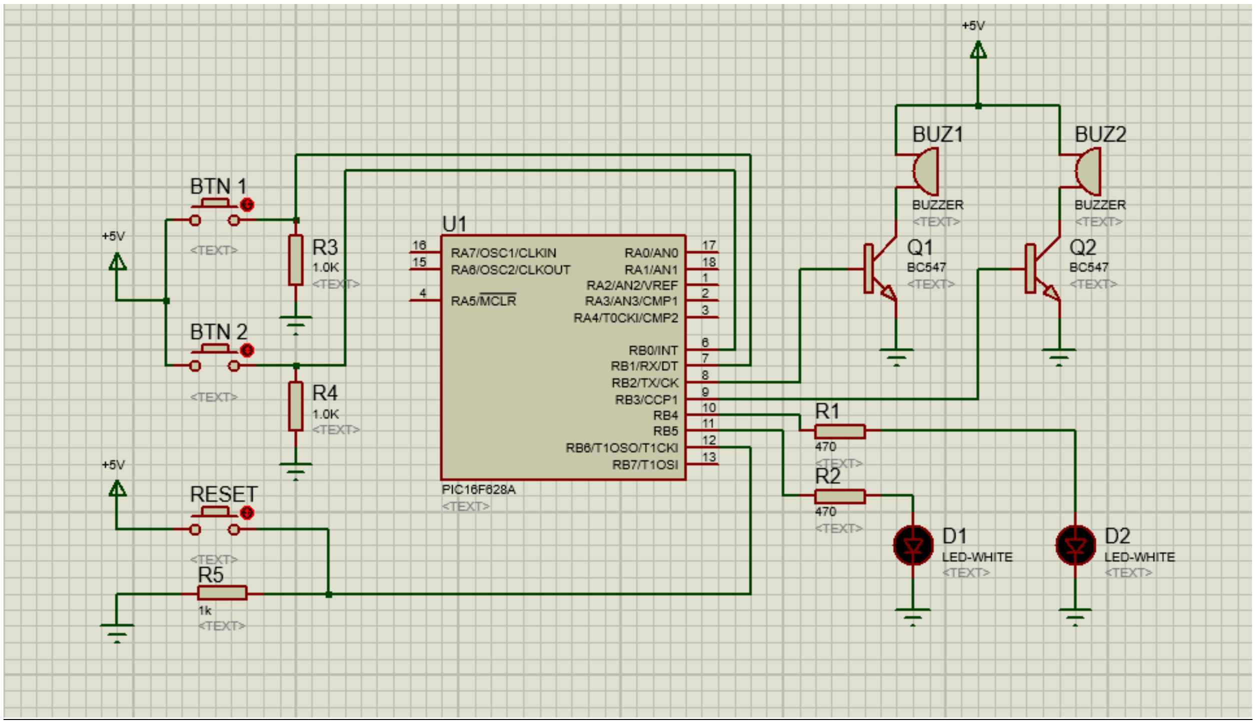
We used transistors (BC547) to drive the buzzers since the microcontroller cannot source enough current directly. The PORTB pins were configured with buttons on RB0, RB1 (players), and RB6 (reset), and outputs for buzzers and LEDs on the remaining pins.

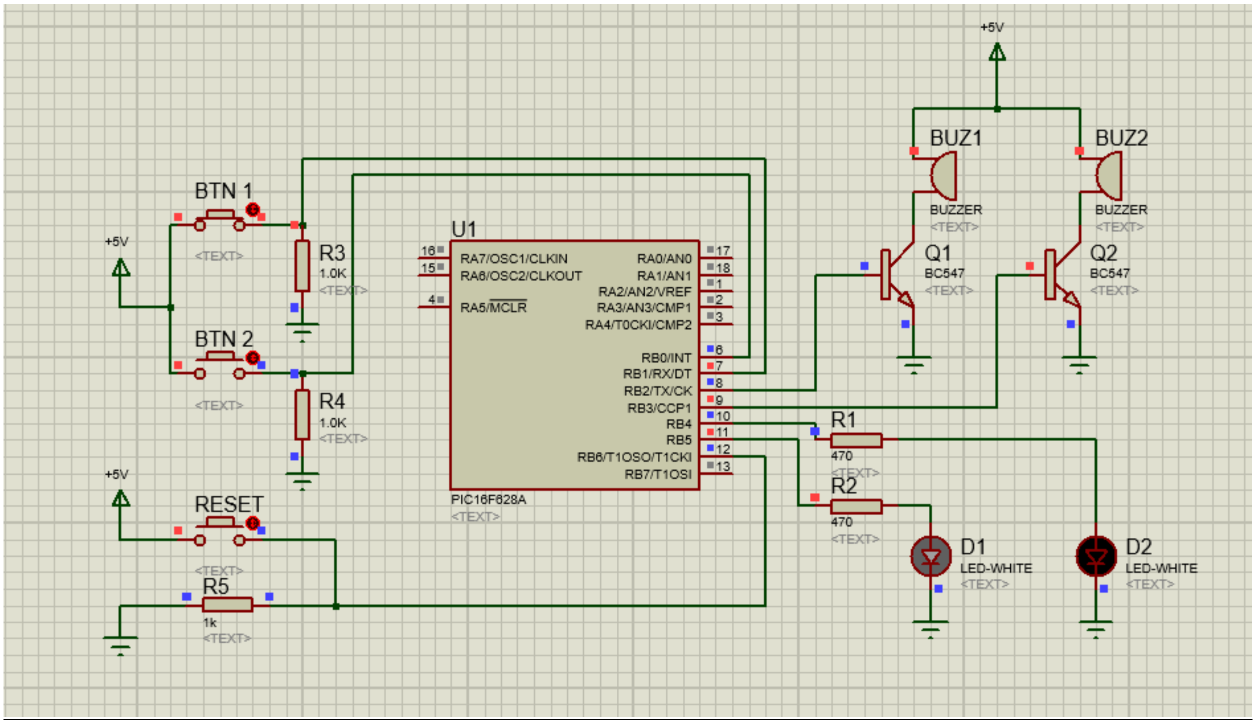
The main challenge faced during the practical was ensuring that only the first button press was recognized, as both players could press almost simultaneously. We had to ensure proper logic in the code and clean wiring on the breadboard to avoid false triggering. Debouncing the buttons was also essential for stable input detection. Additionally, using transistors correctly to isolate the microcontroller from the buzzers require precise connection and understanding of transistor switching.

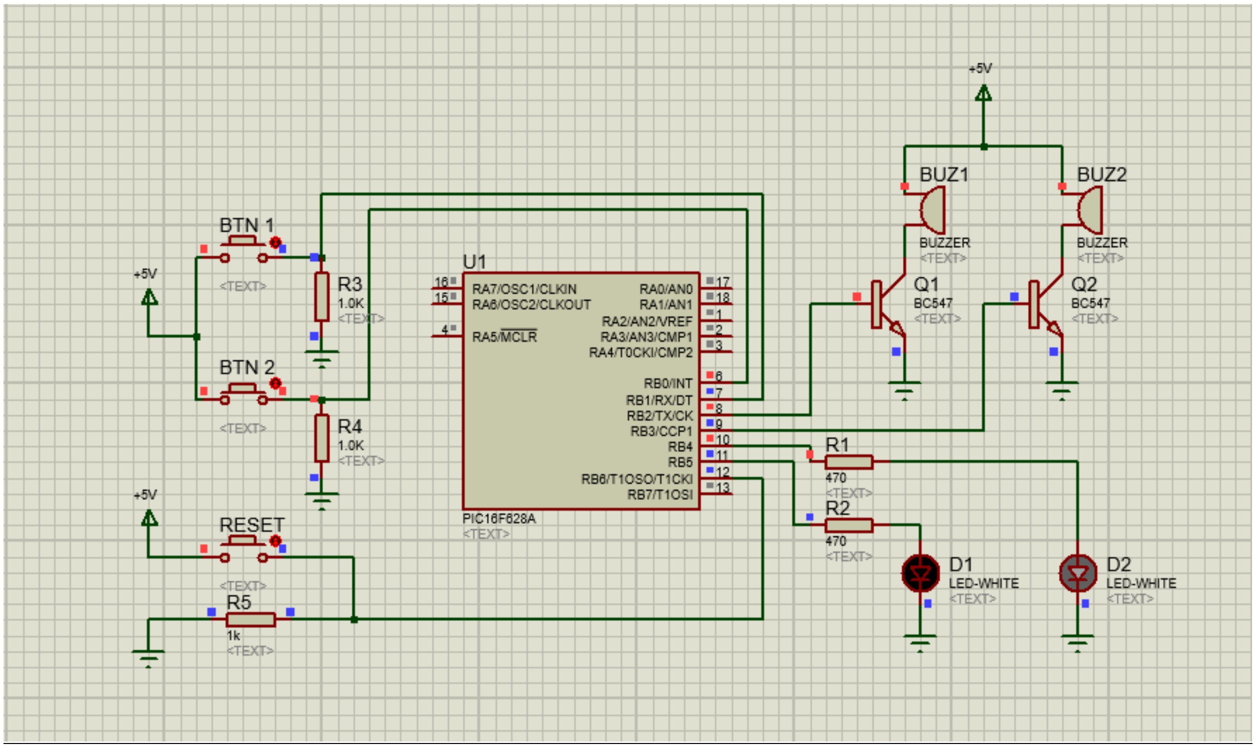
SOURCE CODE

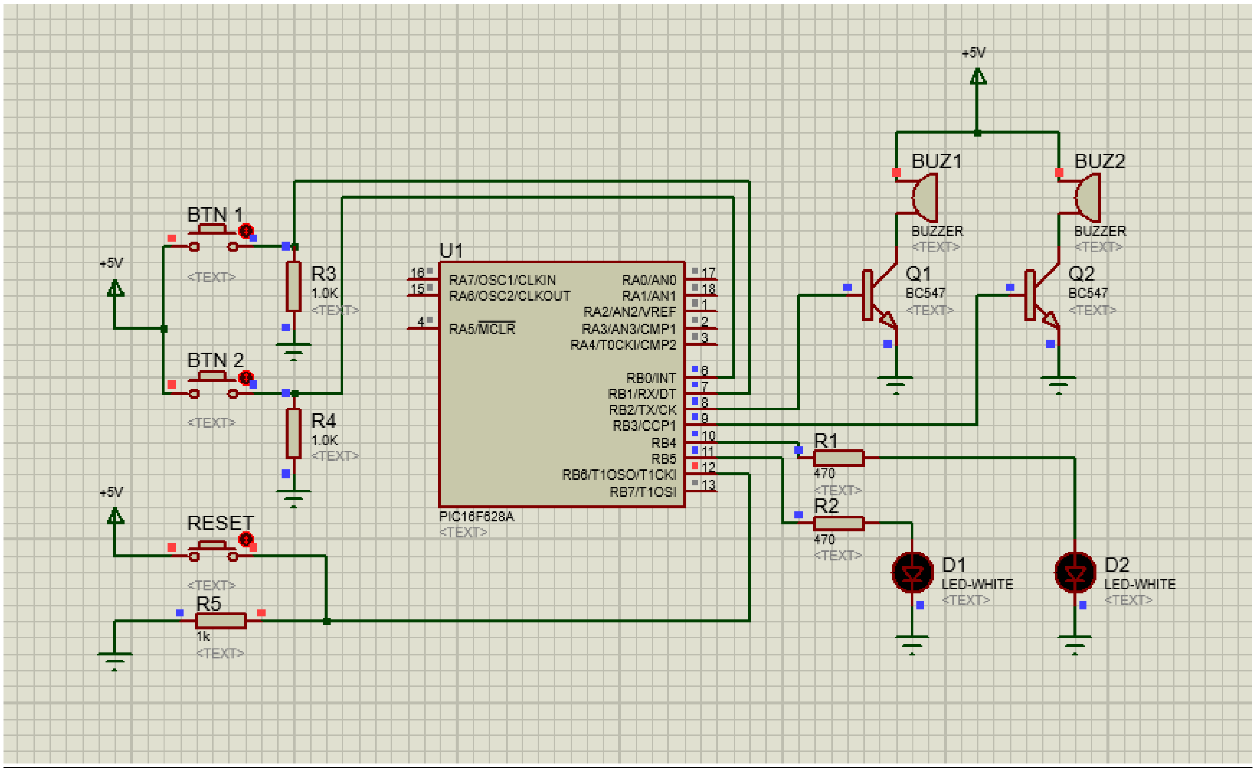
```
void main() {
    int i = 0;
    TRISB = 0b11000011;
    PORTB = 0b00000000;
    while(1) {

        if(PORTB == 0b00000001) {
            PORTB = 0b00010100;
            while(i == 0) {
                if(PORTB.RB6 == 1) {
                    PORTB = 0b00000000;
                    i = 1;
                }
            }
            i = 0;
        }
        else if(PORTB == 0b00000010) {
            PORTB = 0b00101000;
            while(i == 0) {
                if(PORTB.RB6 == 1) {
                    PORTB = 0b00000000;
                    i = 1;
                }
            }
            i = 0;
        }
    }
}
```

SIMULATION SCREENSHOTS






+5V
BUZ1
BUZ2
BUZZER
BUZZER
<TEXT>
BTN 1
<TEXT>
R3
1.0K
+5V
U1
RA7/OSC1/CLKIN
RA6/OSC2/CLKOUT
RA5/MCLR
RA0/AN0
RA1/AN1
RA2/AN2/VREF
RA3/AN3/CMP1
RA4/T0CKI/CMP2
RB0/INT
RB1/RX/DT
RB2/TX/CK
RB3/CCP1
RB4
RB5
RB6/T1OSO/T1CKI
RB7/T1OSI
16
15
4
17
18
1
2
3
6
7
8
9
10
11
12
13
PIC16F628A
Q1
BC547
Q2
BC547
BTN 2
R4
1.0K
R1
470
R2
470
+5V
RESET
D1
LED-WHITE
D2
LED-WHITE
R5
1k


+5V
BUZ1
BUZ2
BUZZER
BUZZER
<TEXT>
BTN 1
+5V
R3
1.0K
U1
RA7/OSC1/CLKIN
RA6/OSC2/CLKOUT
RA5/MCLR
RA0/AN0
RA1/AN1
RA2/AN2/VREF
RA3/AN3/CMP1
RA4/T0CKI/CMP2
RB0/INT
RB1/RX/DT
RB2/TX/CK
RB3/CCP1
RB4
RB5
RB6/T1OSO/T1CKI
RB7/T1OSI
16
15
4
17
18
1
2
3
6
7
8
9
10
11
12
13
PIC16F628A
Q1
BC547
Q2
BC547
BTN 2
R4
1.0K
R1
470
R2
470
+5V
RESET
D1
LED-WHITE
D2
LED-WHITE
R5
1k