SCHOOL OF COMPUTER SCIENCE ENGINEERING

WINTER SEMESTER 2022-2023

LAB ASSIGNMENT - 3

Slot: L11 – L12

Class: VL2022230504038

Programme Name & Branch: B. Tech CSE

Course code & Title: BECE204P – Microprocessors and Microcontrollers Lab

Faculty Name: Venu Allapakam

Implementation of Timers and counters

Program 1: Up Counting till 10

Aim: To design an ALP that counts the no. of people entering a room and when the count equals 10, it turns on the LED at P0.1

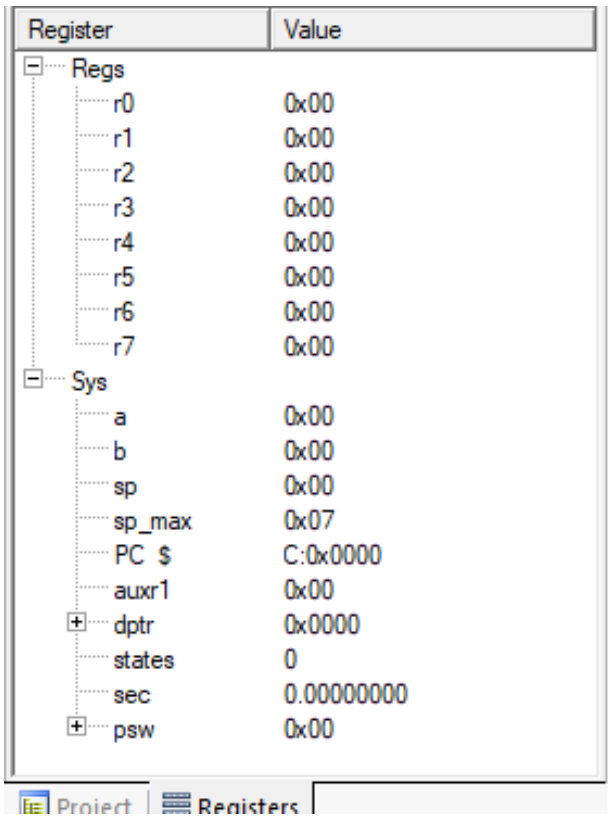
Software Requirement: Keil Software

Program:

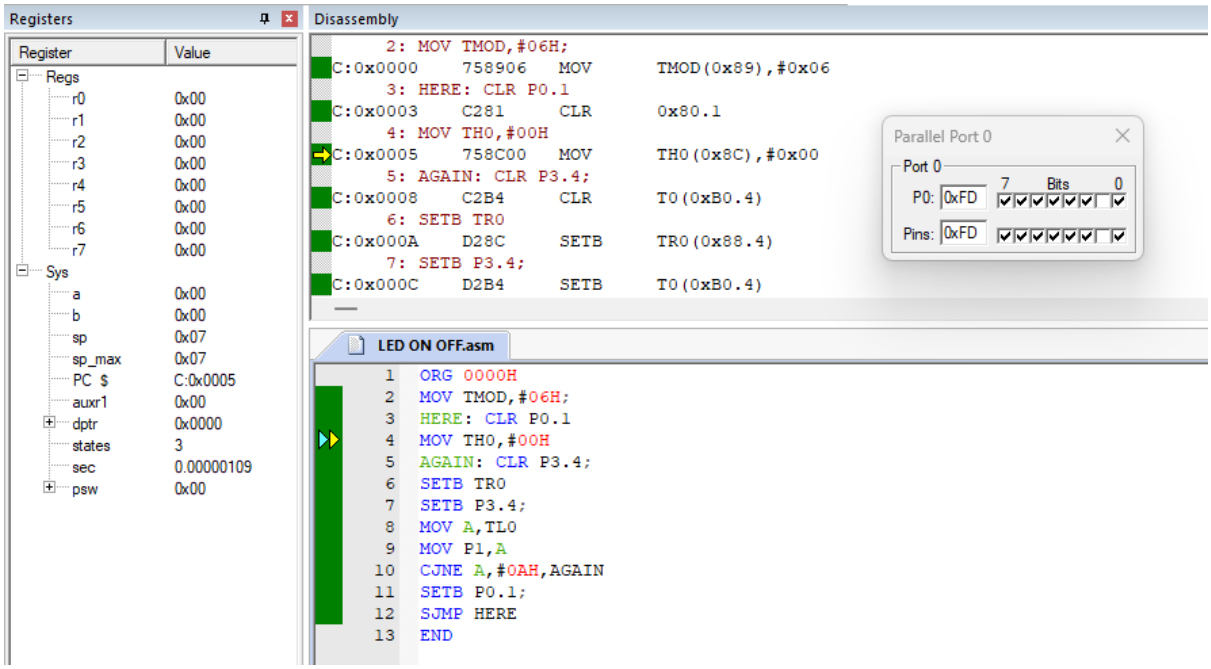
LED ON OFF.asm

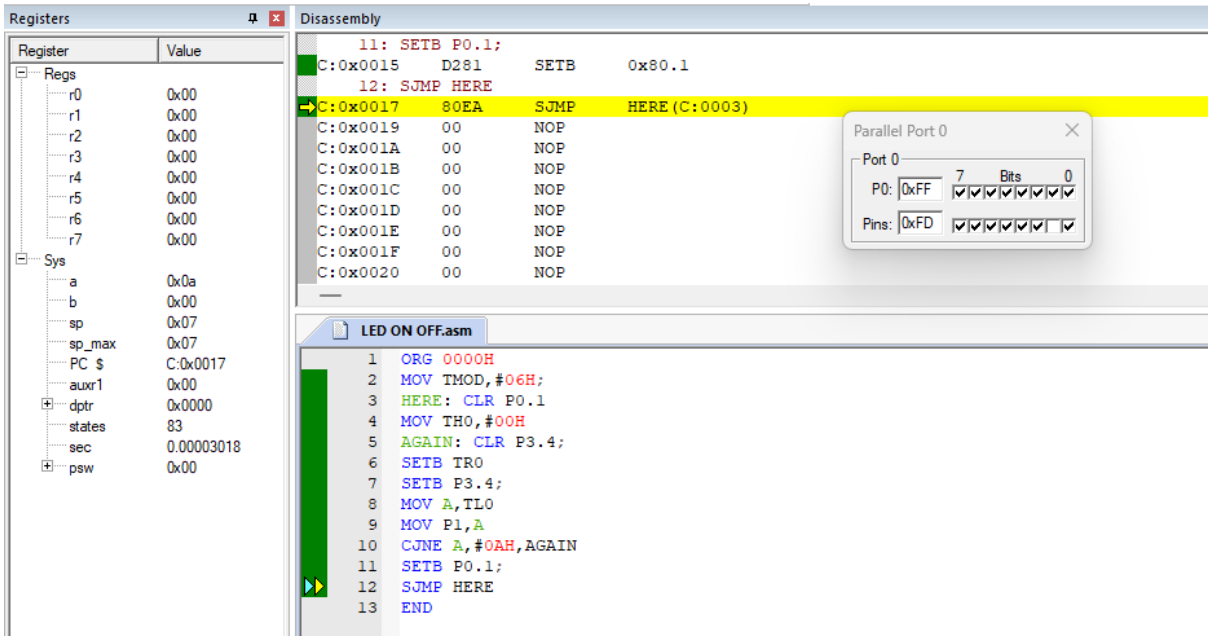
```
1   ORG 0000H
2   MOV TMOD,#06H;
3   HERE: CLR P0.1
4   MOV TH0,#00H
5   AGAIN: CLR P3.4;
6   SETB TR0
7   SETB P3.4;
8   MOV A,TL0
9   MOV P1,A
10  CJNE A,#0AH,AGAIN
11  SETB P0.1;
12  SJMP HERE
13  END
```

Output:
Before Execution Register status:



After Execution:





Result-

Hence, the no. of people entering the room are counted using counter 0 operated in mode 2 by giving the input via TR0 bit. Once the count completes to 10, the LED linked to P0.1 is turned on.

Program 2: Count and display

Aim: To design an ALP that counts the pulses provided via pin T1 using counter 1 and display the state of the TL1 count on P2, which connects to 8 LEDs.

Software Requirement: Keil Software

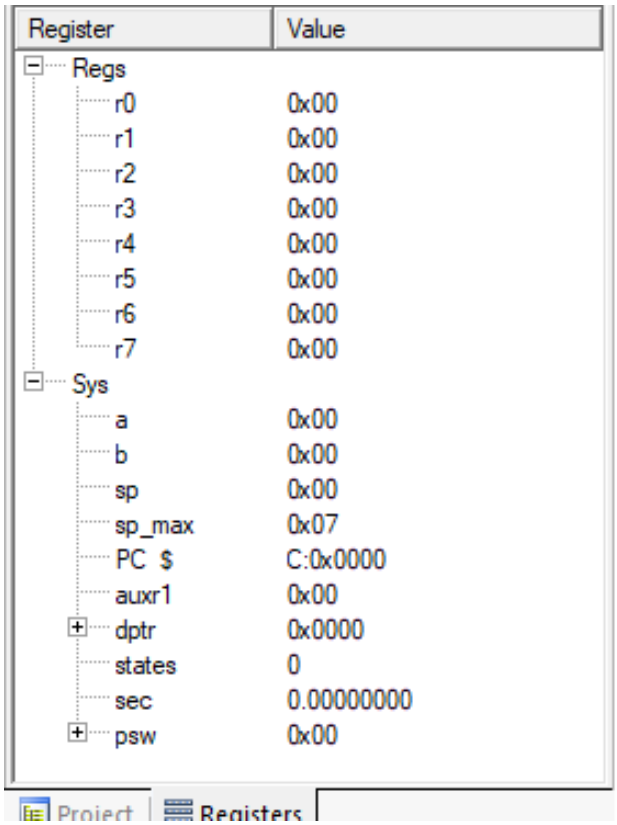
Program:

COUNTER 2.asm

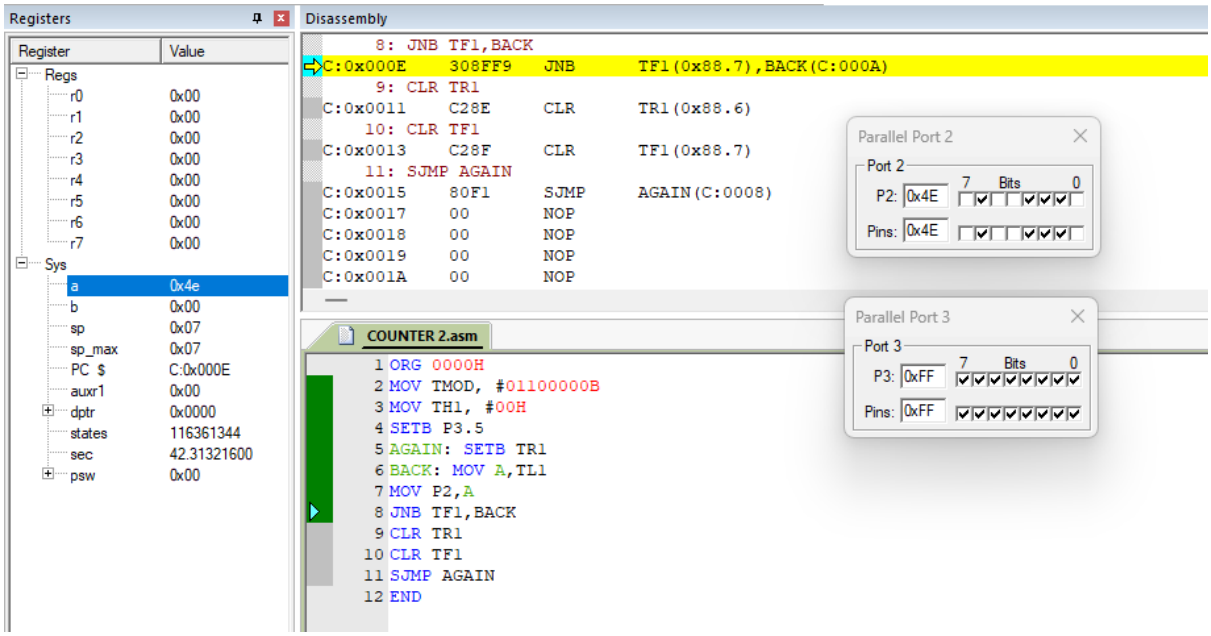
```
ORG 0000H
MOV TMOD, #01100000B
MOV TH1, #00H
SETB P3.5
AGAIN: SETB TR1
BACK: MOV A,TL1
MOV P2,A
JNB TF1,BACK
CLR TR1
CLR TF1
SJMP AGAIN
END
```

Output:

Before Execution Register status:



After Execution:



Result—

Hence, the pulses provided via T1 are counted using counter 1 and the state of TL1 is displayed on P2 which is further connected to 8 LEDs and therefore the LEDs glow as per the input.

Program 3:

Aim: To generate a square wave on P1 of any frequency without using timers

Software Requirement: Keil Software

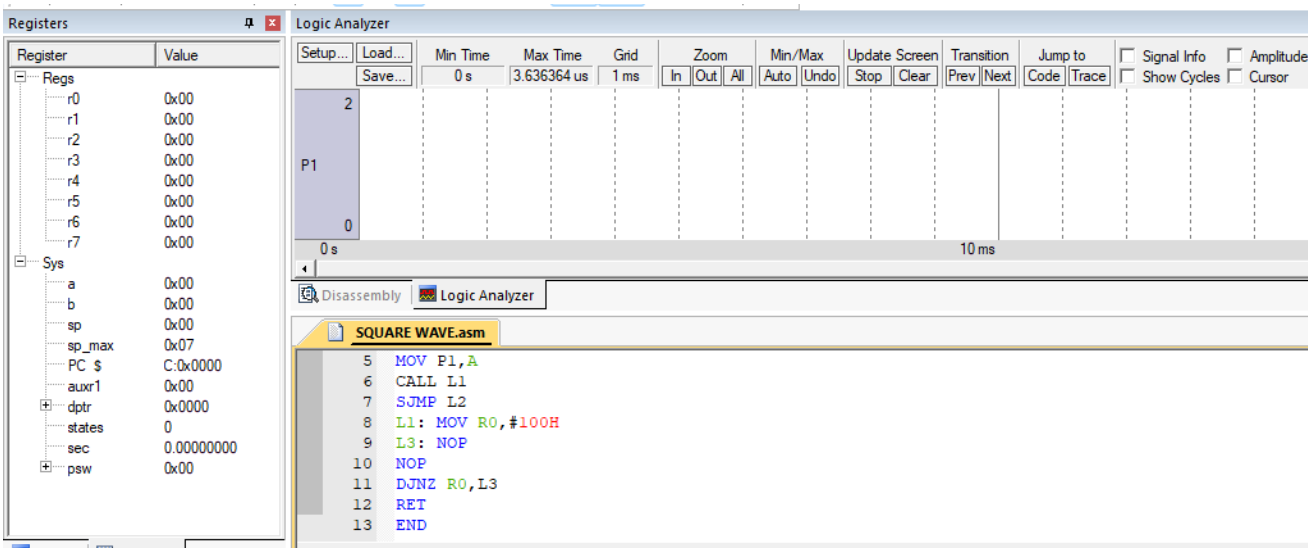
Program:

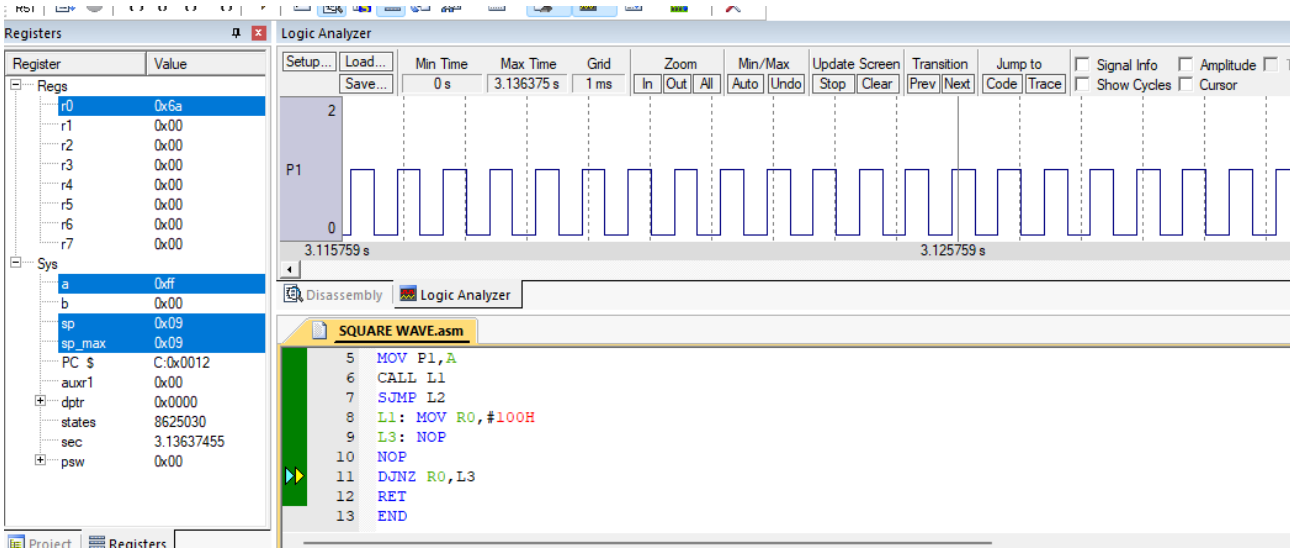
SQUARE WAVE.asm

```
1   L2: MOV A, #00H
2   MOV P1,A
3   CALL L1
4   MOV A,#0FFH
5   MOV P1,A
6   CALL L1
7   SJMP L2
8   L1: MOV R0,#100H
9   L3: NOP
10  NOP
11  DJNZ R0,L3
12  RET
13  END
```

Output:

BEFORE & AFTER Execution Register status:





Result:

Hence, the square wave with 50% duty cycle and a randomly selected time (delay) has been generated on P1 and is visualized using the logic analyzer.

Program 4:

Aim: To generate a 500 Hz square wave with 50% duty cycle using timer 0 on P1

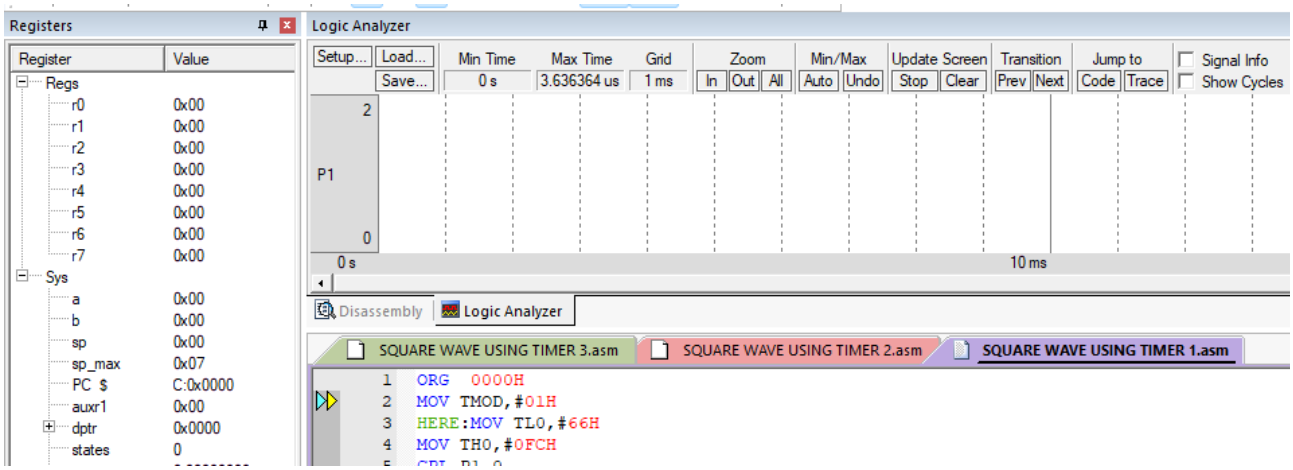
Software Requirement: Keil Software

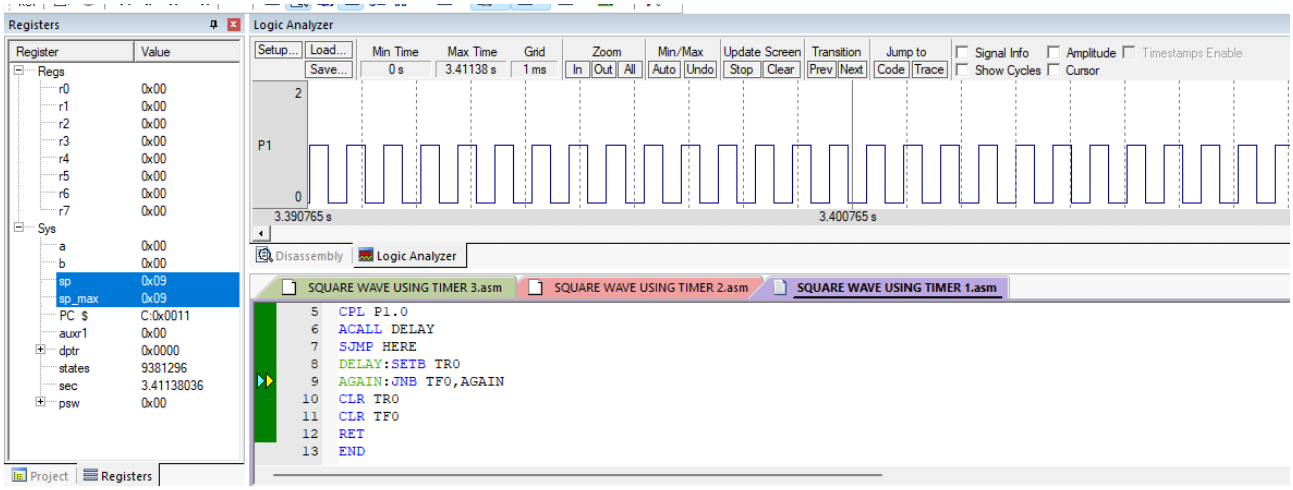
Program:

```
ORG  0000H
MOV TMOD,#01H
HERE:MOV TL0,#66H
MOV TH0,#0FCH
CPL P1.0
ACALL DELAY
SJMP HERE
DELAY:SETB TR0
AGAIN:JNB TF0,AGAIN
CLR TR0
CLR TF0
RET
END
```

Output:

BEFORE & AFTER Execution Register status:





Result:

Hence, the 500 Hz square wave with 50% duty cycle has been generated on P1 using timer 0 and is visualized using the logic analyzer.

Program 5: timer

Aim: To generate a 1 kHz square wave on one of the pins of P1 using timer 1.

Software Requirement: Keil Software

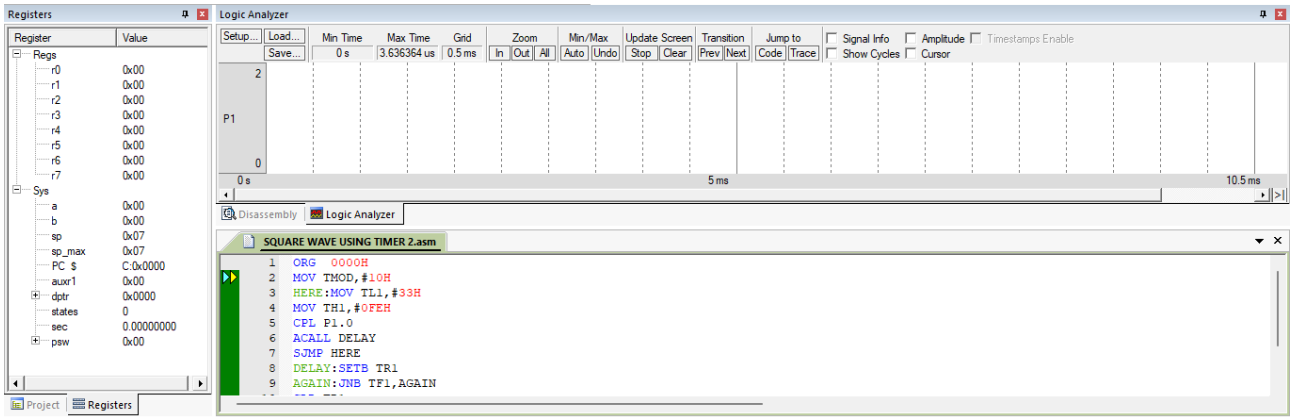
Program:

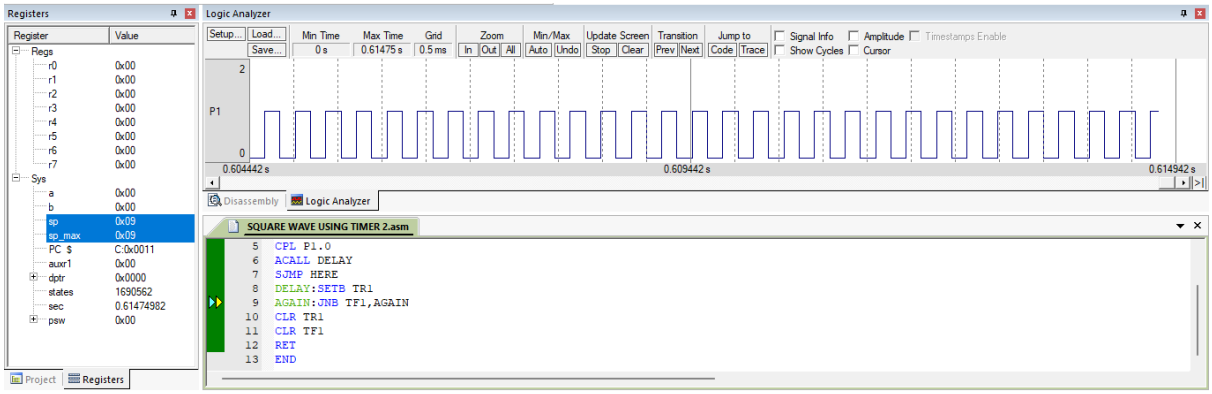
SQUARE WAVE USING TIMER 2.asm

```
1  ORG  0000H
2  MOV TMOD,#10H
3  HERE:MOV TL1,#33H
4  MOV TH1,#0FEH
5  CPL P1.0
6  ACALL DELAY
7  SJMP HERE
8  DELAY:SETB TR1
9  AGAIN:JNB TF1,AGAIN
10 CLR TR1
11 CLR TF1
12 RET
13 END
```

Output:

Before Execution &After execution:





Result:

Hence, the 1 kHz square wave with 50% duty cycle has been generated on P1 using timer 1 and is visualized using the logic analyzer.

Program 6:

Aim: To generate a 2 kHz square wave on the pin of P1.0 using timer 1.

Software Requirement: Keil Software

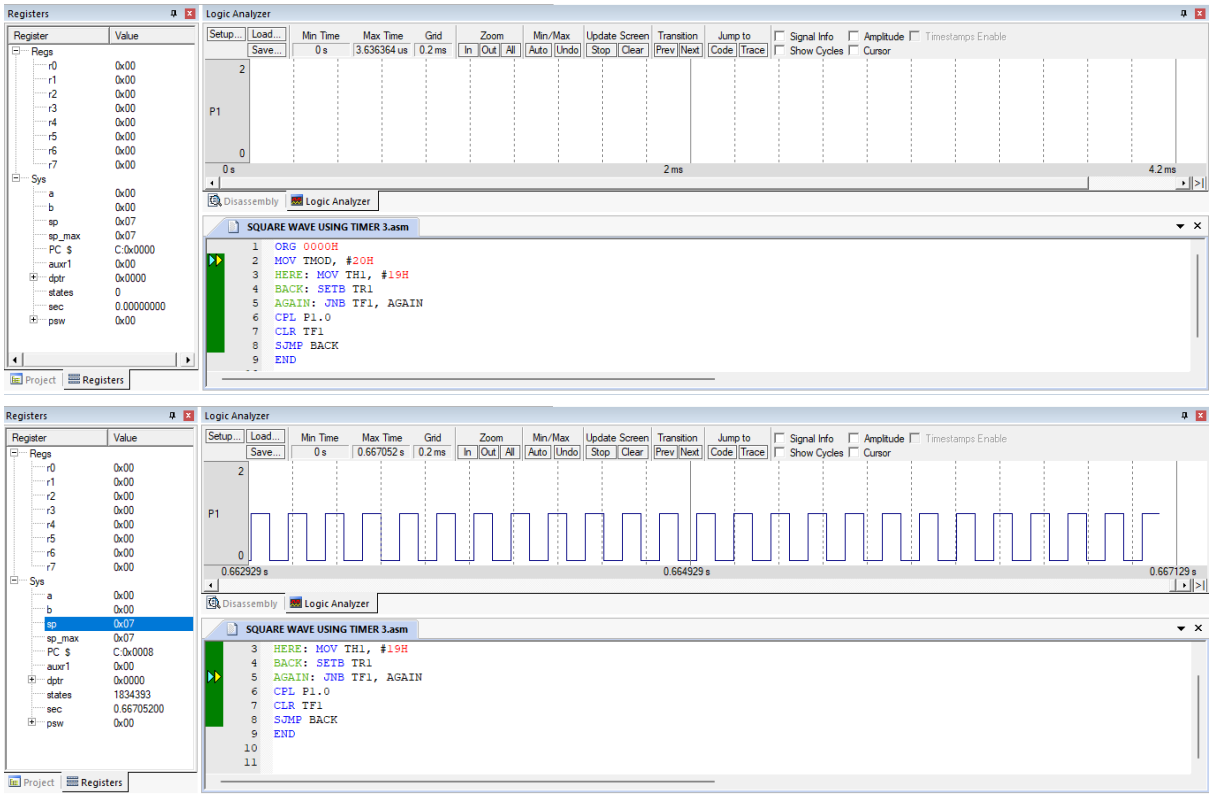
Program:

SQUARE WAVE USING TIMER 3.asm

```
1  ORG 0000H
2  MOV TMOD, #20H
3  HERE: MOV TH1, #19H
4  BACK: SETB TR1
5  AGAIN: JNB TF1, AGAIN
6  CPL P1.0
7  CLR TF1
8  SJMP BACK
9  END
```

Output:

Before and AfterExecution:



Result:

Hence, the 2 kHz square wave with 50% duty cycle has been generated on P.0 using timer 1.