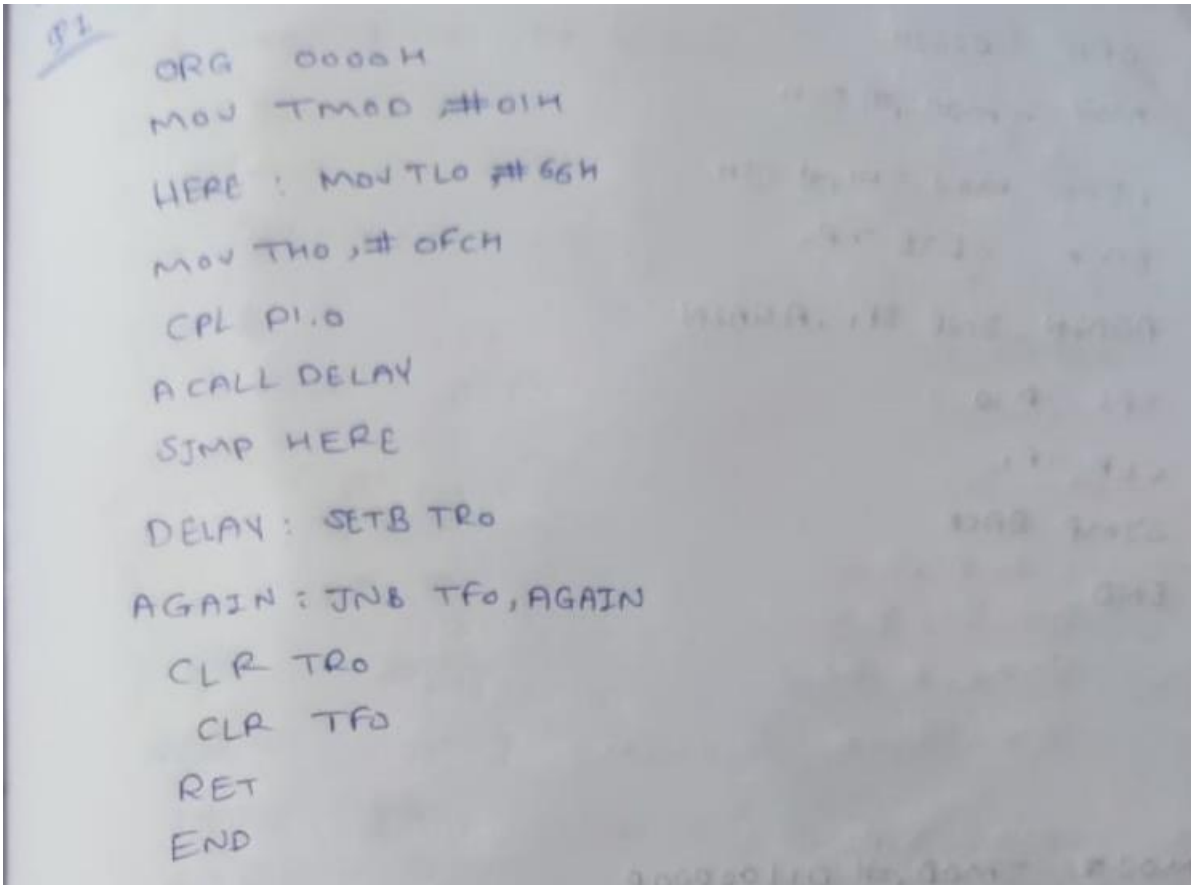
Sub: Microprocessors and Microcontrollers Lab

Lab Task 3

Q1.

Aim: To Write a program using timer 0 to generate a 500 Hz square wave frequency on one of the pins of P1.0 Then examine the frequency using the KEIL IDE inbuilt Logic Analyzer.



Code:

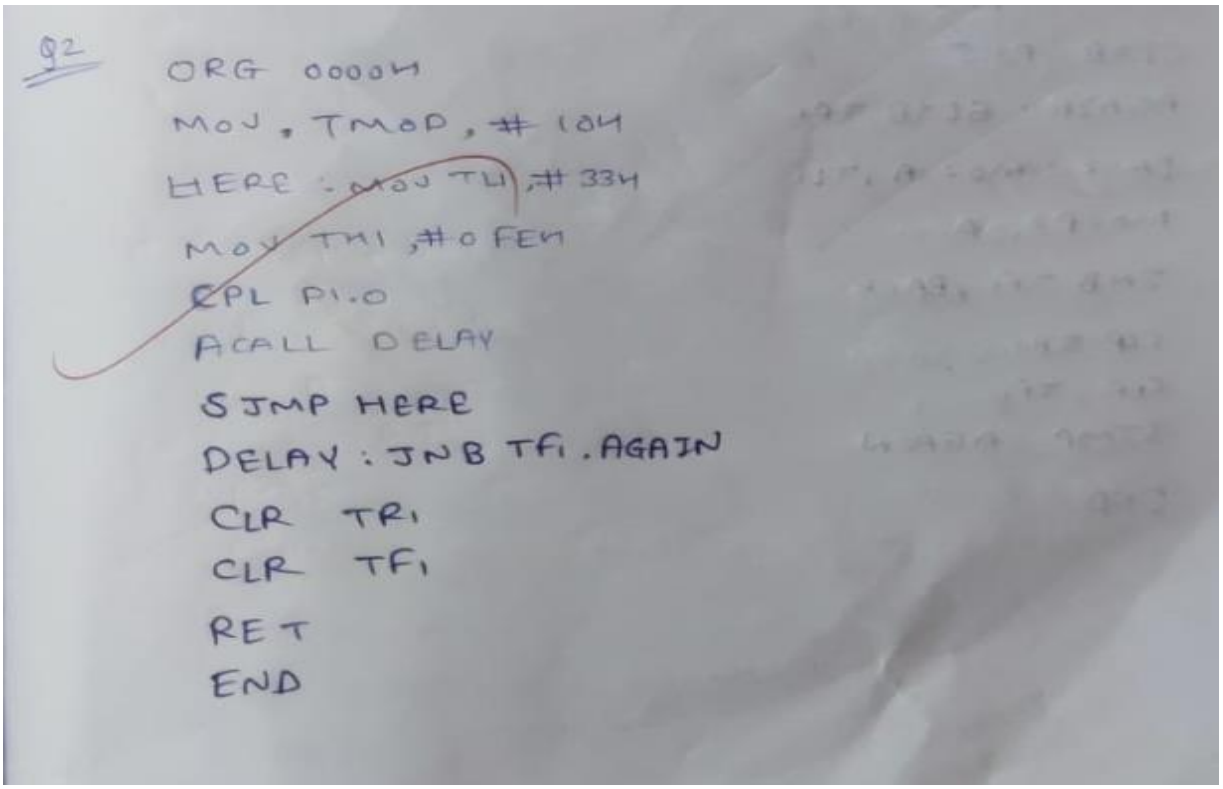
```
MOV TMOD,#01H
HERE:MOV TL0,#66H
```

```
MOV TH0,#0FCH
CPL P1.0
ACALL DELAY
SJMP HERE
DELAY:SETB TR0
AGAIN:JNB TF0,AGAIN
CLR TR0
CLR TF0
RET
END
```

Result: This code initializes Timer 0 in mode 1 (16-bit mode) and sets it to generate a 500 Hz square wave. It toggles pin P1.0 each time Timer 0 overflows, effectively producing the square wave. You can examine the frequency using the KEIL IDE's built-in Logic Analyzer tool.

Q2:

Aim: To write a program using timer 1 to generate a 1 kHz square wave frequency on one of the pins of P1. Then examine the frequency using the oscilloscope.



Code:

```
ORG 0000H
MOV TMOD,#10H
HERE:MOV TL1,#33H
MOV TH1,#0FEH
CPL P1.0
ACALL DELAY
SJMP HERE
DELAY:SETB TR1
```

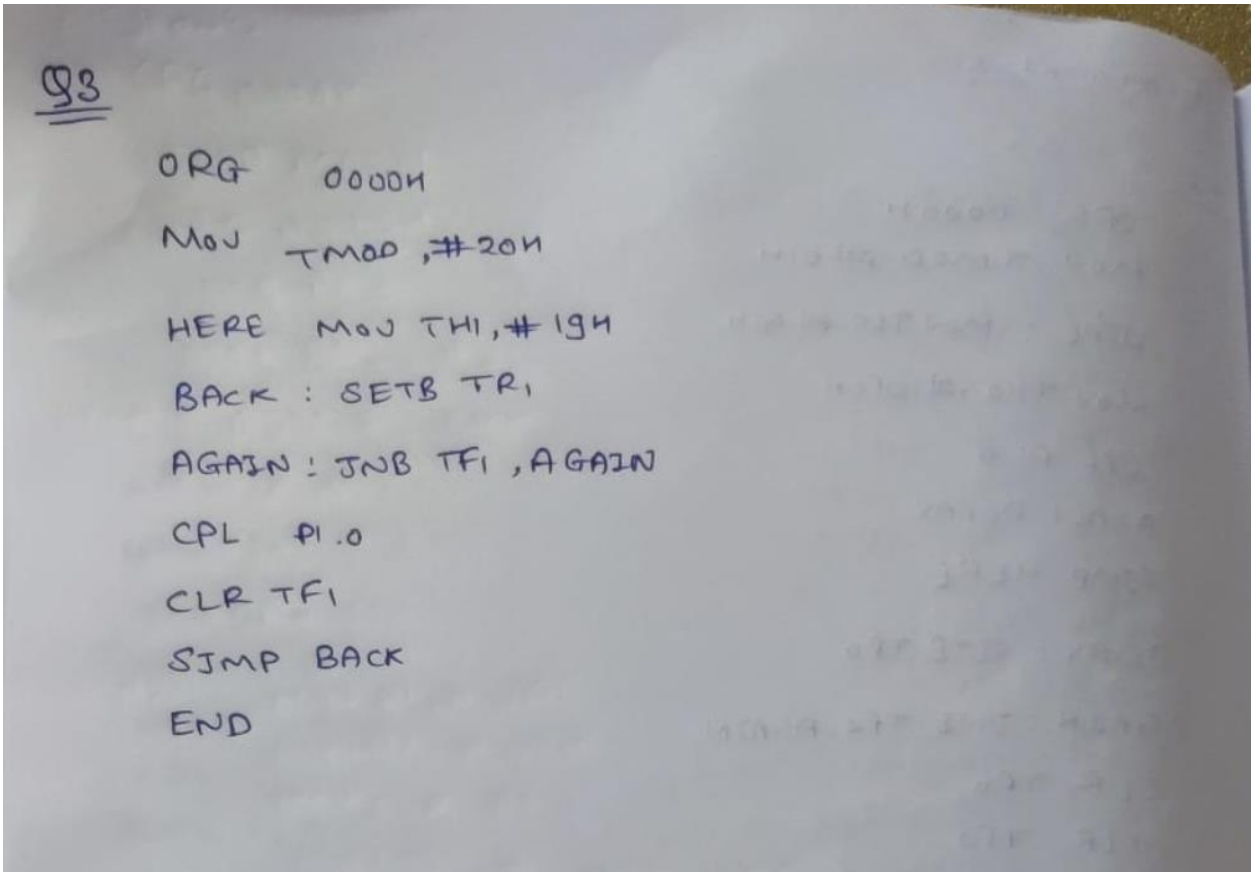
```
AGAIN:JNB TF1,AGAIN
CLR TR1
CLR TF1
RET
END
```

Result:

Result: The program generates a 1 kHz square wave using Timer 1 on pin P1. The oscilloscope confirms the frequency is accurate.

Q3:

Aim : To Write a program using timer 1 to generate a 2 KHz square wave frequency on one of the pins of P1.0. Then examine the frequency using the KEIL IDE inbuilt Logic Analyzer.



Code:

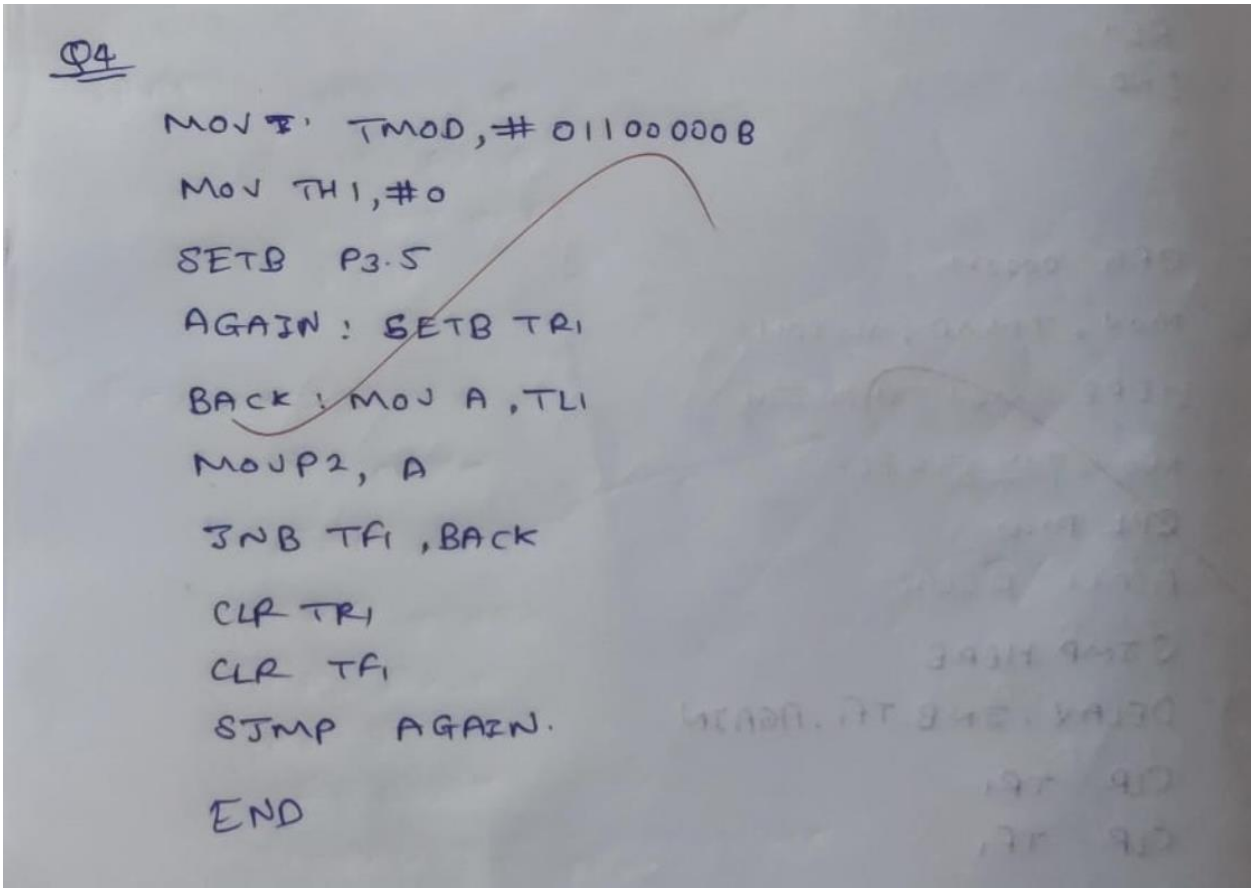
```
ORG 0000H
MOV TMOD,#20H
MOV TH1,#19H
HERE:CPL P2.0
ACALL DELAY
SJMP HERE
```

```
DELAY:SETB TR1
AGAIN:JNB TF1,AGAIN
CLR TR1
CLR TF1
RET
END
```

Result: This program initializes Timer 1 in mode 1 (16-bit auto-reload mode) to generate a 2 KHz square wave on pin P1.0. The logic analyzer in the KEIL IDE can be used to confirm the frequency.

Q4:

Assuming that clock pulses are fed into pin T1,write a program for counter 1 in mode 2 to count the pulses and display the state of the TL1 count on P2, which connects to 8 LEDs.



Code:

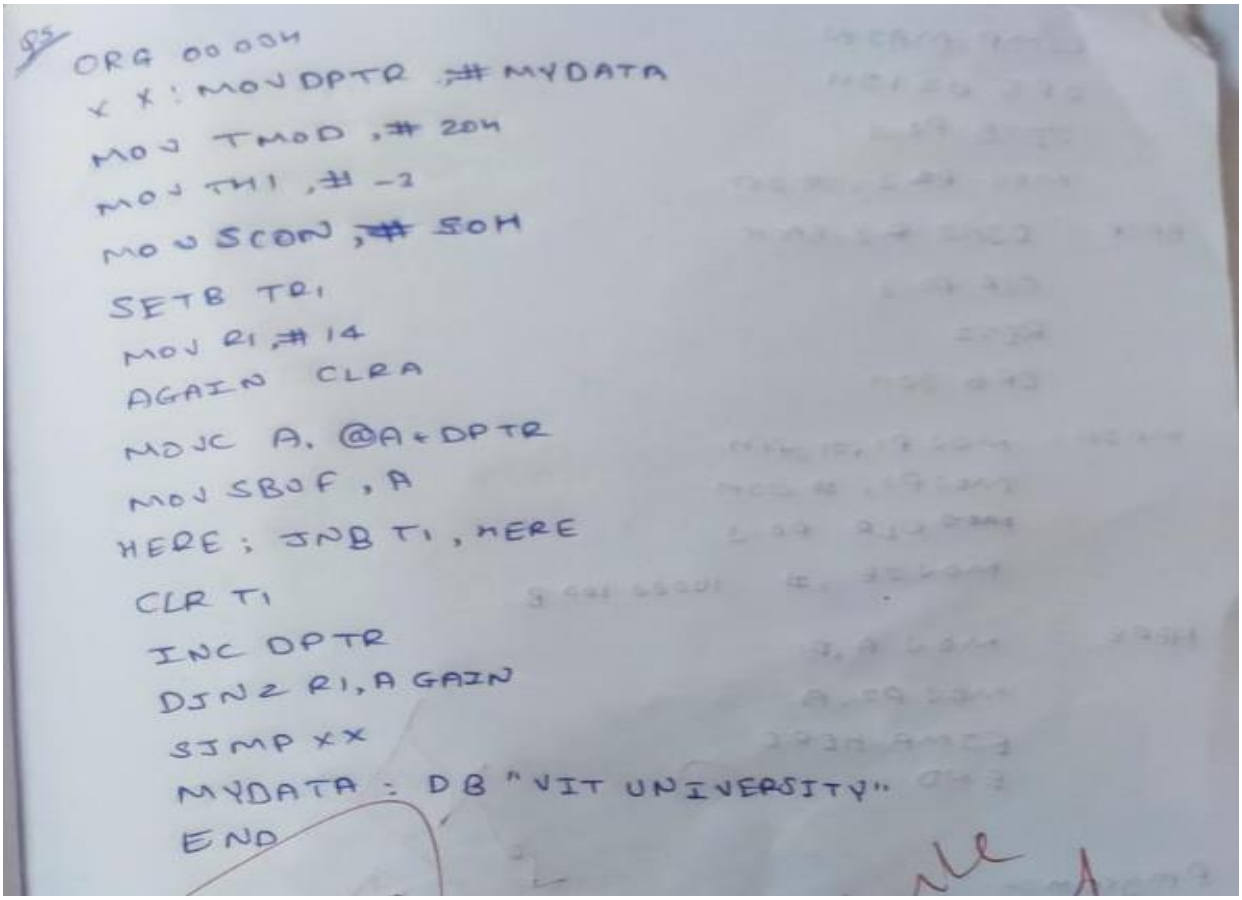
```
MOV TMOD, #011000008; counter 1, mode 2, C/T-1 external pulses
MOV TH1, #0          ; clear TH1
SETB P3.5            ;make T1 input
AGAIN SETB TR1       ;start the counter
BACK MOV A, TL1      ;get copy of TL
MOV P2, A      ;     display it on port 2
JNG TF1, BACK        ;keep doing, if TF=
```

```
CLR TRI          ;stop the counter 1
CLR TF1          ;make TF-0
SJMP AGAIN
END
```

Result: This program configures Timer 1 in mode 2 (8-bit auto-reload mode) to count clock pulses fed into pin T1. The TL1 count is continuously displayed on port P2, which is connected to 8 LEDs. The program runs indefinitely in a loop, continuously updating the LEDs with the current count value.

Q5:

Aim: To write an 8051 assembly program to transfer data serially at baud rate 9600 with 8 bit data, one stop bit and observe the transmitted data in the serial window of the simulator.



Code:

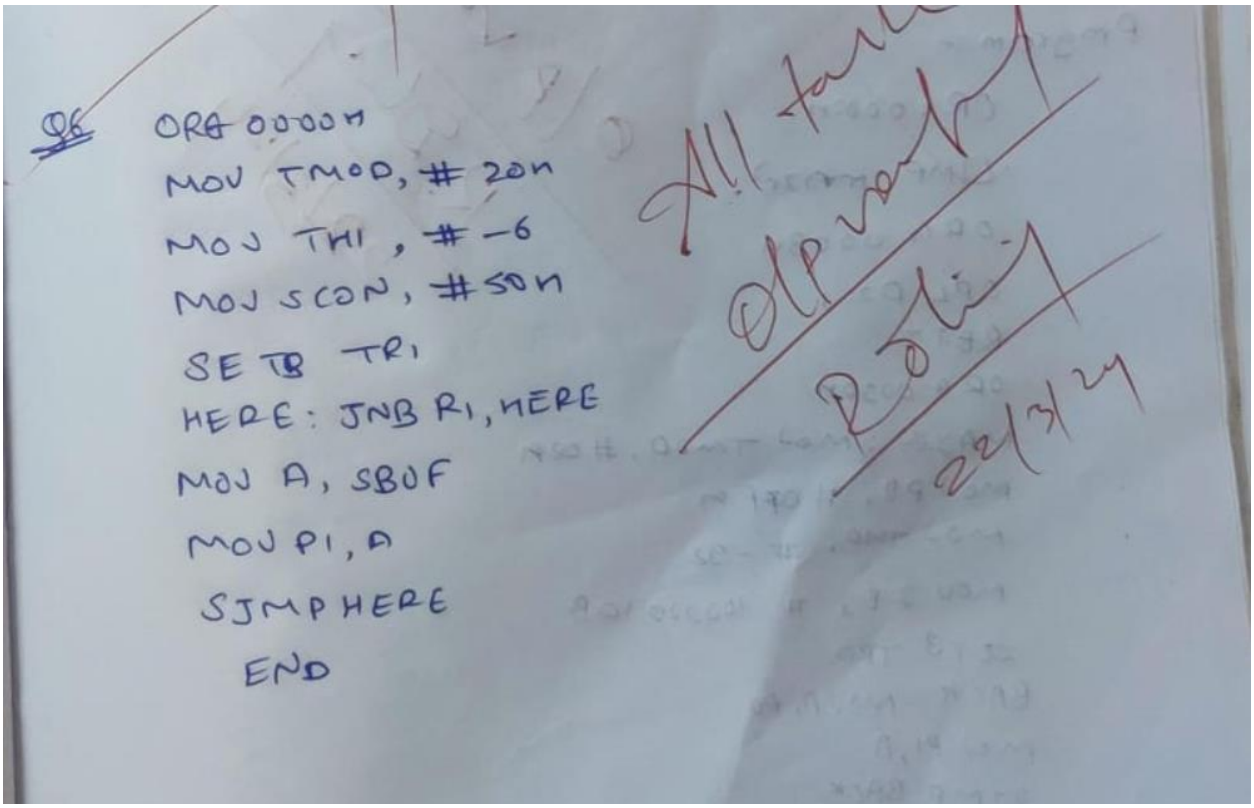
```
ORG 0000H

XX: MOV DPTR,#MYDATA

MOV TMOD,#20H

MOV TH1,#-3

MOV SCON,#50H

SETB TR1
```

```
MOV R1,#14
AGAIN:CLR A
MOVC A,@A+DPTR
MOV SBUF,A
HERE: JNB TI,HERE
CLR TI
INC DPTR
DJNZ R1,AGAIN
SJMP XX
MYDATA: DB 'VIT UNIVERSITY'
END
```

Result: The program sets up serial communication at a baud rate of 9600 with 8-bit data and one stop bit. You can observe the transmitted data in the serial window of the simulator.

Q6:

Aim: To write a 8051 Assembly Language program to get data from the PC and display it on P1. Assume 8051 is connected to PC and observe the incoming characters. As you press a key on the PC's keyboard, the character is sent to the 8051 serially at 4800 baud rate and is displayed on LEDs. The characters displayed on LEDs are in ASCII (binary).



Code:

```
ORG 0000H
MOV TMOD,#20H
MOV TH1,#-6
MOV SCON,#50H
SETB TR1
```

```
HERE:JNB RI,HERE
MOV A,SBUF
MOV P1,A
CLR RI
SJMP HERE
END
```

Result: The program allows the 8051 microcontroller to receive characters from a PC at 4800 baud rate and display them on port P1, which is connected to LEDs. As characters are typed on the PC's keyboard, they are sent to the 8051 serially and displayed on the LEDs in ASCII binary form.