Assume that a 1-Hz external clock is being fed into pin T1(P3.5). Write a C program for counter 1 in mode 2 to count up and display the state of the TL1 count on P1. Start the count at 0H.

```
#include <reg51.h>
void main(void)
{
  T1=1;
  TMOD = 0X60;
  TH1 = 0;

  while(1)
{
 do
   {
     TR1=1;
     P1=TL1;
   }
while(TF1==0);
TR1=0;
TF1=0;
}
```

}

Assume that a 1-Hz external clock is being fed into pin T0(P3.4). Write a C program for counter 0 in mode 1 to count up and display the state of the TL0 and TH0 registers on P2 and P1 respectively.

```
#include <reg51.h>
void main(void)
 {
     T0=1;  //make T0 an input
       TMOD=0x05;
       TL0=0;   //set count to 0
       TH0=0;  //set count to 0

       while(1)   //repeat forever
       {
        do
        {
          TR0=1;   //start timer
               P1=TL0;  //place value on pins
                     P2=TH0;
        }
       while (TF0==0);  //wait here
```

```
        TR0=0;          // stop timer
        TF0=0;
        }
 }
```

Write an 8051 C program to toggle all bits of P2 continuously every 500ms. Use Timer 1, mode 1 to create the delay.

Making TH and TL both zero means that the timer will count from 0000 to FFFF, and then roll over to raise the TF flag. As a result, it goes through a total Of 65536 states. Therefore, we have delay =

(65536 - 0) × 1.085 us = 71.1065ms.

71.1065ms * X =500ms

X = 500/71.1065 = 7

```
#include<reg51.h>
void T1M1Delay(void);
void main(void)
{
Unsigned char x;
P2=0X55;
while(1)
{
  P2=~P2;
```

```
for(x=0;x<7;x++)
        T1M1Delay();
}
}
void T1M1Delay(void)
{
        TMOD=0x10;
        TH1=0x00;
        TL1=0X00;
        TR1=1;
        while(TF1==0);
        TF1=0;
        TR1=0;
}
```

Write an 8051 C program to create a frequency of 2500Hz on pin P2.7. Use Timer 1, mode 2 to create the delay.

```
#include <reg51.h>
void T1M2Delay(void);
sbit mybit=P2^7;
void Main(void)
{
while(1)
```

```
  {
   mybit=~mybit;   //toggle p2.7
    T1M2Delay();
  }
}
void T1M2Delay(void)
{
TMOD=0x20;
TH1=48;
TR1=1;
while(TF1==0);
TR1=0;
TF1=0;
}
```

Write a 8051 C program to toggle port P1 continuously with some delay. Use timer 0 16 bit mode for delay.

```
#include<reg51.h>
void TMR_delay();
void main()
{
while(1)
{
```

```
P1=0xAA;
TMR_delay();
P1=0x55;
TMR_delay();
}
}

void TMR_delay()
{
    TMOD=0x01;
    TH0=0xFE;
    TL0=0XBE;
    TR0=1;
    while(TF0==0);
    TF0=0;
    TR0=0;
}
```

Hardware:

Write an 8051 C program to toggle port only bit p1.5 continuously every 50ms.

```
#include<reg51.h>
void T0M1Delay(void);
```

```
sbit mybit=P1^5;
void main(void)
{
while(1)
{
  mybit=~mybit;
        T0M1Delay();
}
}
void T0M1Delay(void)
{
        TMOD=0x01;
        TH0=0x4B;
        TL0=0XFD;
        TR0=1;
        while(TF0==0);
        TF0=0;
        TR0=0;
}
```