1. Napisati program za uC 8051 koji treba da generise povorku impulsa na pinu P1.0. Perioda signala je 300 us tako da impuls traje 150us, pauza 150us. Frekfencija oscilatora je 12 MHz. Program napisati:
   a) koristeci Tajmer 1 koji radi u modu 2 bez upotrebe rutine za prekid
   b) koristeci Tajmer 0 koji radi u modu 2 upotrebom rutine za prekid

255 - 149 = 106 = 0x6A //vrednost na koju treba napuniti TL1 I TH1

a)

```
#include <reg51.h>                      /* Include x51 header file */
sbit pulse = 0x90;                  /* P1^0;  set test pin0 of port1 */

void main()
{
        TMOD = 0x20;                    /* Timer1 mode2 (8-bit auto reload timer mode) */
/* ili M0_0 = 0;
      M0_1 = 1; ???? but TMOD is not bit addressable; */

        TH1 = 0x6A;                     /* Load 8-bit in TH1 */
        TL1 = 0x6A;                     /* Load 8-bit in TL1 once */
        TR1 = 1;                /* Start timer1 */
        pulse = 1;              /* Toggle pulse pin */
        while(1)
        {
                while(!TF1);    /* Wait until timer1 flag set */
                pulse = !pulse;         /* Toggle pulse pin */
                TF1 = 0;        /* Clear timer1 flag */

        }
}
```

b)

```
#include<reg51.h>
sbit pulse = 0x90;                  /* P1^0;  set test pin0 of port1 */

void timer0_isr() interrupt 1
{
    LED =! LED;       // Toggle the LED pin,
    TF0 = 0;
                      //Note Timer value is not reloaded, It is
automatically taken care,
//  whether the Timer Flag 0 (TF0) needs to be cleared manually or is cleared automatically upon
exiting the ISR depends on the specific microcontroller architecture you are using.
For many microcontrollers, especially those in the 8051 family, the TF0 flag is not automatically
cleared when exiting the ISR. You typically need to clear it manually within the ISR to prevent the
interrupt from triggering again immediately after the ISR exits.
U knizi stoji da se TF0 I TF1 automatski hardversi resetuju nakon poziva prekidnog potprograma.
}

void main()
{
    TMOD = 0x02;       //Timer0 mode 2
    TL0 = 0x6A;
    TH0 = 0X6A;        //Load the timer value
    TR0 = 1;           //turn ON Timer zero
    ET0 = 1;           //Enable TImer0 Interrupt
    EA = 1;            //Enable Global Interrupt bit
    LED =1;        //Initialize LED
```

```
    while(1)
    {
        // Do nothing
    }
}
```

2. Napisati program za uC 8051 koji treba da generise povorku impulsa na pinu P1.0. Perioda signala je 2 ms tako da impuls traje 1ms, pauza 1ms. Frekfencija oscilatora je 12 MHz. Program napisati:
   c) koristeci Tajmer 0 koji radi u modu 2 bez upotrebe rutine za prekid
   d) koristeci Tajmer 0 koji radi u modu 2 upotrebom rutine za prekid

   1000:200 = 5; - br cilusa brojanja
   255-199 = 56 = 0x38 - vrednost za inicijalizaciju TL0 I TH0

A)

```
#include <reg51.h>                      /* Include x51 header file */
sbit pulse = 0x90;                      /* P1^0;  set test pin0 of port1 */
data unsigned int i =0x00;
void main()
{
        TMOD = 0x02;                    /* Timer1 mode2 (8-bit auto reload timer mode) */
/* ili M0_0 = 0;
     M0_1 = 1; ???? but TMOD is not bit addressable; */

        TH0 = 0x38;                     /* Load 8-bit in TH1 */
        TL0= 0x38;                      /* Load 8-bit in TL1 once */
        TR1 = 1;                        /* Start timer1 */
        pulse = 1;                      /* Toggle pulse pin */
        while(1)
        {
                while(!TF1);            /* Wait until timer1 flag set */
                        i++;
                        If (i>=5)
                        {
                                pulse = !pulse;         /* Toggle pulse pin */
                                i =0x00;
                        }
                        TF1 = 0;        /* Clear timer1 flag */
        }
}
```

B)

```
#include<reg51.h>
sbit pulse = 0x90;                      /* P1^0;  set test pin0 of port1 */
data unsigned int i =0x00;

void timer0_isr() interrupt 1
{
    i++;
                        If (i>=5)
                        {
                                pulse = !pulse;         /* Toggle pulse pin */
                                i =0x00;
                        }

    TF0 = 0;
```

```
                      //Note Timer value is not reloaded, It is
automatically taken care,

}

void main()
{
    TMOD = 0x02;       //Timer0 mode 2
    TL0 = 0x38;
    TH0 = 0X38;        //Load the timer value
    TR0 = 1;           //turn ON Timer zero
    ET0 = 1;           //Enable TImer0 Interrupt
    EA = 1;            //Enable Global Interrupt bit
    pulse = 1;           /* Toggle pulse pin */

    while(1)
    {
        // Do nothing
    }
}
```