

**How many bytes of code space does your program require?**

Code Size? 51 bytes.

I found this by removing the preconditions (with them it would be 56 bytes) and building the project. Then I checked the build window for the byte size as seen in Fig 1.5.1:

```
Build Output
Build started: Project: Lab1Pat1.1
Build target 'Target_1'
assembling lab1Pat1_1.asm...
linking...
Program Size: data=8.0 xdata=0 code=51
".\Objects\Lab1Pat1.1" - 0 Error(s), 0 Warning(s).
Build Time Elapsed: 00:00:00
```

**Fig 1.5.1: Build file output (without preconditions)**

**How long did your program take to execute for X=0x33 and Y=0x07? Assume an 11.0592 MHz clock and include the instructions executed from the beginning until you reach the ENDLOOP label.**

Execution Time? 17.6323784722 us

Calculations can be seen in Fig 1.5.2

1  $f = 11.0592 \cdot 10^6$  = 11059200

2  $t_{operation} = \frac{1}{f}$  =  $9.0422453704 \times 10^{-8}$

3  $n_{steps} = 195$

4  $t_{operation} \cdot n_{steps} \cdot 10^6$  = 17.6323784722

**Fig 1.5.2: Detailed Calculation**

The way  $n_{steps}$  was found was by running the code with a breakpoint at ENDLOOP and checking the machine states after reaching said loop, which was 195, as seen in Fig 1.5.3

wrong, each machine step is 12 oscillations

Register	Value
r0	0x00
r1	0x00
r2	0x00
r3	0x00
r4	0x00
r5	0x00
r6	0x00
r7	0x00
[-] Sys	
a	0x01
b	0x07
sp	0x00
sp_max	0x07
dptr	0x0000
PC \$	C:0x0031
states	195
sec	0.00005850
[+] psw	0xc1

Fig 1.5.3: Register display after running code to ENDLOOP