

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

| 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