Report For Lab 5

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EEN 312

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**Objective:**

Write two different programs that turns on different LED lights for periods of time by using the timer registers. This requires understanding how the timer in the 8051 functions.

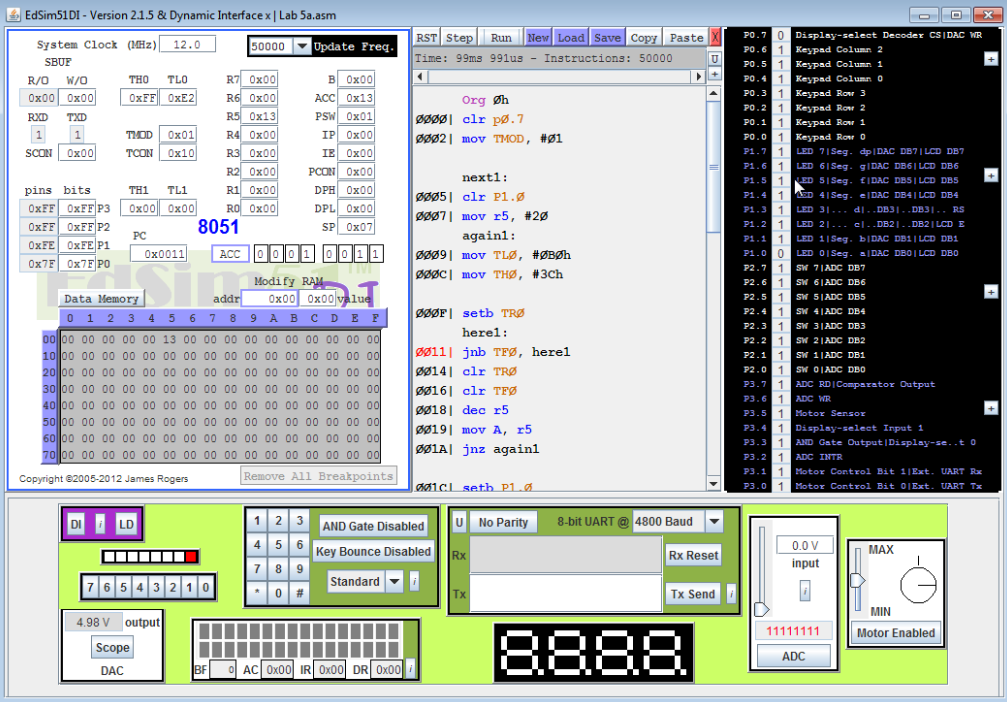
**Equipment:**

Software:

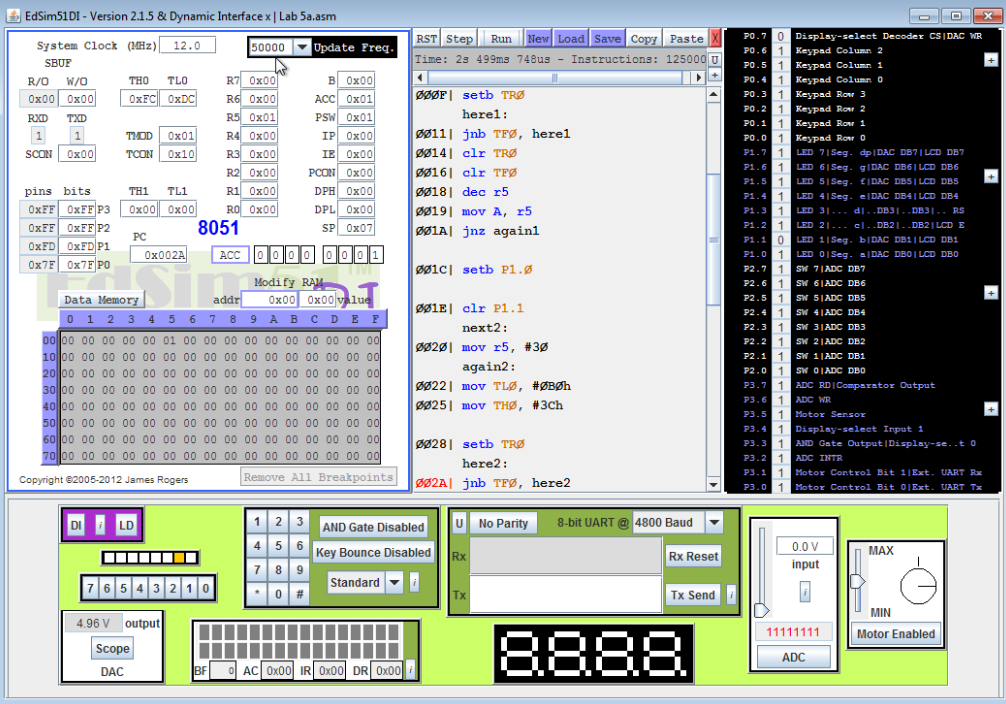
* Text editor and 8051 ASM assembler
* Step debugger to execute program one instruction at a time
* Data memory, accumulator, code memory
* Built in LED lights

**Results:**

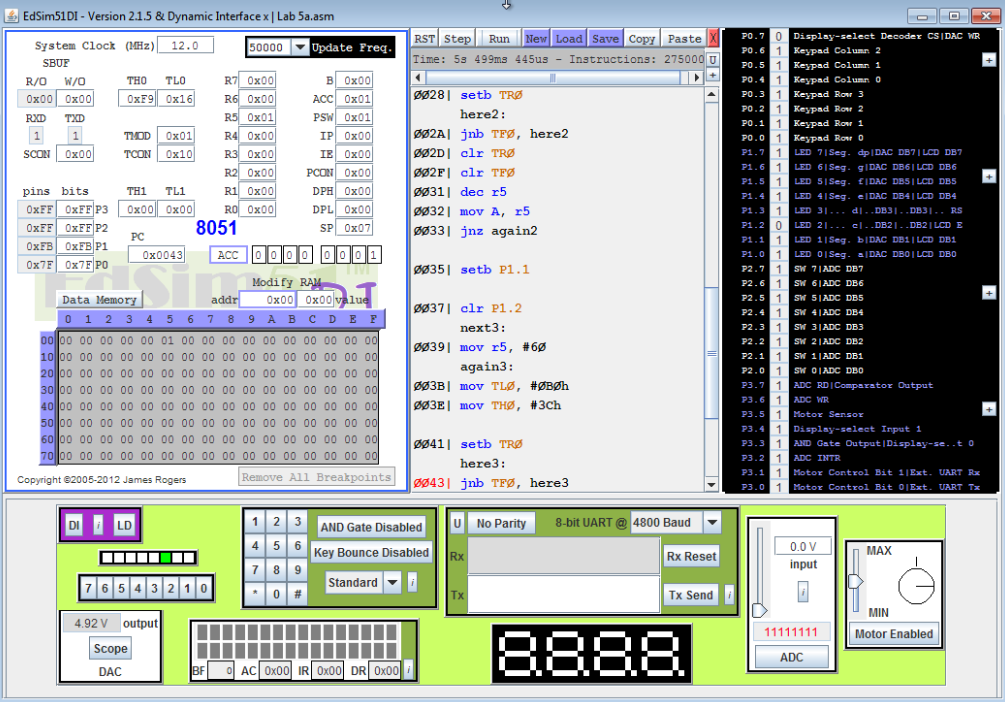
Part A: LED 0 is on for 1 second.

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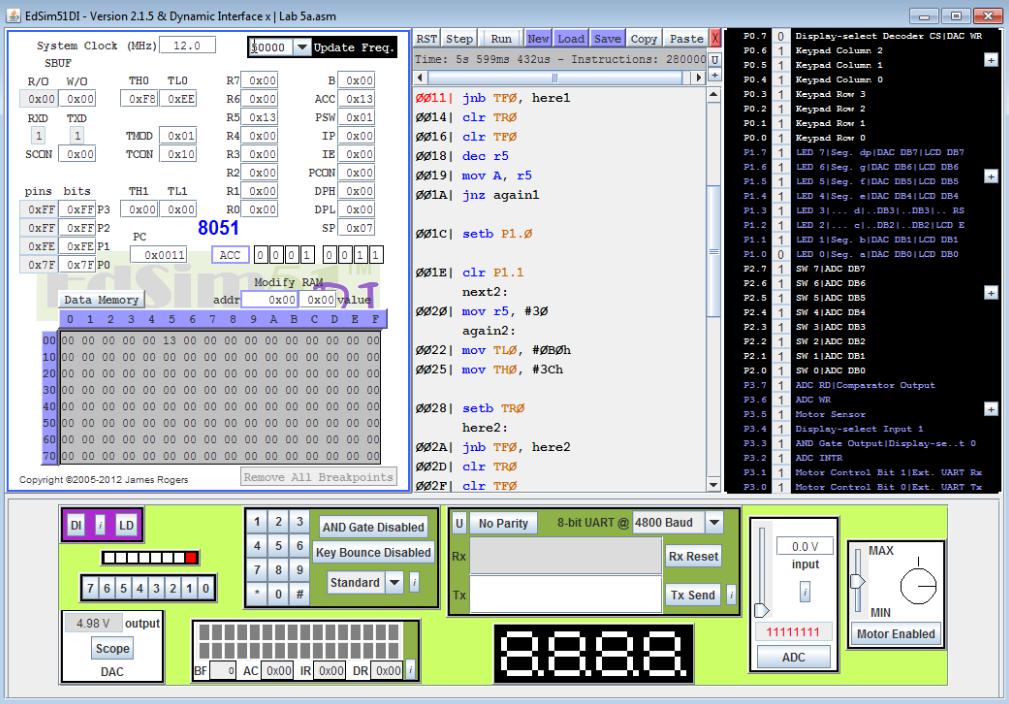
Part A: LED 1 is on for 1.5 seconds

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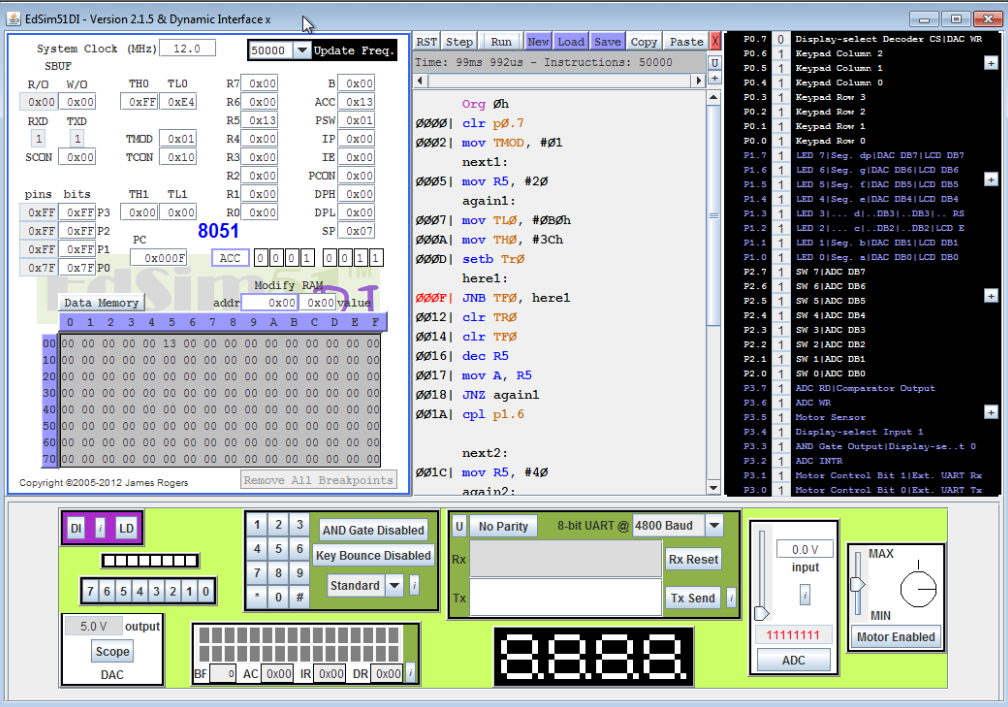
Part A: LED 2 is on for 2 seconds

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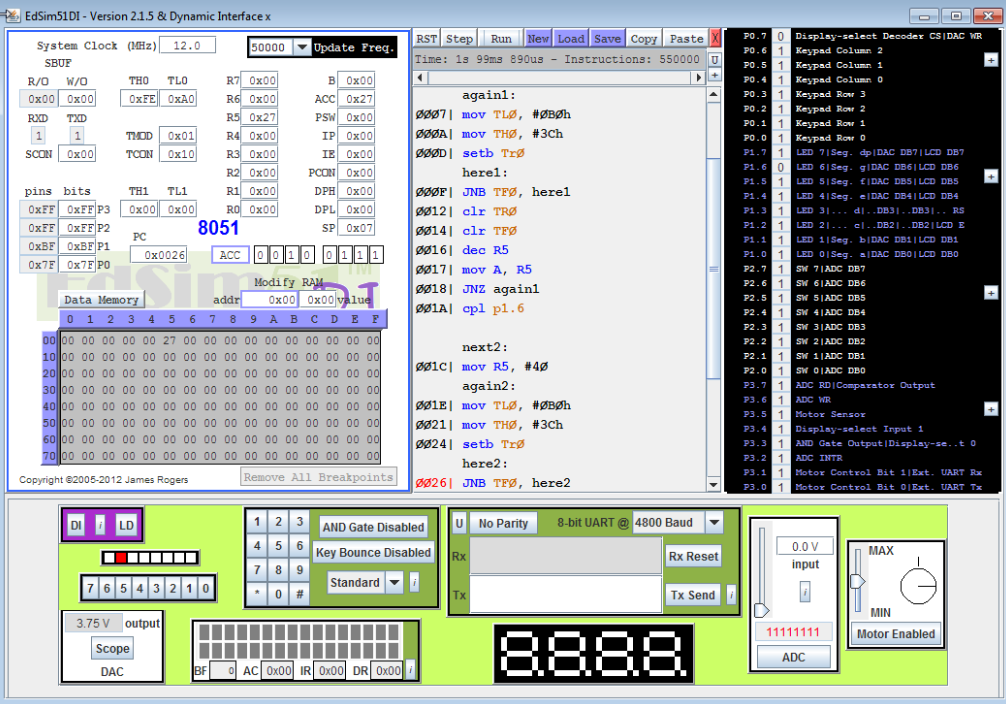
Part A: Sequence repeats indefinitely

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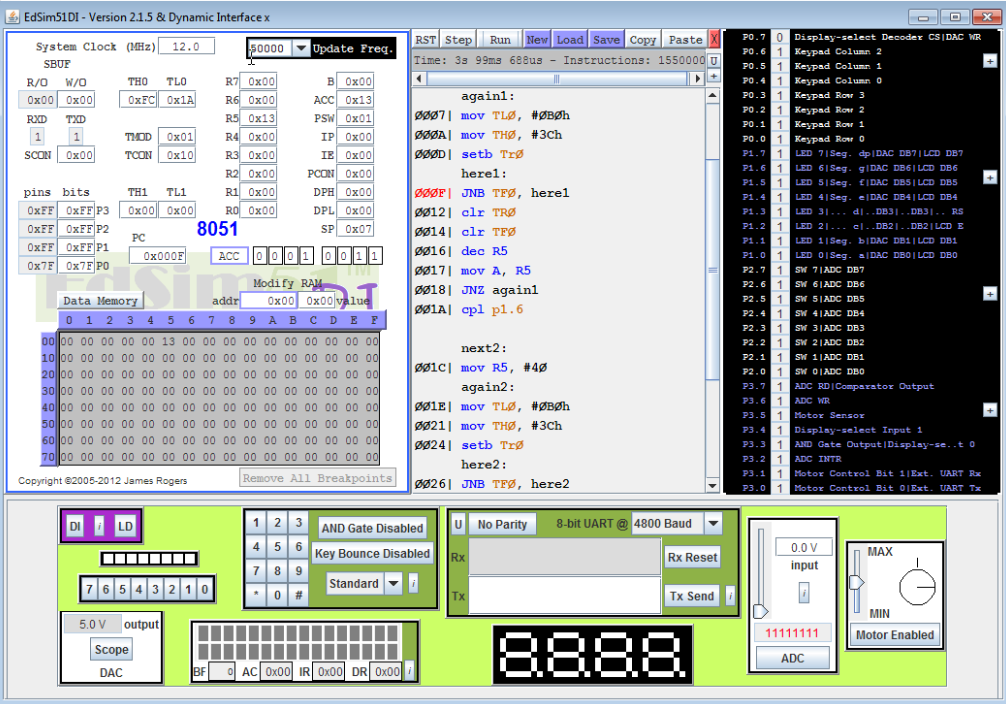
Part B: Light is off for one initially

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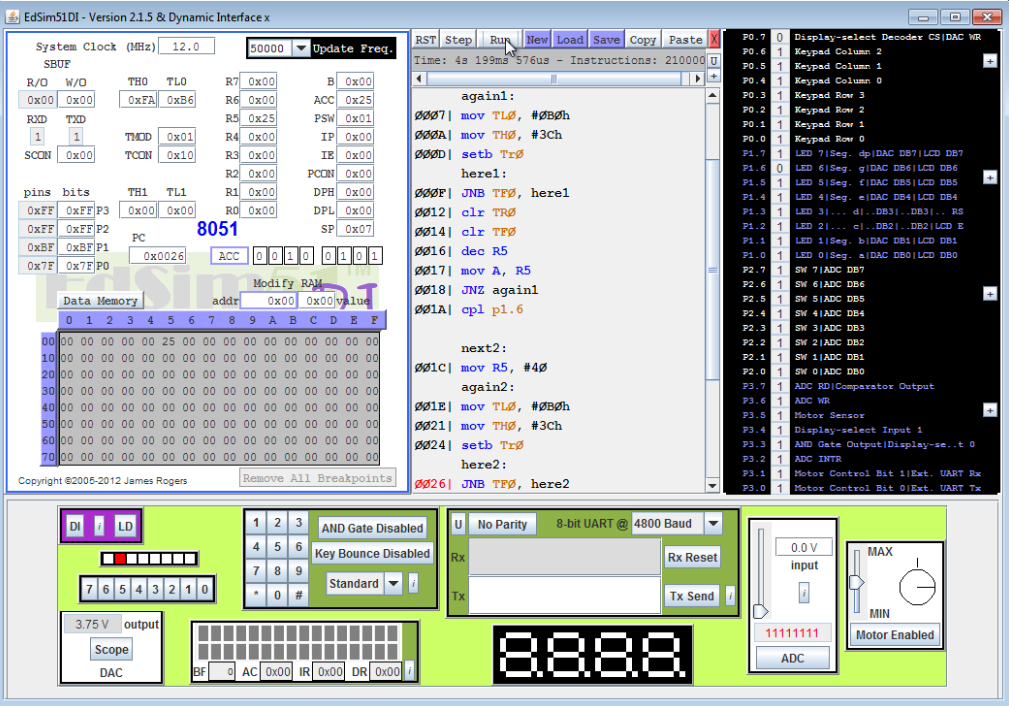
Part B: Light complimented after one second.

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Part B: Light complimented again after 2 seconds

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Part B: Light complimented again after 1 second.

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**Conclusion:**

This lab taught the importance of understanding how timers work in the 8051 so that operations can occur at normal intervals. The 8051 can’t just be told to wait a certain time, it has to loop until the timer has gone through a certain number of cycles. This requires knowledge of how long each cycle takes in order to calculate the number of times the timer has to loop.

**Code:**

Lab 5a

Org 0h  
clr p0.7  
mov TMOD, #01 ; Timer mode 1

next1:  
clr P1.0 ; Turn on LED 0  
mov r5, #20 ; Timer will be for 1 second based on this register

again1:  
mov TL0, #0B0h  
mov TH0, #3Ch

setb TR0

here1:  
jnb TF0, here1  
clr TR0  
clr TF0  
dec r5  
mov A, r5  
jnz again1 ; Do again loop 20 times by decrementing each time

setb P1.0 ; Turn off LED 0

clr P1.1 ; Turn on LED 1

next2:  
mov r5, #30 ; Timer will go for 1.5 seconds

again2:  
mov TL0, #0B0h  
mov TH0, #3Ch

setb TR0

here2:  
jnb TF0, here2  
clr TR0  
clr TF0  
dec r5  
mov A, r5  
jnz again2

setb P1.1 ; Turn off LED 1

clr P1.2 ; Turn on LED 2

next3:  
mov r5, #60 ; Timer will go for 3 seconds  
again3:  
mov TL0, #0B0h  
mov TH0, #3Ch

setb TR0

here3:  
jnb TF0, here3  
clr TR0  
clr TF0  
dec r5  
mov A, r5  
jnz again3  
setb P1.2 ; Turn off LED 2  
LJMP next1 ; Start over at end  
End

Lab 5b

Org 0h  
clr p0.7  
mov TMOD, #01  
next1:  
mov R5, #20 ; Timer will be for 1 second

again1:  
mov TL0, #0B0h  
mov TH0, #3Ch  
setb Tr0

here1:  
JNB TF0, here1  
clr TR0  
clr TF0  
dec R5  
mov A, R5  
JNZ again1  
cpl p1.6 ; Compliment P1.6

next2:  
mov R5, #40 ; Timer will be for two seconds

again2:  
mov TL0, #0B0h  
mov TH0, #3Ch  
setb Tr0

here2:  
JNB TF0, here2  
clr TR0  
clr TF0  
dec R5  
mov A, R5  
JNZ again2  
cpl p1.6  
ljmp next1 ; Keep doing indefinitely  
End