OC EXPERIMENT LAB 8

TITLE: Writing 8051 assembly language programs

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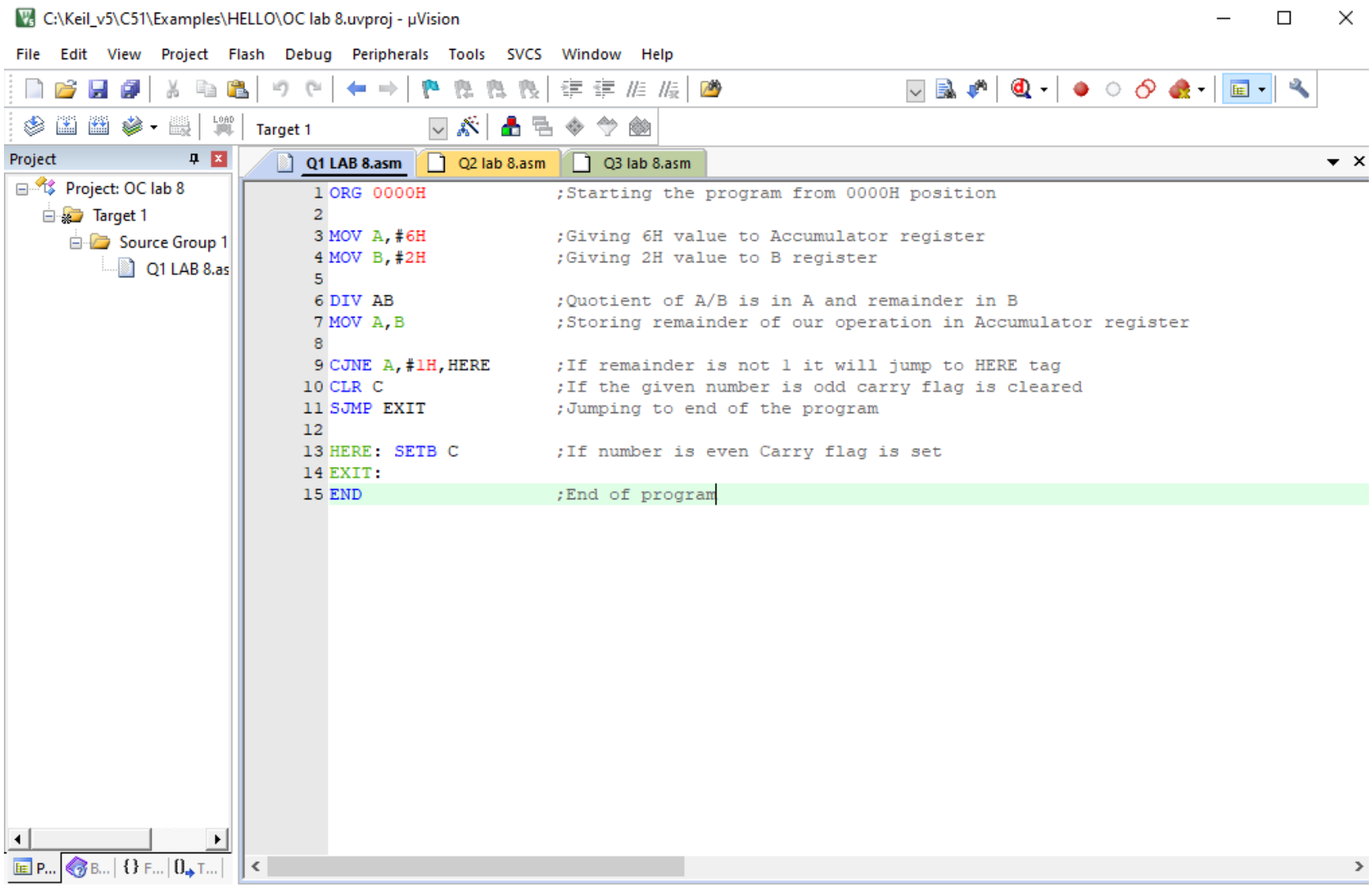
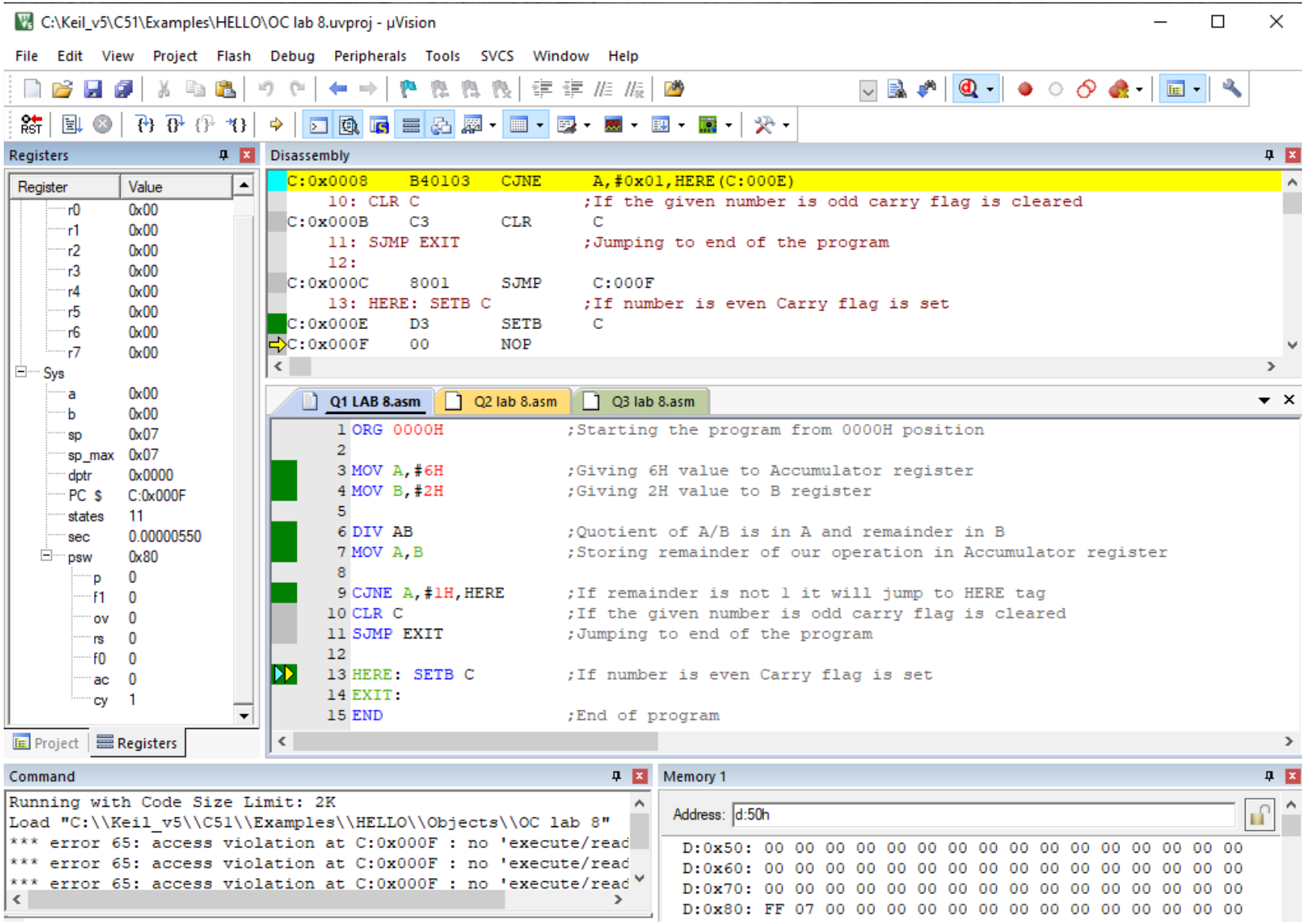
OBSERVATION: In this lab I learnt how to write advanced 8051 assembly language programs in keil software.

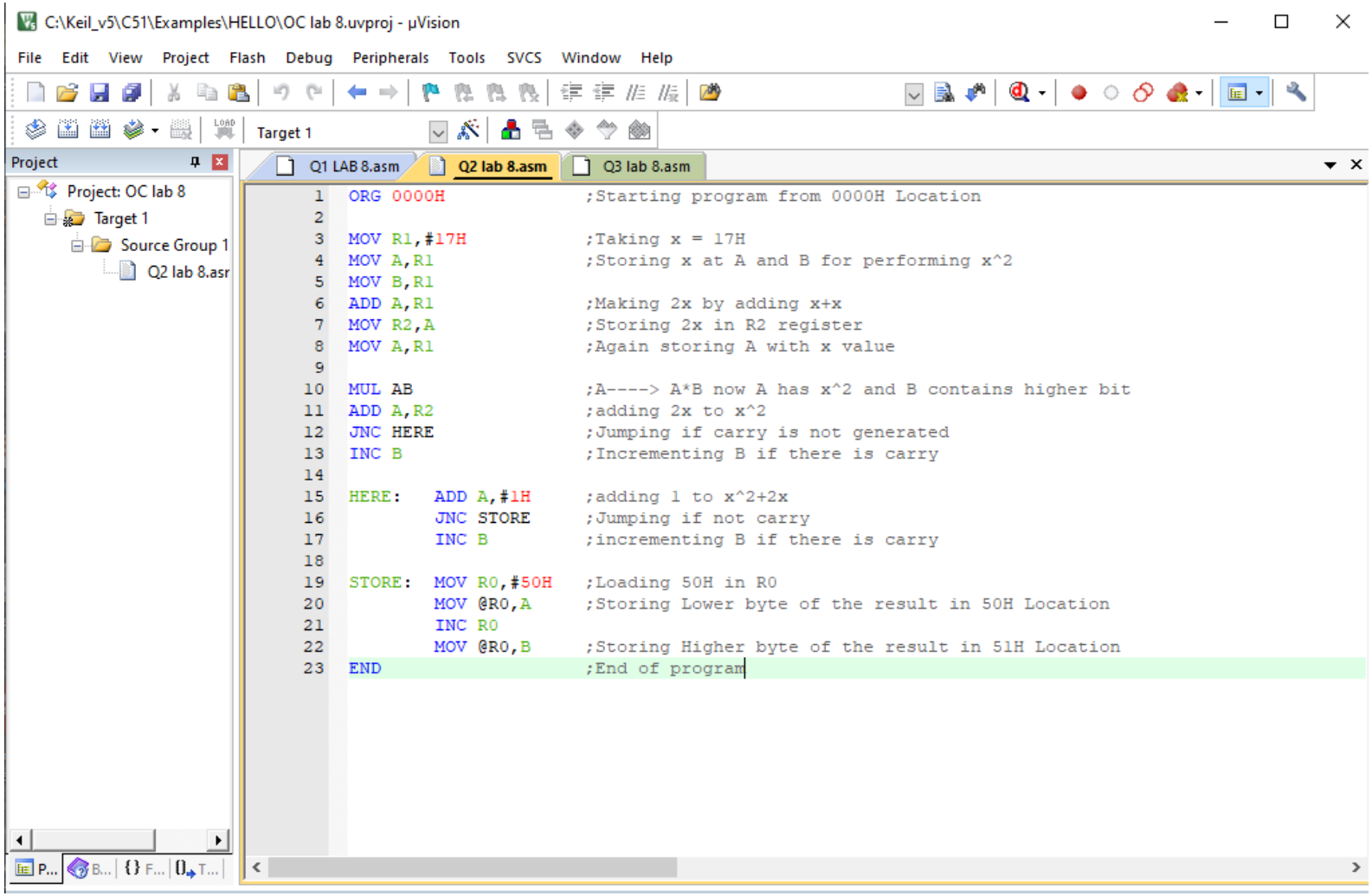
Q1. Write an 8051-assembly language program to detect whether a given number is even or odd. If number is even set ‘carry flag’ else ‘clear the carry flag’.

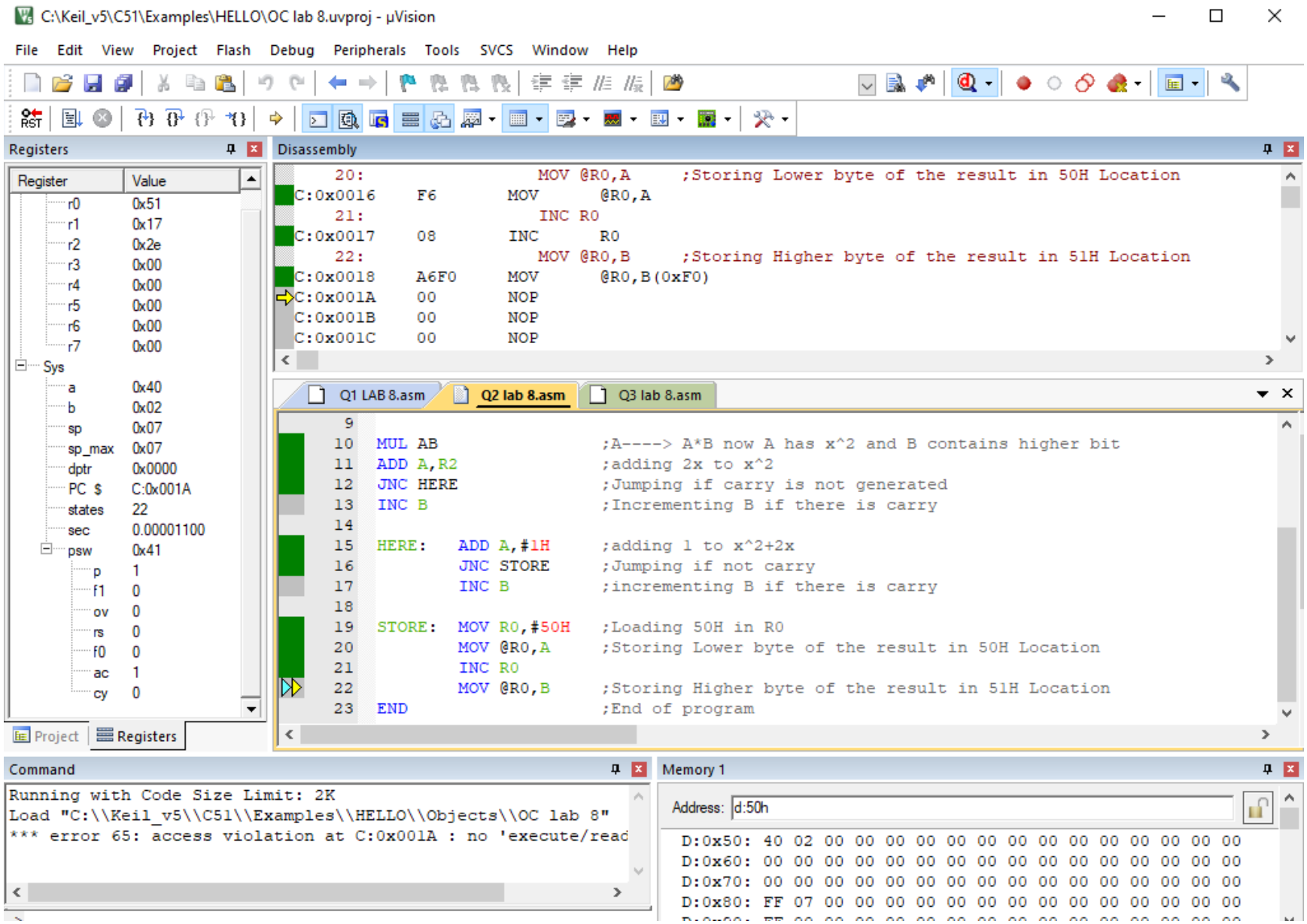

C:\Keil_v5\C51\Examples\HELLO\OC lab 8.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Project: OC lab 8
Target 1
Source Group 1
Q1 LAB 8.as
Q1 LAB 8.asm
Q2 lab 8.asm
Q3 lab 8.asm
1 ORG 0000H ;Starting the program from 0000H position
2
3 MOV A,#6H ;Giving 6H value to Accumulator register
4 MOV B,#2H ;Giving 2H value to B register
5
6 DIV AB ;Quotient of A/B is in A and remainder in B
7 MOV A,B ;Storing remainder of our operation in Accumulator register
8
9 CJNE A,#1H,HERE ;If remainder is not 1 it will jump to HERE tag
10 CLR C ;If the given number is odd carry flag is cleared
11 SJMP EXIT ;Jumping to end of the program
12
13 HERE: SETB C ;If number is even Carry flag is set
14 EXIT:
15 END ;End of program


C:\Keil_v5\C51\Examples\HELLO\OC lab 8.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Registers
Register Value
r0 0x00
r1 0x00
r2 0x00
r3 0x00
r4 0x00
r5 0x00
r6 0x00
r7 0x00
Sys
a 0x00
b 0x00
sp 0x07
sp_max 0x07
dptr 0x0000
PC $ C:0x000F
states 11
sec 0.00000550
psw 0x80
p 0
f1 0
ov 0
rs 0
f0 0
ac 0
cy 1
Project
Registers
Disassembly
C:0x0008 B40103 CJNE A,#0x01,HERE(C:000E)
10: CLR C ;If the given number is odd carry flag is cleared
C:0x000B C3 CLR C
11: SJMP EXIT ;Jumping to end of the program
12:
C:0x000C 8001 SJMP C:000F
13: HERE: SETB C ;If number is even Carry flag is set
C:0x000E D3 SETB C
C:0x000F 00 NOP
Q1 LAB 8.asm
Q2 lab 8.asm
Q3 lab 8.asm
1 ORG 0000H ;Starting the program from 0000H position
2
3 MOV A,#6H ;Giving 6H value to Accumulator register
4 MOV B,#2H ;Giving 2H value to B register
5
6 DIV AB ;Quotient of A/B is in A and remainder in B
7 MOV A,B ;Storing remainder of our operation in Accumulator register
8
9 CJNE A,#1H,HERE ;If remainder is not 1 it will jump to HERE tag
10 CLR C ;If the given number is odd carry flag is cleared
11 SJMP EXIT ;Jumping to end of the program
12
13 HERE: SETB C ;If number is even Carry flag is set
14 EXIT:
15 END ;End of program
Command
Running with Code Size Limit: 2K
Load "C:\\Keil_v5\\C51\\Examples\\HELLO\\Objects\\OC lab 8"
*** error 65: access violation at C:0x000F : no 'execute/read
*** error 65: access violation at C:0x000F : no 'execute/read
*** error 65: access violation at C:0x000F : no 'execute/read
Memory 1
Address: d:50h
D:0x50: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x80: FF 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Q2. Write an 8051-assembly language program to implement the following function using the concept of different addressing modes:

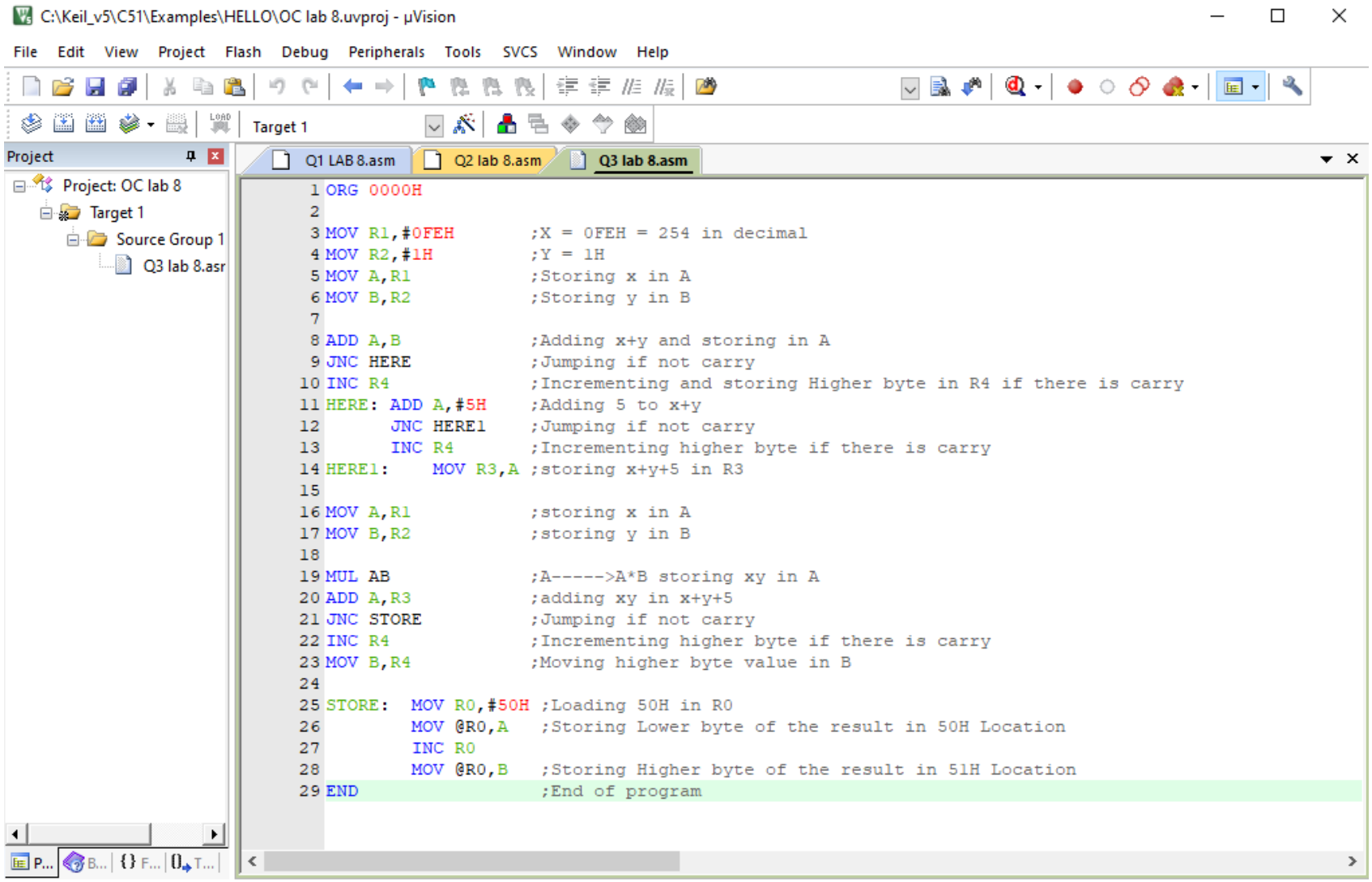
f(x) = x^2 + 2x + 1, where ‘x’ indicates a value/unsigned number

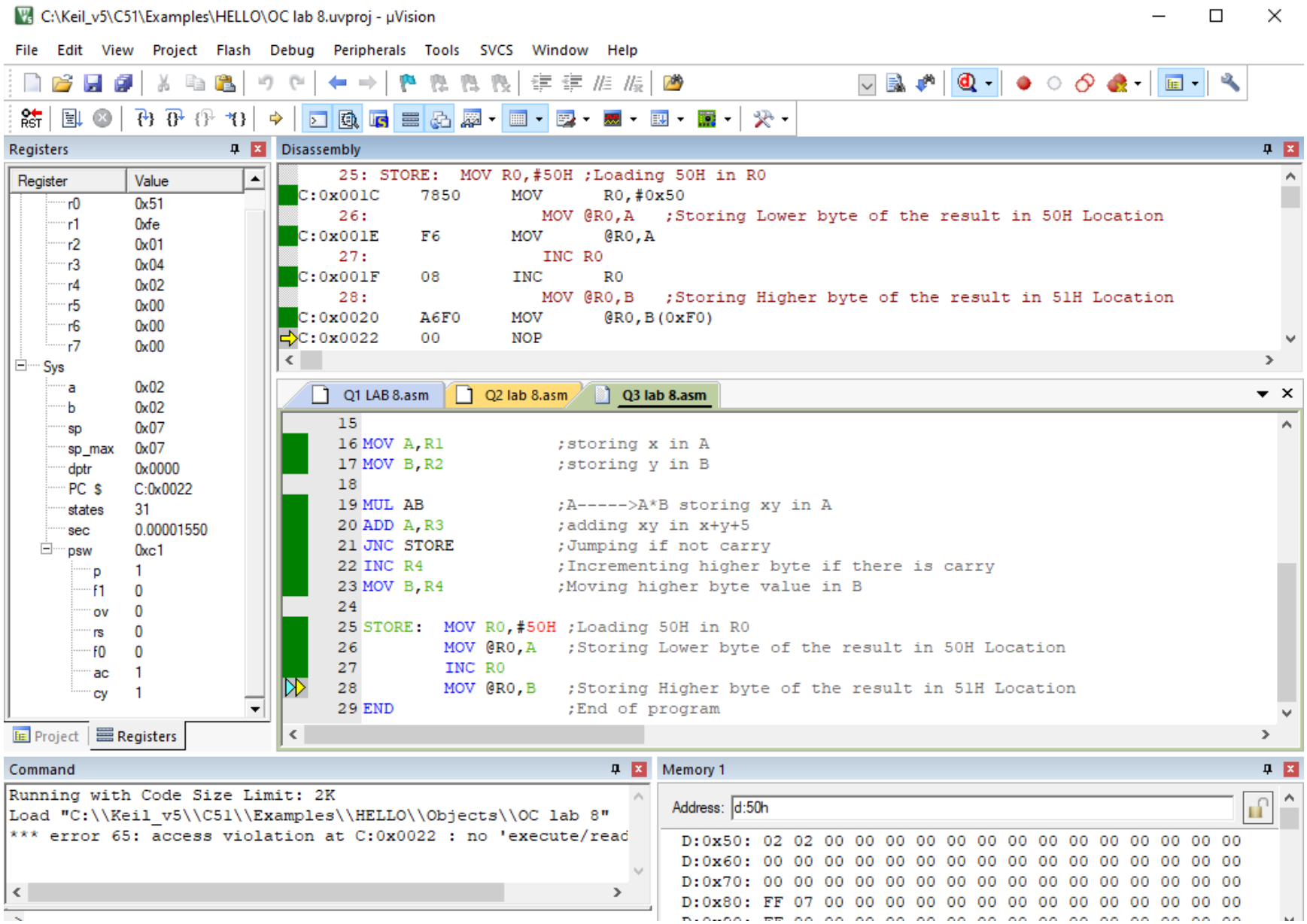



C:\Keil_v5\C51\Examples\HELLO\OC lab 8.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Registers
Register Value
r0 0x51
r1 0x17
r2 0x2e
r3 0x00
r4 0x00
r5 0x00
r6 0x00
r7 0x00
Sys
a 0x40
b 0x02
sp 0x07
sp_max 0x07
dptr 0x0000
PC $ C:0x001A
states 22
sec 0.00001100
psw 0x41
p 1
f1 0
ov 0
rs 0
f0 0
ac 1
cy 0
Project Registers
Disassembly
20: MOV @R0,A ;Storing Lower byte of the result in 50H Location
C:0x0016 F6 MOV @R0,A
21: INC R0
C:0x0017 08 INC R0
22: MOV @R0,B ;Storing Higher byte of the result in 51H Location
C:0x0018 A6F0 MOV @R0,B(0xF0)
C:0x001A 00 NOP
C:0x001B 00 NOP
C:0x001C 00 NOP
Q1 LAB 8.asm
Q2 lab 8.asm
Q3 lab 8.asm
9
10 MUL AB ;A----> A*B now A has x^2 and B contains higher bit
11 ADD A,R2 ;adding 2x to x^2
12 JNC HERE ;Jumping if carry is not generated
13 INC B ;Incrementing B if there is carry
14
15 HERE: ADD A,#1H ;adding 1 to x^2+2x
16 JNC STORE ;Jumping if not carry
17 INC B ;incrementing B if there is carry
18
19 STORE: MOV R0,#50H ;Loading 50H in R0
20 MOV @R0,A ;Storing Lower byte of the result in 50H Location
21 INC R0
22 MOV @R0,B ;Storing Higher byte of the result in 51H Location
23 END ;End of program
Command
Running with Code Size Limit: 2K
Load "C:\\Keil_v5\\C51\\Examples\\HELLO\\Objects\\OC lab 8"
*** error 65: access violation at C:0x001A : no 'execute/read
Memory 1
Address: d:50h
D:0x50: 40 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x80: FF 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Q3. Write an 8051-assembly language program to implement the following function:

f (x, y) = x + y + xy + 5, where ‘x’ and ‘y’ indicate a value/unsigned number




C:\Keil_v5\C51\Examples\HELLO\OC lab 8.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Registers
Register Value
r0 0x51
r1 0xfe
r2 0x01
r3 0x04
r4 0x02
r5 0x00
r6 0x00
r7 0x00
Sys
a 0x02
b 0x02
sp 0x07
sp_max 0x07
dptr 0x0000
PC $ C:0x0022
states 31
sec 0.00001550
psw 0xc1
p 1
f1 0
ov 0
rs 0
f0 0
ac 1
cy 1
Project
Registers
Disassembly
25: STORE: MOV R0,#50H ;Loading 50H in R0
C:0x001C 7850 MOV R0,#0x50
26: MOV @R0,A ;Storing Lower byte of the result in 50H Location
C:0x001E F6 MOV @R0,A
27: INC R0
C:0x001F 08 INC R0
28: MOV @R0,B ;Storing Higher byte of the result in 51H Location
C:0x0020 A6F0 MOV @R0,B(0xF0)
C:0x0022 00 NOP
Q1 LAB 8.asm
Q2 lab 8.asm
Q3 lab 8.asm
15
16 MOV A,R1 ;storing x in A
17 MOV B,R2 ;storing y in B
18
19 MUL AB ;A----->A*B storing xy in A
20 ADD A,R3 ;adding xy in x+y+5
21 JNC STORE ;Jumping if not carry
22 INC R4 ;Incrementing higher byte if there is carry
23 MOV B,R4 ;Moving higher byte value in B
24
25 STORE: MOV R0,#50H ;Loading 50H in R0
26 MOV @R0,A ;Storing Lower byte of the result in 50H Location
27 INC R0
28 MOV @R0,B ;Storing Higher byte of the result in 51H Location
29 END ;End of program
Command
Running with Code Size Limit: 2K
Load "C:\\Keil_v5\\C51\\Examples\\HELLO\\Objects\\OC lab 8"
*** error 65: access violation at C:0x0022 : no 'execute/read
Memory 1
Address: d:50h
D:0x50: 02 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x70: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
D:0x80: FF 07 00 00 00 00 00 00 00 00 00 00 00 00 00 00