

LAB 01

COMPUTER ORGANIZATION AND ASSEMBLY LANG(COAL)



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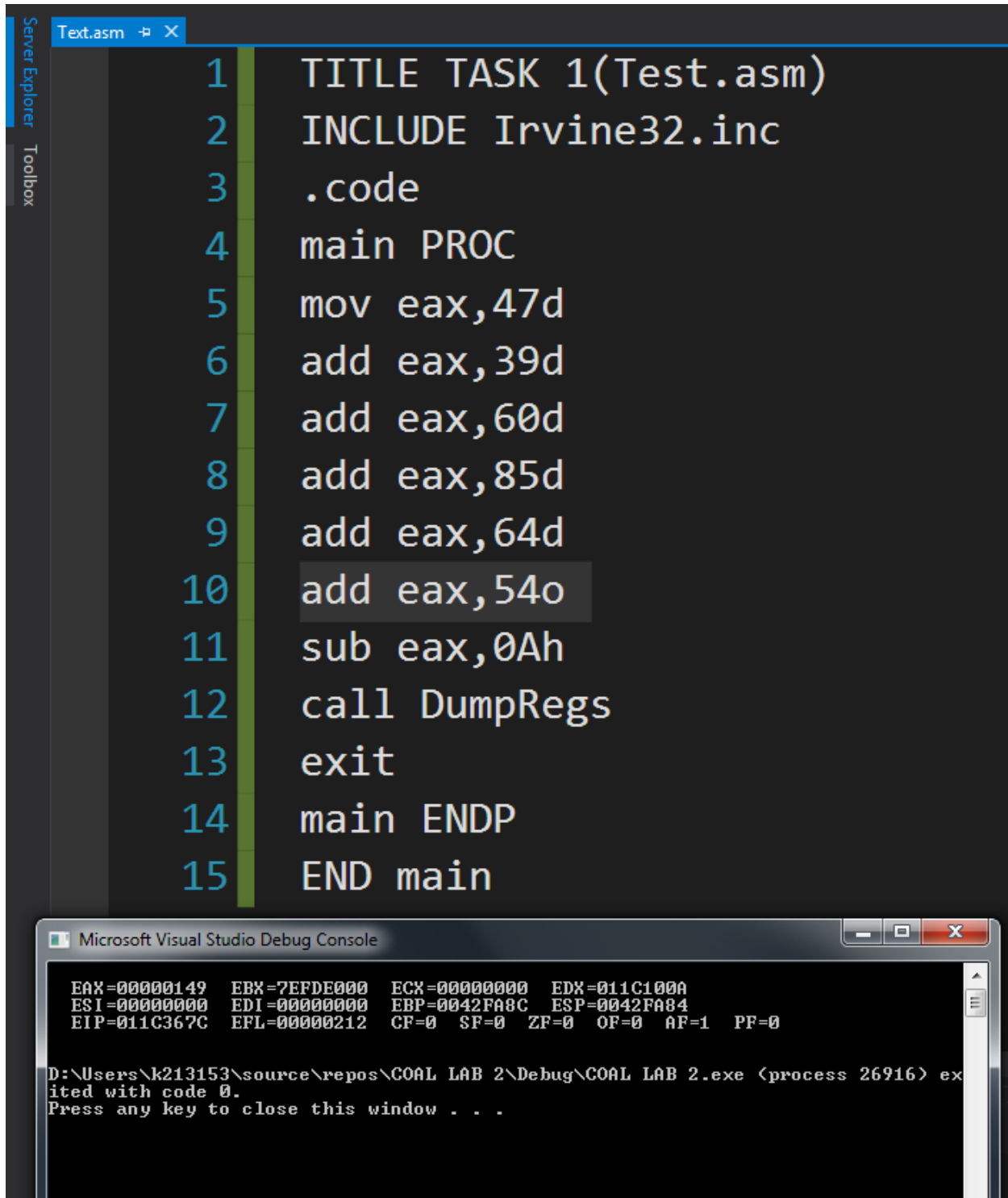
MARKS AWARDED: _____

NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
(NUCES), KARACHI

Task 01:

Assigned a value to EAX register and added the other values one by one and line by line. This was done because the add command can only have two variables.

$47 + 39 + 60 + 85 + 64 + 54 - 0Ah$



The image shows a screenshot of the Visual Studio IDE. The top window, titled 'Text.asm', displays assembly code for a task. The code is as follows:

```
1  TITLE TASK 1(Test.asm)
2  INCLUDE Irvine32.inc
3  .code
4  main PROC
5  mov  eax,47d
6  add  eax,39d
7  add  eax,60d
8  add  eax,85d
9  add  eax,64d
10 add  eax,54o
11 sub  eax,0Ah
12 call DumpRegs
13 exit
14 main ENDP
15 END main
```

The bottom window, titled 'Microsoft Visual Studio Debug Console', shows the state of the registers and the program's exit message:

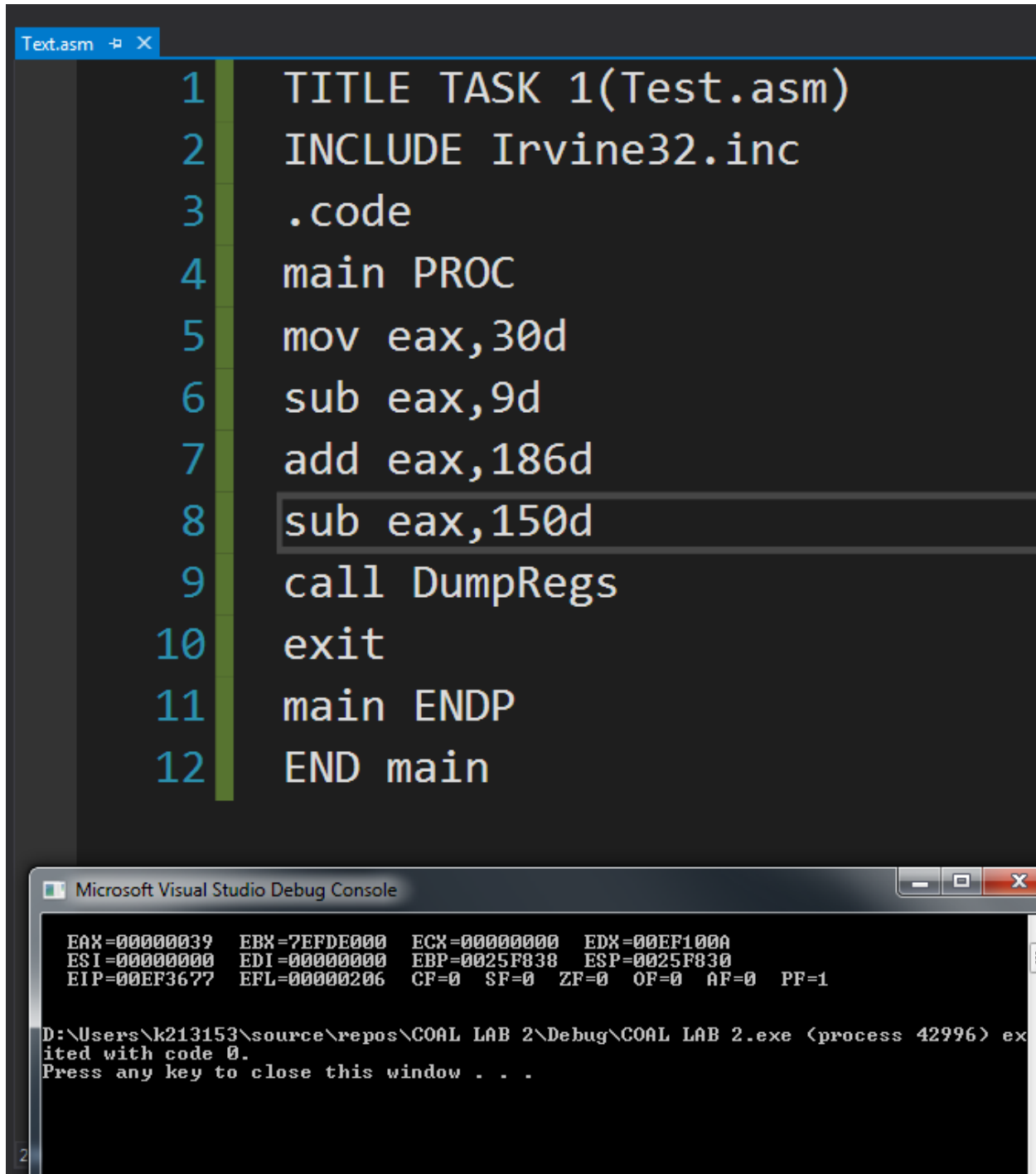
```
EAX=00000149  EBX=7EFDE000  ECX=00000000  EDX=011C100A
ESI=00000000  EDI=00000000  EBP=0042FA8C  ESP=0042FA84
EIP=011C367C  EFL=00000212  CF=0  SF=0  ZF=0  OF=0  AF=1  PF=0

D:\Users\k213153\source\repos\COAL LAB 2\Debug\COAL LAB 2.exe (process 26916) exited with code 0.
Press any key to close this window . . .
```

Task 02:

Assigned a value to EAX register and added the other values one by one and line by line. This was done because the add command can only have two variables.

$30 - 9 + 186 - 150$



The image shows a screenshot of the Visual Studio IDE. The top window, titled 'Text.asm', contains the following assembly code:

```
1  TITLE TASK 1(Test.asm)
2  INCLUDE Irvine32.inc
3  .code
4  main PROC
5  mov  eax,30d
6  sub  eax,9d
7  add  eax,186d
8  sub  eax,150d
9  call DumpRegs
10 exit
11 main ENDP
12 END main
```

The bottom window, titled 'Microsoft Visual Studio Debug Console', displays the state of the registers and the program's exit status:

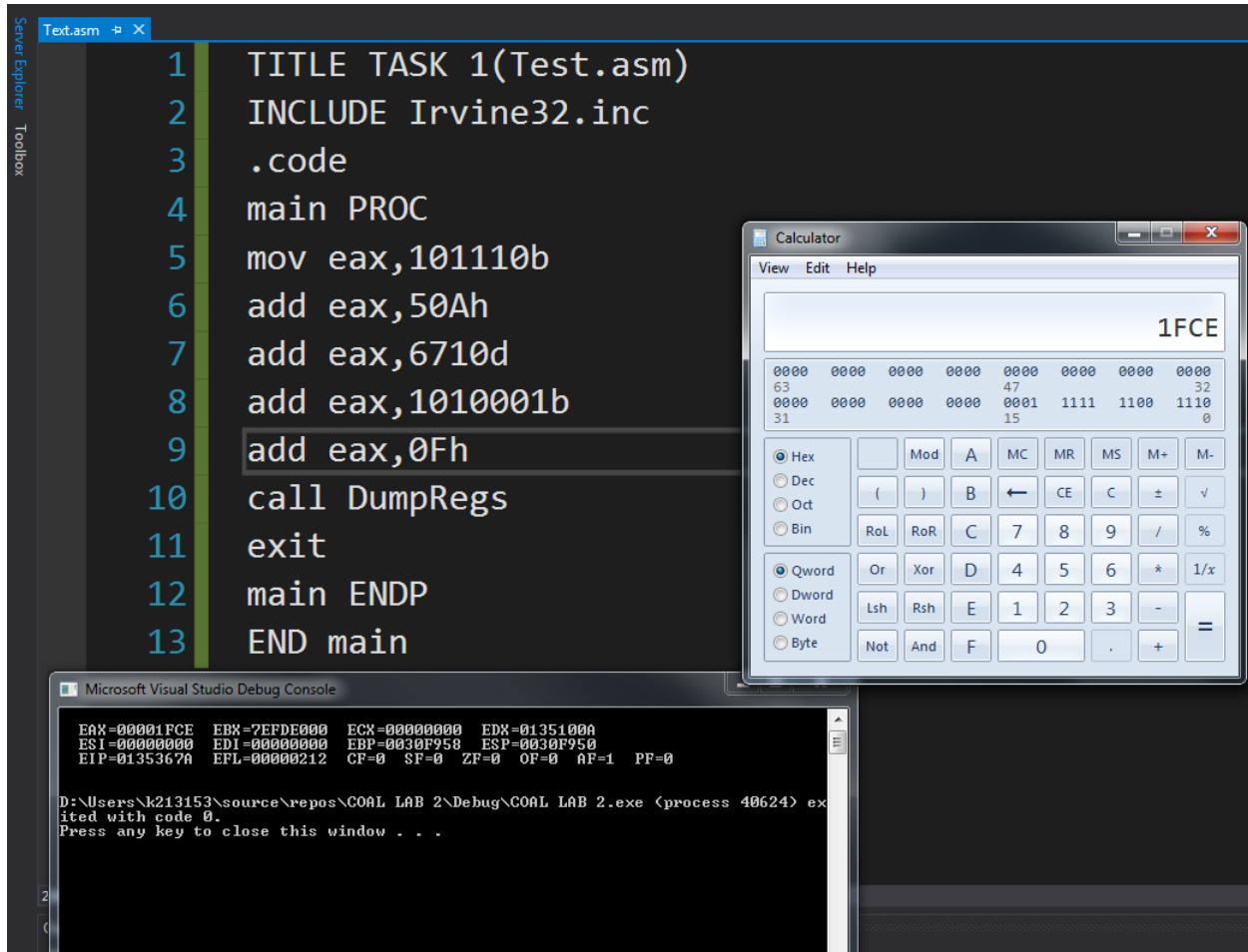
```
EAX=00000039  EBX=7EFDE000  ECX=00000000  EDI=00EF100A
ESI=00000000  EDI=00000000  EBP=0025F838  ESP=0025F830
EIP=00EF3677  EFL=00000206  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=1

D:\Users\k213153\source\repos\COAL LAB 2\Debug\COAL LAB 2.exe (process 42996) ex
ited with code 0.
Press any key to close this window . . .
```

Task 03:

Assigned a value to EAX register and added the other values one by one and line by line. This was done because the add command can only have two variables.

101110 + 50Ah + 6710d + 1010001 + F



Task 04:

Assigned a value to EAX register and added the other values one by one and line by line. This was done because the add command can only have two variables.

10001101 – D83h + 385+10 + 1111101 – E+F

The screenshot displays the Visual Studio IDE with three windows open:

- Text.asm:** Contains assembly code for a task. The code starts with a title, includes Irvine32.inc, and defines a main procedure. It initializes EAX to 10001101b, then performs a series of additions and subtractions: subtracts 0D83h, adds 385d, adds 10b, adds 1111101b, subtracts 0Eh, and adds 0Fh. Finally, it calls DumpRegs and exits.
- Calculator:** A standard Windows calculator window showing the hexadecimal value FFFFFFFF50B. The display is in Hex mode.
- Microsoft Visual Studio Debug Console:** Shows the state of the registers after the execution of the assembly code. The EAX register contains FFFFFFFF50B, which matches the value in the calculator. Other registers like EBX, ECX, EDX, ESI, EDI, EBP, ESP, EIP, EFL, CF, SF, ZF, OF, AF, and PF are also listed with their values.

```
1  TITLE TASK 1(Test.asm)
2  INCLUDE Irvine32.inc
3  .code
4  main PROC
5  mov eax,10001101b
6  sub eax,0D83h
7  add eax,385d
8  add eax,10b
9  add eax,1111101b
10 sub eax,0Eh
11 add eax,0Fh
12 call DumpRegs
13 exit
```

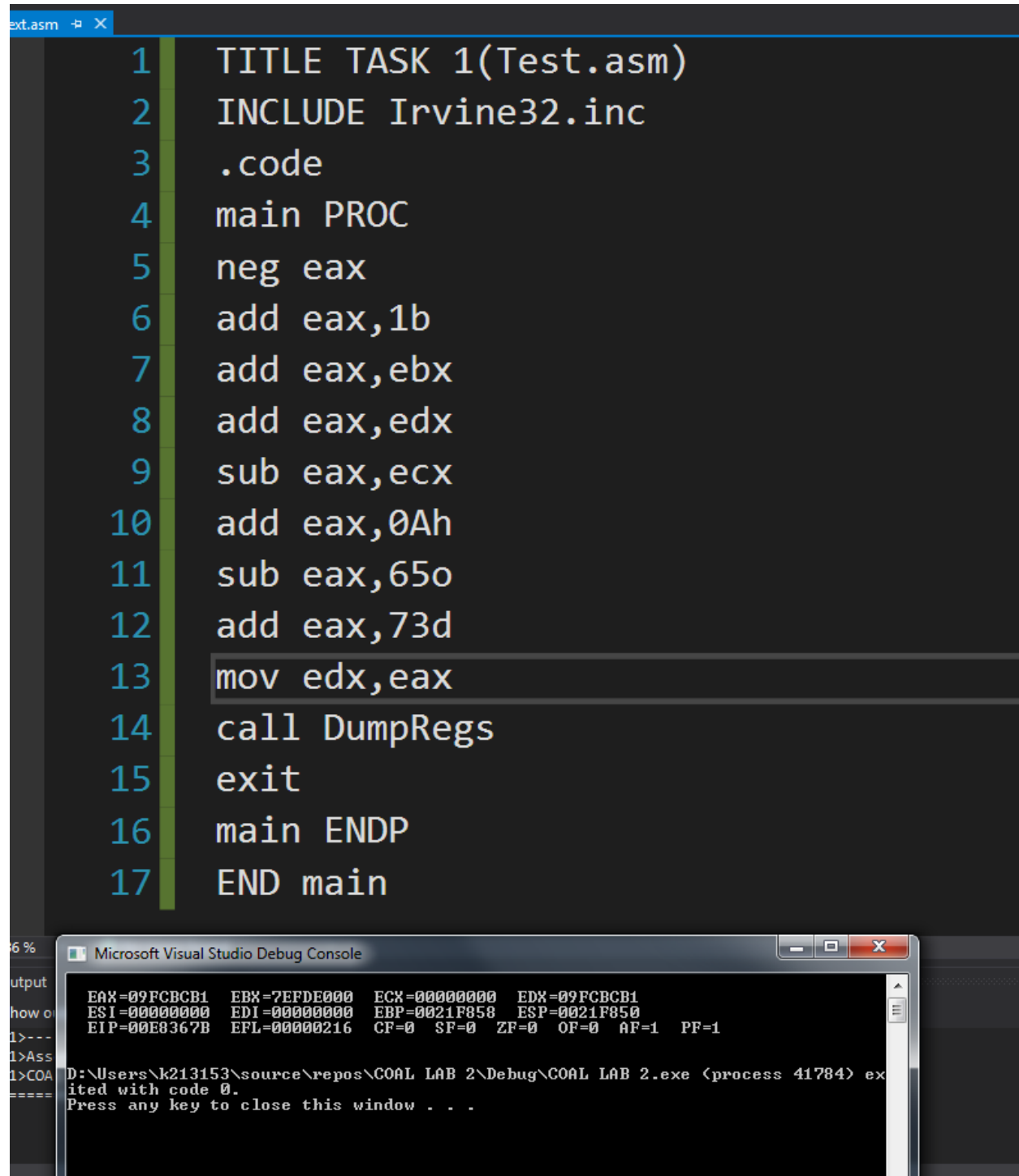
EAX=FFFFFF50B EBX=7EFDE000 ECX=00000000 EDX=0111100A
ESI=00000000 EDI=00000000 EBP=002DFA98 ESP=002DFA90
EIP=01113680 EFL=00000292 CF=0 SF=1 ZF=0 OF=0 AF=1 PF=0

D:\Users\k213153\source\repos\COAL LAB 2\Debug\COAL LAB 2.exe (process 17404) ex
ited with code 0.
Press any key to close this window . . .

Task 05:

Learned the negate command, using it on `-eax` by writing `neg eax`. Then we carried out the arithmetic operations on `eax` and then assigned it to `edx`.

$edx = -eax + 1 + ebx + edx - ecx + 0Ah - 650 + 73d$



```
ext.asm  X
1  TITLE TASK 1(Test.asm)
2  INCLUDE Irvine32.inc
3  .code
4  main PROC
5      neg eax
6      add eax,1b
7      add eax,ebx
8      add eax,edx
9      sub eax,ecx
10     add eax,0Ah
11     sub eax,650
12     add eax,73d
13     mov edx,eax
14     call DumpRegs
15     exit
16 main ENDP
17 END main
```

Microsoft Visual Studio Debug Console

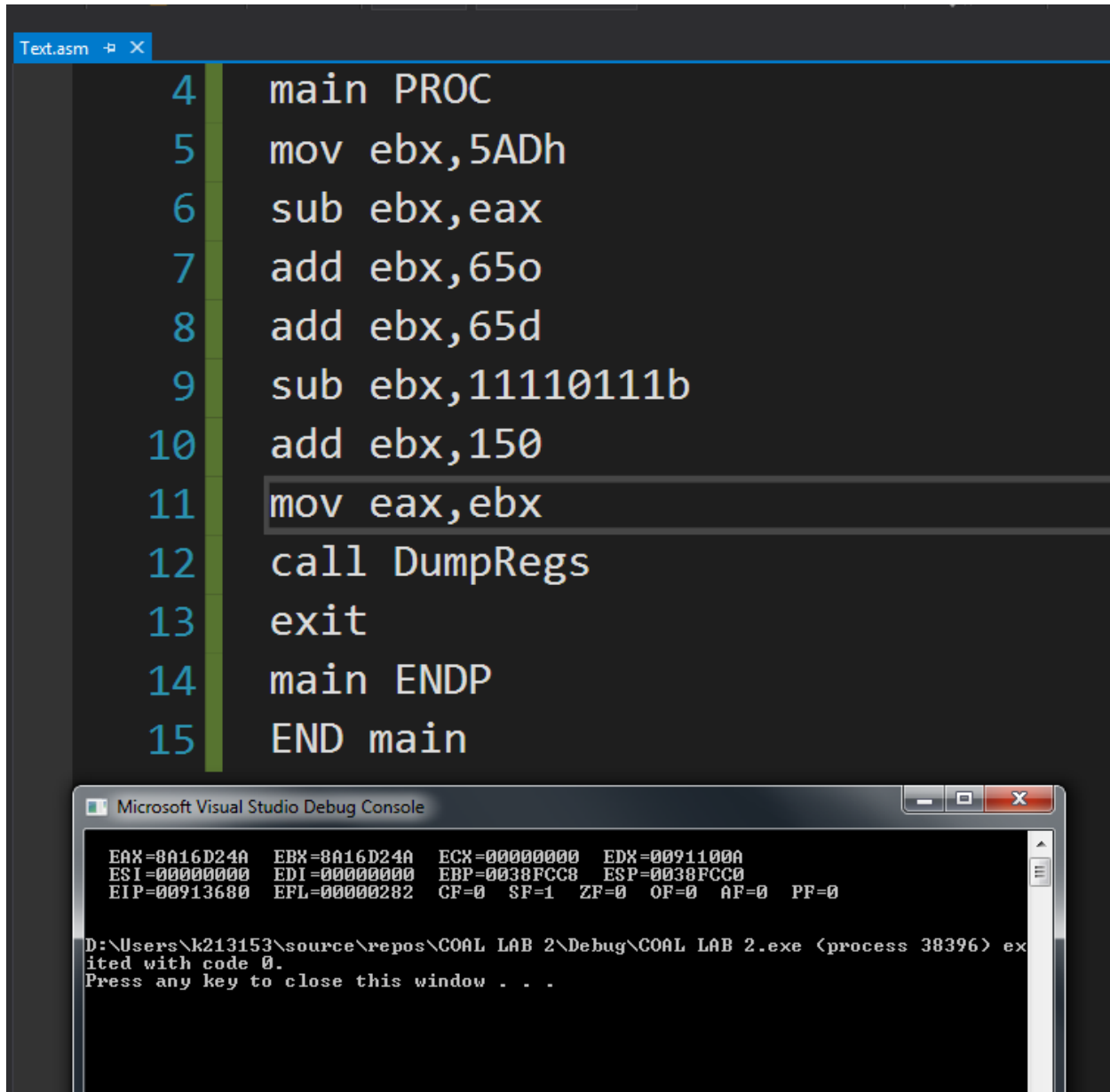
EAX=09FCBCB1	EBX=7EFDE000	ECX=00000000	EDX=09FCBCB1
ESI=00000000	EDI=00000000	EBP=0021F858	ESP=0021F850
EIP=00E8367B	EFL=00000216	CF=0	SF=0 ZF=0 OF=0 AF=1 PF=1

D:\Users\k213153\source\repos\COAL LAB 2\Debug\COAL LAB 2.exe (process 41784) exited with code 0.
Press any key to close this window . . .

Task 06:

Circumvented using negate, assigned 5ADh to ebx and performed all arithmetic on it. The final step was assigning the value of ebx to eax

$eax = 5ADh - eax + 650 + 65d - 11110111 + 150$



The image shows a Visual Studio IDE window with a file named 'Text.asm' open. The assembly code is as follows:

```
4  main PROC
5  mov ebx,5ADh
6  sub ebx,eax
7  add ebx,650
8  add ebx,65d
9  sub ebx,11110111b
10 add ebx,150
11 mov eax,ebx
12 call DumpRegs
13 exit
14 main ENDP
15 END main
```

Below the code editor, the 'Microsoft Visual Studio Debug Console' is open, displaying the state of the registers and the program's exit status:

```
EAX=8A16D24A  EBX=8A16D24A  ECX=00000000  EDI=0091100A
ESI=00000000  EDI=00000000  EBP=0038FCC8  ESP=0038FCC0
EIP=00913680  EFL=00000282  CF=0  SF=1  ZF=0  OF=0  AF=0  PF=0

D:\Users\k213153\source\repos\COAL LAB 2\Debug\COAL LAB 2.exe (process 38396) ex
ited with code 0.
Press any key to close this window . . .
```