

COAL

LAB04

23K2001

BCS-3J

Q1:

Finding Errors

MOV AX 3d

Syntax error: Must use , after destination & before source. E.g: MOV AX,3d

MOV 23, AX

Cannot move reg value to an immediate value. Should have been MOV AX,23

MOV CX, CH

MOV operator only works for the same size of both source & destination

MOVE AX, 1h

Syntax error: MOV is the operand to be used not 'MOVE'

ADD 2, CX

Cannot add reg value to an immediate value. Should have been ADD CX,2

ADD 3, 6

Cannot add immediate values to each other. Should use a reg to MOV one, then add

INC AX, 2

INC operator increments the operand by only one, so forcing '2' is a syntax error. More than 1 increment can be achieved by ADD AX,2

Q2:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc
```

```
.code
main PROC
mov eax, 0
mov ebx, 0
mov ecx, 0
mov edx, 0
```

```
mov eax, 778590d ; M-77 U-85 Z-90
call DumpRegs
```

```
exit
main ENDP
END main
```

The screenshot shows the Visual Studio IDE with the assembly file 'Lab04.asm' open. The code is as follows:

```
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3
4  .code
5  main PROC
6  mov eax, 0
7  mov ebx, 0
8  mov ecx, 0
9  mov edx, 0
10
11  mov eax, 778590d ; M-77 U-85 Z-90
12  call DumpRegs
13
14  exit
15  main ENDP
16  END main
17
```

The debug console on the right shows the state of the registers and the execution path:

```
EAX=000BE15E  EBX=00000000  ECX=00000000  EDX=00000000
ESI=00AF10AA  EDI=00AF10AA  EBP=010FFC0C  ESP=010FFC00
EIP=00AF367E  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

The console also displays the following message:

```
E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (proces
To automatically close the console when debugging stops, enable T
le when debugging stops.
Press any key to close this window . . .|
```

Q3:

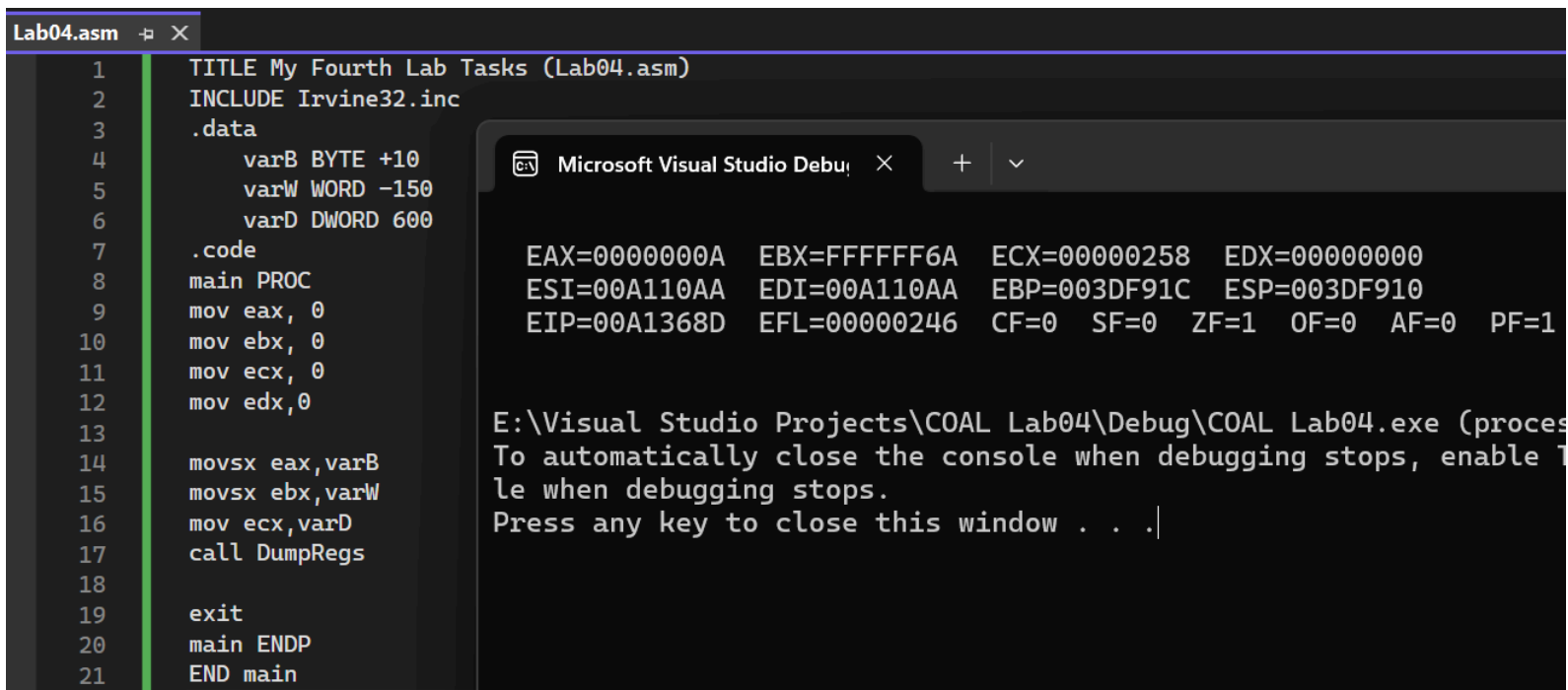
```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc

.data
    varB BYTE +10
    varW WORD -150
    varD DWORD 600

.code
main PROC
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0

    movsx eax, varB
    movsx ebx, varW
    mov ecx, varD
    call DumpRegs

    exit
main ENDP
END main
```



The screenshot shows the Visual Studio IDE with the assembly file 'Lab04.asm' open. The code is as follows:

```
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .data
4      varB BYTE +10
5      varW WORD -150
6      varD DWORD 600
7  .code
8  main PROC
9      mov eax, 0
10     mov ebx, 0
11     mov ecx, 0
12     mov edx, 0
13
14     movsx eax, varB
15     movsx ebx, varW
16     mov ecx, varD
17     call DumpRegs
18
19     exit
20 main ENDP
21 END main
```

The 'Microsoft Visual Studio Debug Console' window is open, displaying the following information:

EAX=0000000A EBX=FFFFFF6A ECX=00000258 EDX=00000000
ESI=00A110AA EDI=00A110AA EBP=003DF91C ESP=003DF910
EIP=00A1368D EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1

E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process ID 12345) has finished execution. To automatically close the console when debugging stops, enable the option 'Automatically close the console when debugging stops' in the 'Debug Console' window. Press any key to close this window . . .

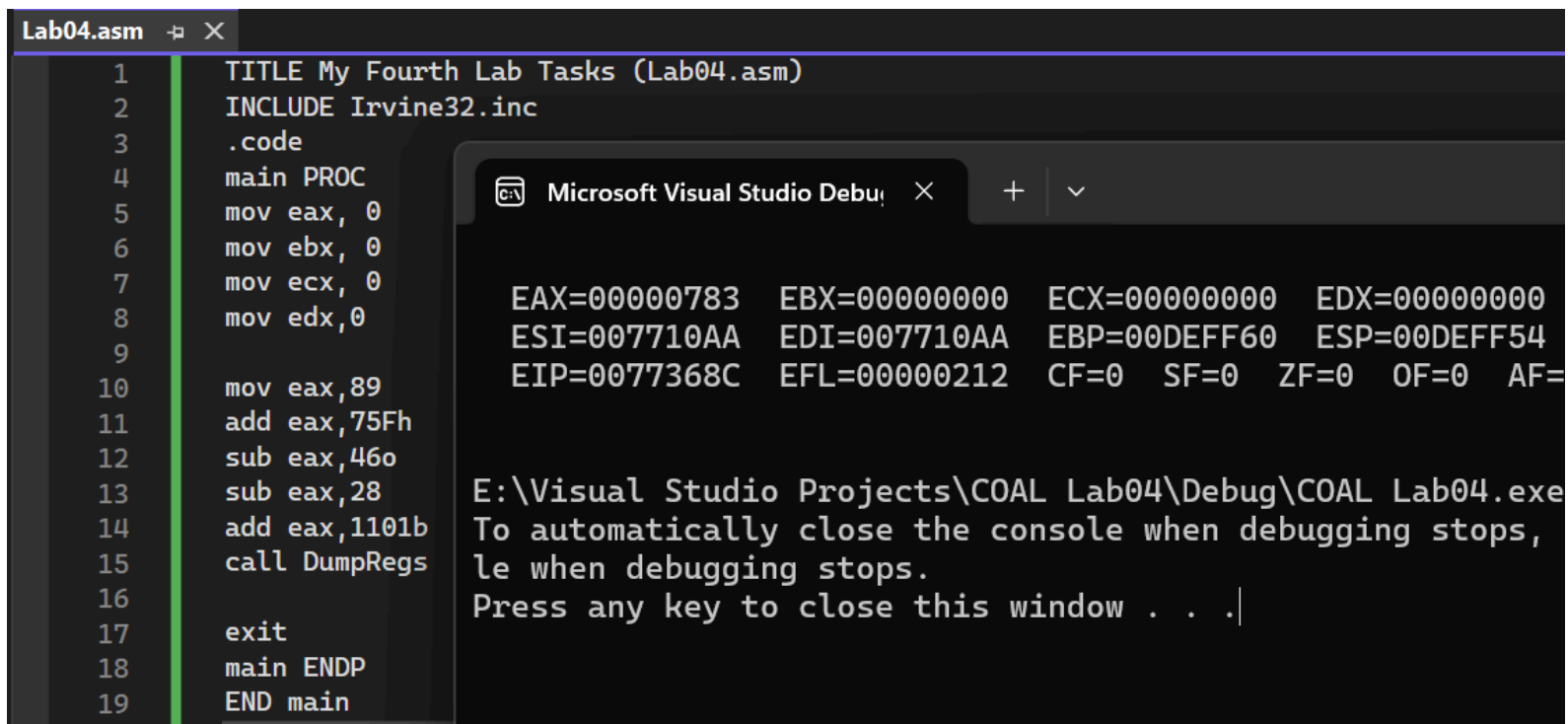
Q4:

Part I:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc
.code
main PROC
mov eax, 0
mov ebx, 0
mov ecx, 0
mov edx, 0

mov eax, 89
add eax, 75Fh
sub eax, 460
sub eax, 28
add eax, 1101b
call DumpRegs

exit
main ENDP
END main
```



The screenshot shows a Visual Studio IDE with a file named `Lab04.asm` open. The assembly code is as follows:

```
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .code
4  main PROC
5  mov eax, 0
6  mov ebx, 0
7  mov ecx, 0
8  mov edx, 0
9
10 mov eax, 89
11 add eax, 75Fh
12 sub eax, 460
13 sub eax, 28
14 add eax, 1101b
15 call DumpRegs
16
17 exit
18 main ENDP
19 END main
```

Below the code editor, a Windows command prompt window titled "Microsoft Visual Studio Debug Console" is open. It displays the following register values and program execution details:

```
EAX=00000783  EBX=00000000  ECX=00000000  EDX=00000000
ESI=0077710AA  EDI=0077710AA  EBP=00DEFF60  ESP=00DEFF54
EIP=00777368C  EFL=00000212  CF=0  SF=0  ZF=0  OF=0  AF=0
```

The command prompt also shows the following text:

```
E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe
To automatically close the console when debugging stops,
press Ctrl+Shift+F5 or click the console icon in the
toolbar when debugging stops.
Press any key to close this window . . .|
```

Part II:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc

.data
    val1 DWORD 25h
    val2 BYTE 36o
    val3 WORD 20d

.code
main PROC
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0

    mov eax, val1
    movzx ebx, val2
    add eax, ebx
    sub eax, 654h
    movzx ebx, val3
    add eax, ebx
    call DumpRegs

    exit
main ENDP
END main
```

The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab04.asm', displays the assembly code from the previous block. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program. The output includes the state of the CPU registers (EAX, EBX, ECX, EDX, ESI, EDI, EBP, ESP, EIP, EFL, CF, SF, ZF, OF, AF, PF) and a message indicating the process path and a prompt to press any key to close the window.

```
Lab04.asm  + X
```

```
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .data
4      val1 DWORD 25h
5      val2 BYTE 36o
6      val3 WORD 20d
7  .code
8  main PROC
9      mov eax, 0
10     mov ebx, 0
11     mov ecx, 0
12     mov edx, 0
13
14     mov eax, val1
15     movzx ebx, val2
16     add eax, ebx
17     sub eax, 654h
18     movzx ebx, val3
19     add eax, ebx
20     call DumpRegs
21
22     exit
23 main ENDP
24 END main
```

```
Microsoft Visual Studio Debug Console
```

```
EAX=FFFFFFA03  EBX=00000014  ECX=00000000  EDX=00000000
ESI=006310AA  EDI=006310AA  EBP=0073FED4  ESP=0073FEC8
EIP=00633695  EFL=00000296  CF=0  SF=1  ZF=0  OF=0  AF=1  PF=1

E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process)
To automatically close the console when debugging stops, enable T
le when debugging stops.
Press any key to close this window . . .|
```

Q5:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc

.data
    secondsInDay = 24*60*60

.code
main PROC
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0

    mov eax, secondsInDay
    call DumpRegs

    exit
main ENDP
END main
```

The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab04.asm', displays the assembly code from the previous block. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program. The output includes the values of the registers EAX, EBX, ECX, EDX, ESI, EDI, EBP, ESP, EIP, and EFL, followed by a message indicating the process path and instructions on how to close the console window.

```
Lab04.asm  + X
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .data
4      secondsInDay = 24*60*60
5  .code
6  main PROC
7      mov eax, 0
8      mov ebx, 0
9      mov ecx, 0
10     mov edx, 0
11
12     mov eax, secondsInDay
13     call DumpRegs
14
15     exit
16 main ENDP
17 END main
18
19

Microsoft Visual Studio Debug Console
EAX=00015180  EBX=00000000  ECX=00000000  EDX=00000000
ESI=00E610AA  EDI=00E610AA  EBP=004FF900  ESP=004FF8F4
EIP=00E6367E  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1

E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process
To automatically close the console when debugging stops, enable Tool
le when debugging stops.
Press any key to close this window . . .|
```

Q6:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc

.data
    A DWORD 0FF10h
    B DWORD 0E10Bh

.code
main PROC
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0

    mov eax, A
    mov ebx, B
    xchg eax, ebx
    mov A, eax
    mov B, ebx
    call DumpRegs

    exit
main ENDP
END main
```

The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab04.asm', displays the assembly code from the previous block, with line numbers 1 through 22 on the left margin. The right window, titled 'Microsoft Visual Studio Debugger', shows the state of the program during execution. It displays a table of register values: EAX=0000E10B, EBX=0000FF10, ECX=00000000, EDX=00000000, ESI=004410AA, EDI=004410AA, EBP=00EFFED8, ESP=00EF FECC, EIP=00443690, and EFL=00000246. It also shows status flags: CF=0, SF=0, ZF=1, OF=0, AF=0, and PF=1. Below the register values, the debugger shows the current instruction address and the instruction being executed: 'E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process...)' and 'To automatically close the console when debugging stops, enable To...'. The instruction being executed is 'call DumpRegs'.

```
Lab04.asm  X
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .data
4      A DWORD 0FF10h
5      B DWORD 0E10Bh
6  .code
7  main PROC
8      mov eax, 0
9      mov ebx, 0
10     mov ecx, 0
11     mov edx, 0
12
13     mov eax, A
14     mov ebx, B
15     xchg eax, ebx
16     mov A, eax
17     mov B, ebx
18     call DumpRegs
19
20     exit
21 main ENDP
22 END main

Microsoft Visual Studio Debugger
EAX=0000E10B  EBX=0000FF10  ECX=00000000  EDX=00000000
ESI=004410AA  EDI=004410AA  EBP=00EFFED8  ESP=00EF FECC
EIP=00443690  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1

E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process...
To automatically close the console when debugging stops, enable To...
le when debugging stops.
Press any key to close this window . . .|
```


Q7:

```
TITLE My Fourth Lab Tasks (Lab04.asm)
INCLUDE Irvine32.inc

.data
    val1 BYTE 10h
    val2 WORD 8000h
    val3 DWORD 0FFFFh
    val4 WORD 7FFFh

.code
main PROC
mov eax, 0
mov ebx, 0
mov ecx, 0
mov edx, 0

INC val2
mov ax, val2

sub ebx, val3

mov cx, val2
sub cx, val4
call DumpRegs
exit
main ENDP
END main
```

The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab04.asm', displays the assembly code from the previous block. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program. The output includes a table of register values and a message about the process path.

```
Lab04.asm  + X
```

```
1  TITLE My Fourth Lab Tasks (Lab04.asm)
2  INCLUDE Irvine32.inc
3  .data
4      val1 BYTE 10h
5      val2 WORD 8000h
6      val3 DWORD 0FFFFh
7      val4 WORD 7FFFh
8  .code
9  main PROC
10     mov eax, 0
11     mov ebx, 0
12     mov ecx, 0
13     mov edx, 0
14
15     INC val2
16     mov ax, val2
17
18     sub ebx, val3
19
20     mov cx, val2
21     sub cx, val4
22     call DumpRegs
23     exit
24     main ENDP
25     END main
```

```
Microsoft Visual Studio Debug Console
```

```
EAX=00008001  EBX=FFFF0001  ECX=00000002  EDX=00000000
ESI=00DC10AA  EDI=00DC10AA  EBP=0093FEA8  ESP=0093FE9C
EIP=00DC369A  EFL=00000A12  CF=0  SF=0  ZF=0  OF=1  AF=1  PF=0

E:\Visual Studio Projects\COAL Lab04\Debug\COAL Lab04.exe (process)
To automatically close the console when debugging stops, enable T
le when debugging stops.
Press any key to close this window . . .|
```