

**COAL**

**LAB03**

**23K2001**

**BCS-3J**

## Activity:

```
TITLE My Third Lab Tasks (Lab03.asm)
```

```
INCLUDE Irvine32.inc
```

```
.data
```

```
    varA BYTE 10
```

```
.code
```

```
main PROC
```

```
mov eax, 0
```

```
mov ebx, 0
```

```
mov ecx, 0
```

```
mov edx,0
```

```
mov al, varA
```


```
add al,40
```

```
call DumpRegs
```

```
exit
```

```
main ENDP
```

```
END main
```

 Microsoft Visual Studio Debug Console

```
EAX=00000032  EBX=00000000  ECX=00000000  EDX=00000000
ESI=00E210AA  EDI=00E210AA  EBP=006FFEE4  ESP=006FFED8
EIP=00E23680  EFL=00000212  CF=0   SF=0   ZF=0   OF=0   AF=1   PF=0
```

```
C:\Users\k232001\source\repos\Lab03\Debug\Lab03.exe (process 8184) exited with code 0.
Press any key to close this window . . .
```

Q1:

```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    varA SWORD ?
    varB SBYTE -11d
```

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

```
    mov ax, varA
    mov bl, varB
    call DumpRegs
```

```
    exit
main ENDP
END main
```

C:\> Microsoft Visual Studio Debug Console

```
EAX=00000000  EBX=000000F5  ECX=00000000  EDX=00000000
ESI=00D510AA  EDI=00D510AA  EBP=00AFFB08  ESP=00AFFAFC
EIP=00D53685  EFL=00000246  CF=0   SF=0   ZF=1   OF=0   AF=0   PF=1
```

```
C:\Users\k232001\source\repos\Lab03\Debug\Lab03.exe (process 7096) exited with code 0.
Press any key to close this window . . .
```

Q2:


```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    var3 SDWORD -2147483648d
```

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

```
mov eax, var3
call DumpRegs
```

```
exit
main ENDP
END main
```

 Microsoft Visual Studio Debug Console

```
EAX=80000000  EBX=00000000  ECX=00000000  EDX=00000000
ESI=008010AA  EDI=008010AA  EBP=005BFCEC  ESP=005BFCE0
EIP=0080367E  EFL=00000246  CF=0   SF=0   ZF=1   OF=0   AF=0   PF=1
```

```
C:\Users\k232001\source\repos\Lab03\Debug\Lab03.exe (process 2592) exited with code 0.
Press any key to close this window . . .
```

Q3:


```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    varA WORD 17,27,37
```

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

```
mov ax, varA
call DumpRegs
```

```
exit
main ENDP
END main
```

 Microsoft Visual Studio Debug Console

```
EAX=00000011  EBX=00000000  ECX=00000000  EDX=00000000
ESI=000510AA  EDI=000510AA  EBP=008FF8A8  ESP=008FF89C
EIP=0005367F  EFL=00000246  CF=0   SF=0   ZF=1   OF=0   AF=0   PF=1
```

```
C:\Users\k232001\source\repos\Lab03\Debug\Lab03.exe (process 7256) exited with code 0.
Press any key to close this window . . .
```

Q4:

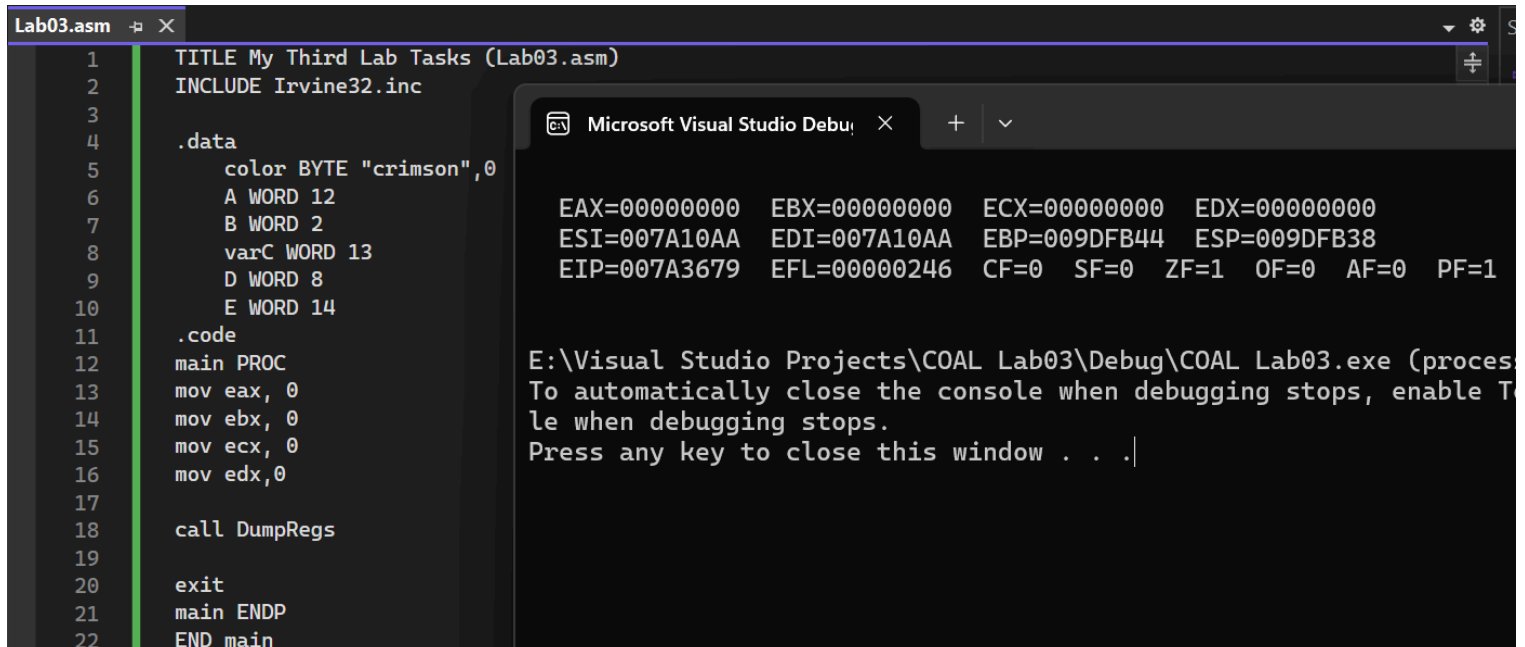
```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    color BYTE "crimson",0
    A WORD 12
    B WORD 2
    varC WORD 13
    D WORD 8
    E WORD 14
```

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

```
call DumpRegs
```

```
exit
main ENDP
END main
```



The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab03.asm', displays the assembly code from the previous blocks. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program. The register dump shows EAX=0, EBX=0, ECX=0, EDX=0, ESI=007A10AA, EDI=007A10AA, EBP=009DFB44, ESP=009DFB38, EIP=007A3679, EFL=00000246, CF=0, SF=0, ZF=1, OF=0, AF=0, PF=1. Below the register dump, the console shows the file path 'E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process...)' and a message 'To automatically close the console when debugging stops, enable T...le when debugging stops.' followed by 'Press any key to close this window . . .|'.

```
Lab03.asm  X
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      color BYTE "crimson",0
6      A WORD 12
7      B WORD 2
8      varC WORD 13
9      D WORD 8
10     E WORD 14
11
12     .code
13     main PROC
14     mov eax, 0
15     mov ebx, 0
16     mov ecx, 0
17     mov edx,0
18
19     call DumpRegs
20
21     exit
22     main ENDP
23     END main

Microsoft Visual Studio Debug Console
EAX=00000000  EBX=00000000  ECX=00000000  EDX=00000000
ESI=007A10AA  EDI=007A10AA  EBP=009DFB44  ESP=009DFB38
EIP=007A3679  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1

E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.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 Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
```

```
    a BYTE 11h
    b BYTE 10h
    varC BYTE 30h
    d BYTE 40h
```

```
.code
```

```
main PROC
```

```
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0
```

```
    mov bl, a
    add bl, b
    mov al, a
    sub al, b
    sub bl, al
    add bl, varC
    add bl, d
```

```
    call DumpRegs
```

```
    exit
```

```
main ENDP
```

```
END main
```

The screenshot shows a Visual Studio IDE with a dark theme. The main editor window displays the assembly code for Lab03.asm, with line numbers 1 through 28. The code includes a title, includes Irvine32.inc, defines data (a, b, varC, d), and a main procedure that moves values into registers, performs arithmetic, and calls DumpRegs. A Windows Debug Console window is open in the foreground, showing the output of the program. It displays the state of registers (EAX, EBX, ECX, EDX, ESI, EDI, EBP, ESP, EIP, EFL, CF, SF, ZF, OF, AF, PF) and a message from the operating system about the process (COAL Lab03.exe) and debugging options.

```
Lab03.asm 1 TITLE My Third Lab Tasks (Lab03.asm)
2 INCLUDE Irvine32.inc
3
4 .data
5     a BYTE 11h
6     b BYTE 10h
7     varC BYTE 30h
8     d BYTE 40h
9
10 .code
11 main PROC
12     mov eax, 0
13     mov ebx, 0
14     mov ecx, 0
15     mov edx, 0
16
17     mov bl, a
18     add bl, b
19     mov al, a
20     sub al, b
21     sub bl, al
22     add bl, varC
23     add bl, d
24
25     call DumpRegs
26
27     exit
28 main ENDP
END main
```

Microsoft Visual Studio Debug Console

EAX=00000001 EBX=00000090 ECX=00000000 EDX=00000000  
ESI=0033310AA EDI=0033310AA EBP=0093FD98 ESP=0093FD8C  
EIP=0033369E EFL=00000A86 CF=0 SF=1 ZF=0 OF=1 AF=0 PF=1

E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process 23656)  
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.  
Press any key to close this window . . .|

Q6:

```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
```

```
    a BYTE 00010001b
    b BYTE 00010000b
    varC BYTE 00110000b
    d BYTE 01000000b
```

```
.code
```

```
main PROC
```

```
    mov eax, 0
    mov ebx, 0
    mov ecx, 0
    mov edx, 0
```

```
    mov bl, a
    add bl, b
    mov al, a
    sub al, b
    sub bl, al
    add bl, varC
    add bl, d
```

```
    call DumpRegs
```

```
    exit
```

```
main ENDP
```

```
END main
```

The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Lab03.asm', displays the assembly code from the previous blocks, with line numbers 1 through 25. The right window, titled 'Microsoft Visual Studio Debug Console', shows the execution output. It displays the values of registers EAX, EBX, ECX, EDX, ESI, EDI, EBP, ESP, EIP, and EFL. Below the register values, it shows the process path 'E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe' and a message: 'To automatically close the console when debugging stops, enable T... Press any key to close this window . . .'.

```
Lab03.asm  X
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      a BYTE 00010001b
6      b BYTE 00010000b
7      varC BYTE 00110000b
8      d BYTE 01000000b
9
10 .code
11 main PROC
12     mov eax, 0
13     mov ebx, 0
14     mov ecx, 0
15     mov edx, 0
16
17     mov bl, a
18     add bl, b
19     mov al, a
20     sub al, b
21     sub bl, al
22     add bl, varC
23     add bl, d
24
25     call DumpRegs

Microsoft Visual Studio Debug Console
EAX=00000001 EBX=00000090 ECX=00000000 EDX=00000000
ESI=005210AA EDI=005210AA EBP=00CFFDD8 ESP=00CFFDCC
EIP=0052369E EFL=00000A86 CF=0 SF=1 ZF=0 OF=1 AF=0 PF=1

E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (proces
To automatically close the console when debugging stops, enable T
le when debugging stops.
Press any key to close this window . . .|
```



Q7:

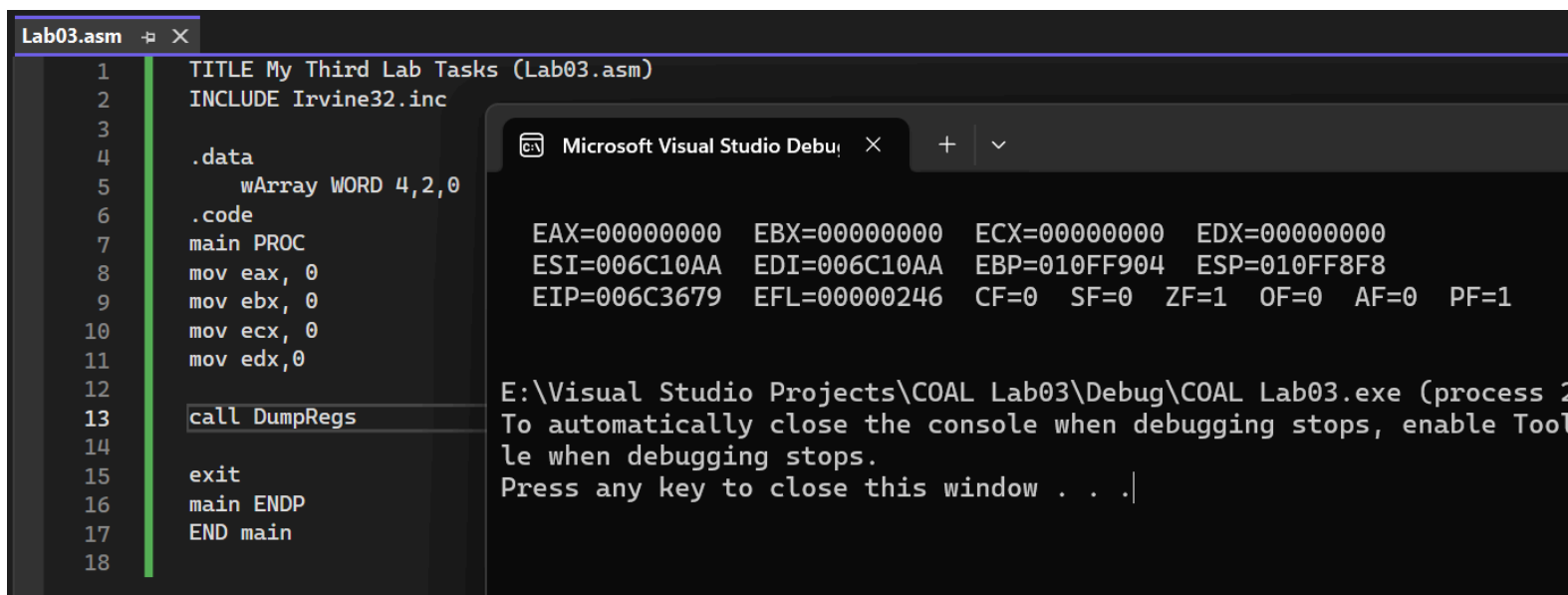
```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    wArray WORD 4,2,0
```

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

```
call DumpRegs
```

```
exit
main ENDP
END main
```



The screenshot shows the Visual Studio IDE with the assembly file 'Lab03.asm' open in the editor. The code is as follows:

```
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      wArray WORD 4,2,0
6
7  .code
8  main PROC
9      mov eax, 0
10     mov ebx, 0
11     mov ecx, 0
12     mov edx, 0
13     call DumpRegs
14
15     exit
16 main ENDP
17 END main
18
```

The 'Microsoft Visual Studio Debug Console' window is open, displaying the following register values and status:

Register	Value
EAX	00000000
EBX	00000000
ECX	00000000
EDX	00000000
ESI	006C10AA
EDI	006C10AA
EBP	010FF904
ESP	010FF8F8
EIP	006C3679
EFL	00000246
CF	0
SF	0
ZF	1
OF	0
AF	0
PF	1

Below the register values, the console shows the following text:

```
E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process 2
To automatically close the console when debugging stops, enable Too
le when debugging stops.
Press any key to close this window . . .|
```

Q8:

```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    dArray DWORD 50 DUP(?)
```

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

```
call DumpRegs
```

```
exit
main ENDP
END main
```

Lab03.asm

```
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      dArray DWORD 50 DUP(?)
6
7  .code
8  main PROC
9      mov eax, 0
10     mov ebx, 0
11     mov ecx, 0
12     mov edx, 0
13
14     call DumpRegs
15
16     exit
17 main ENDP
18 END main
```

Microsoft Visual Studio Debug Console

```
EAX=00000000  EBX=00000000  ECX=00000000  EDX=00000000
ESI=008310AA  EDI=008310AA  EBP=0097FEC4  ESP=0097FEB8
EIP=00833679  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

```
E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process
To automatically close the console when debugging stops, enable To
le when debugging stops.
Press any key to close this window . . .|
```

Q9:

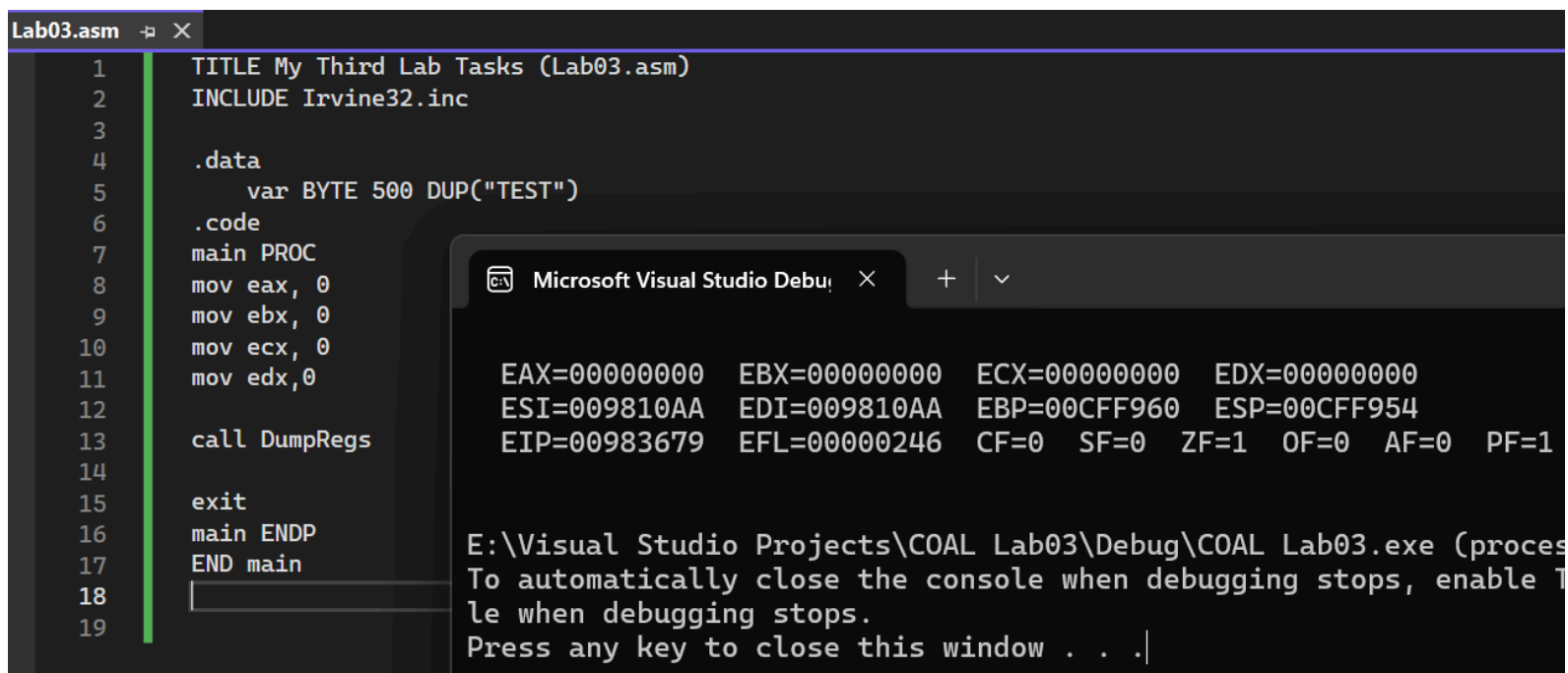
```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    var BYTE 500 DUP("TEST")
```

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

```
call DumpRegs
```

```
exit
main ENDP
END main
```



The screenshot shows the Visual Studio IDE with an assembly file named Lab03.asm open. The code in the editor matches the text provided above. A debug console window is open, displaying the state of the CPU registers after the `call DumpRegs` instruction. The registers are shown in hexadecimal, and the instruction pointer (EIP) is also displayed. The console window title is "Microsoft Visual Studio Debug Console".

```
Lab03.asm  X
```

```
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      var BYTE 500 DUP("TEST")
6  .code
7  main PROC
8      mov eax, 0
9      mov ebx, 0
10     mov ecx, 0
11     mov edx, 0
12
13     call DumpRegs
14
15     exit
16 main ENDP
17 END main
18
19
```

```
Microsoft Visual Studio Debug Console  X  +  v
```

```
EAX=00000000  EBX=00000000  ECX=00000000  EDX=00000000
ESI=009810AA  EDI=009810AA  EBP=00CFF960  ESP=00CFF954
EIP=00983679  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

```
E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process)
To automatically close the console when debugging stops, enable the
option 'Close console when debugging stops' in the 'Debug' menu.
Press any key to close this window . . .
```

## Q10:

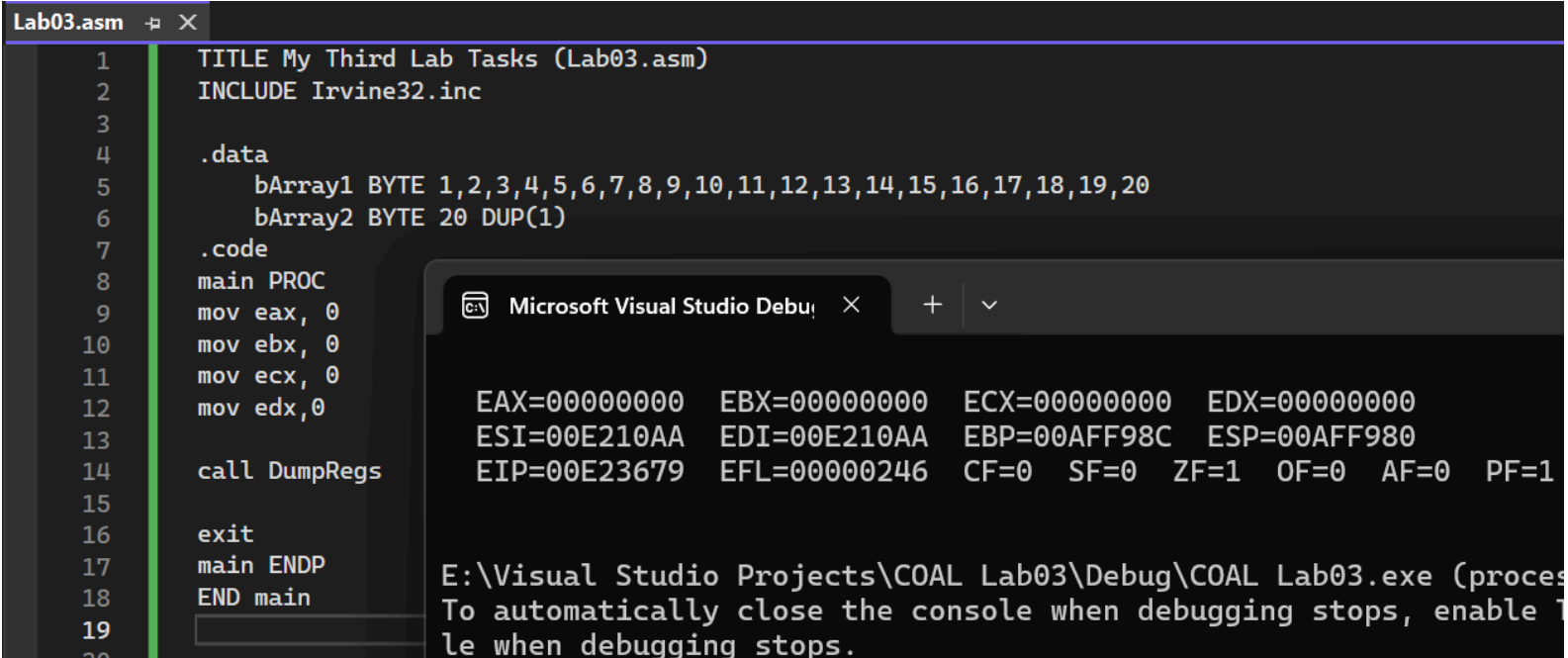
```
TITLE My Third Lab Tasks (Lab03.asm)
INCLUDE Irvine32.inc
```

```
.data
    bArray1 BYTE 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
    bArray2 BYTE 20 DUP(1)
```

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

```
    call DumpRegs
```

```
    exit
main ENDP
END main
```



The screenshot shows the Visual Studio IDE with the assembly file 'Lab03.asm' open. The code is as follows:

```
1  TITLE My Third Lab Tasks (Lab03.asm)
2  INCLUDE Irvine32.inc
3
4  .data
5      bArray1 BYTE 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20
6      bArray2 BYTE 20 DUP(1)
7
8  .code
9  main PROC
10     mov eax, 0
11     mov ebx, 0
12     mov ecx, 0
13     mov edx, 0
14
15     call DumpRegs
16
17     exit
18 main ENDP
19 END main
```

The Windows Debugger (WinDbg) window is open, showing the following register values:

Register	Value
EAX	00000000
EBX	00000000
ECX	00000000
EDX	00000000
ESI	00E210AA
EDI	00E210AA
EBP	00AFF98C
ESP	00AFF980
EIP	00E23679
EFL	00000246
CF	0
SF	0
ZF	1
OF	0
AF	0
PF	1

The console window shows the following output:

```
E:\Visual Studio Projects\COAL Lab03\Debug\COAL Lab03.exe (process)
To automatically close the console when debugging stops, enable the
option 'Enable console window' in the 'Debug' menu.
```