

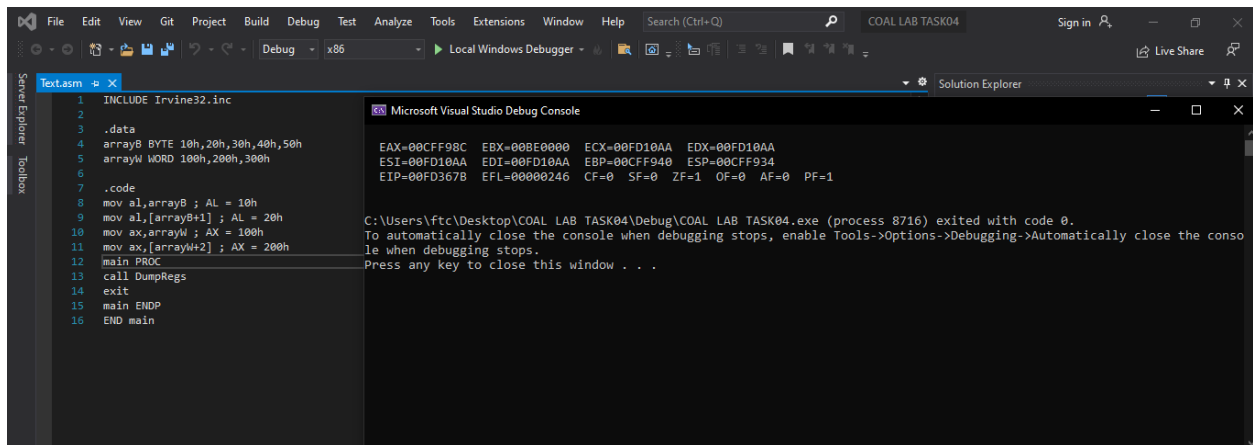
# LAB TASK # 04

## MOHAMMAD BASIL ALI KHAN

### 20K-0477

## Examples

### Example#01:



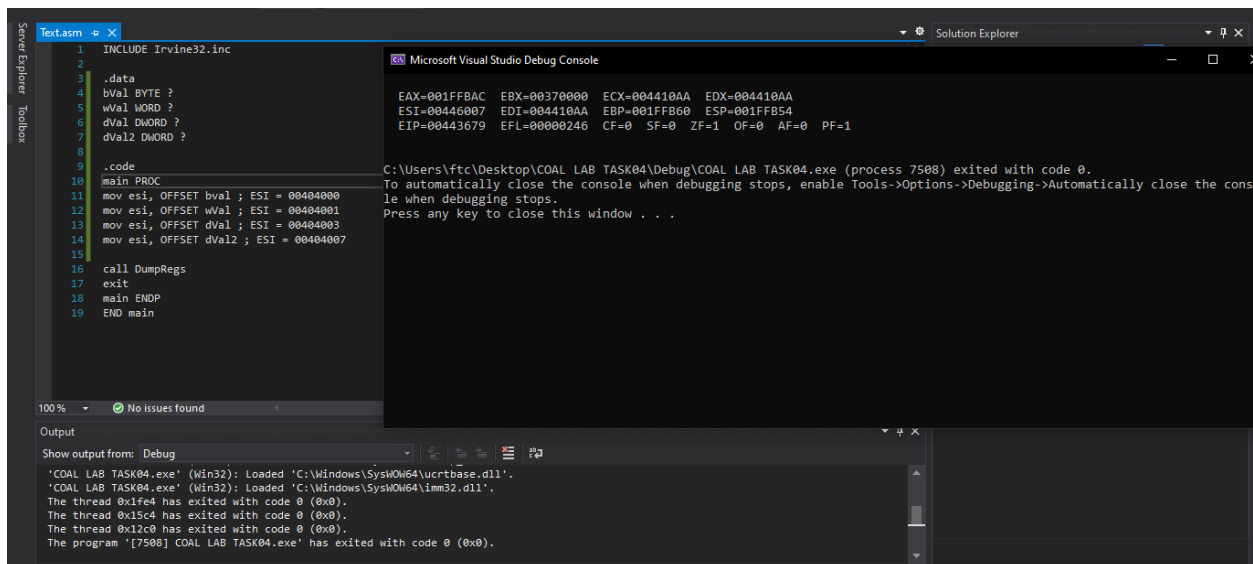
The screenshot shows the Visual Studio IDE with the assembly file 'Text.asm' open. The code includes Irvine32.inc, defines a byte array and a word array, and contains a main procedure that calls DumpRegs and exits. The Microsoft Visual Studio Debug Console shows the register values at the end of the program: EAX=00CFF98C, EBX=008E0000, ECX=00FD10AA, EDX=00FD10AA, ESI=00FD10AA, EDI=00FD10AA, EBP=00CFF940, ESP=00CFF934, EIP=00FD367B, EFL=00000246, CF=0, SF=0, ZF=1, OF=0, AF=0, PF=1. A message indicates that the process 'COAL LAB TASK04.exe' (process 8716) exited with code 0.

```
1 INCLUDE Irvine32.inc
2
3 .data
4 arrayB BYTE 10h,20h,30h,40h,50h
5 arrayW WORD 100h,200h,300h
6
7 .code
8 mov al,arrayB ; AL = 10h
9 mov al,[arrayB+1] ; AL = 20h
10 mov ax,arrayW ; AX = 100h
11 mov ax,[arrayW+2] ; AX = 200h
12 main PROC
13 call DumpRegs
14 exit
15 main ENDP
16 END main
```

EAX=00CFF98C EBX=008E0000 ECX=00FD10AA EDX=00FD10AA  
ESI=00FD10AA EDI=00FD10AA EBP=00CFF940 ESP=00CFF934  
EIP=00FD367B EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1

C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 8716) exited with code 0.  
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 . . .

### Example#02:



The screenshot shows the Visual Studio IDE with the assembly file 'Text.asm' open. The code includes Irvine32.inc, defines a byte variable, a word variable, and a double word variable, and contains a main procedure that moves these variables into the ESI register and calls DumpRegs. The Microsoft Visual Studio Debug Console shows the register values at the end of the program: EAX=001FFBAC, EBX=00370000, ECX=004410AA, EDX=004410AA, ESI=00446007, EDI=004410AA, EBP=001FFB60, ESP=001FFB54, EIP=00443679, EFL=00000246, CF=0, SF=0, ZF=1, OF=0, AF=0, PF=1. A message indicates that the process 'COAL LAB TASK04.exe' (process 7508) exited with code 0.

```
1 INCLUDE Irvine32.inc
2
3 .data
4 bVal BYTE ?
5 wVal WORD ?
6 dVal DWORD ?
7 dVal2 DWORD ?
8
9 .code
10 main PROC
11 mov esi, OFFSET bVal ; ESI = 00404000
12 mov esi, OFFSET wVal ; ESI = 00404001
13 mov esi, OFFSET dVal ; ESI = 00404003
14 mov esi, OFFSET dVal2 ; ESI = 00404007
15
16 call DumpRegs
17 exit
18 main ENDP
19 END main
```

EAX=001FFBAC EBX=00370000 ECX=004410AA EDX=004410AA  
ESI=00446007 EDI=004410AA EBP=001FFB60 ESP=001FFB54  
EIP=00443679 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1

C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 7508) exited with code 0.  
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 . . .

Output

Show output from: Debug

'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System32\user32.dll'.  
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System32\GDI32.dll'.  
The thread 0x1f24 has exited with code 0 (0x0).  
The thread 0x15c4 has exited with code 0 (0x0).  
The thread 0x12c0 has exited with code 0 (0x0).  
The program '[7508] COAL LAB TASK04.exe' has exited with code 0 (0x0).

## Example#03:

The screenshot shows the Visual Studio IDE with the assembly file `Text.asm` open. The code includes `Irvine32.inc` and defines a `main` procedure that moves values from variables `var1`, `var2`, `var3`, and `msg` into the `ax` register, then calls `DumpRegs` and exits. The `msg` is defined as "File not found".

The **Microsoft Visual Studio Debug Console** shows the following output:

```
EAX=003F0001 EBX=0048E000 ECX=007810AA EDX=007810AA  
ESI=007810AA EDI=007810AA EBP=003FF878 ESP=003FF86C  
EIP=00783679 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1  
  
C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 8672) exited with code 0.  
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 . . .
```

The **Output** window shows the following messages:

```
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\ucrbase.dll'.  
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\imm32.dll'.  
The thread 0x1938 has exited with code 0 (0x0).  
The thread 0x43c has exited with code 0 (0x0).  
The thread 0x24a4 has exited with code 0 (0x0).  
The program '[8672] COAL LAB TASK04.exe' has exited with code 0 (0x0).
```

## Example#04:

The screenshot shows the Visual Studio IDE with the assembly file `Text.asm` open. The code includes `Irvine32.inc` and defines a `main` procedure that moves values from variables `var1`, `var2`, `var3`, and `msg` into the `ax` register, then calls `DumpRegs` and exits. The `msg` is defined as "File not found".

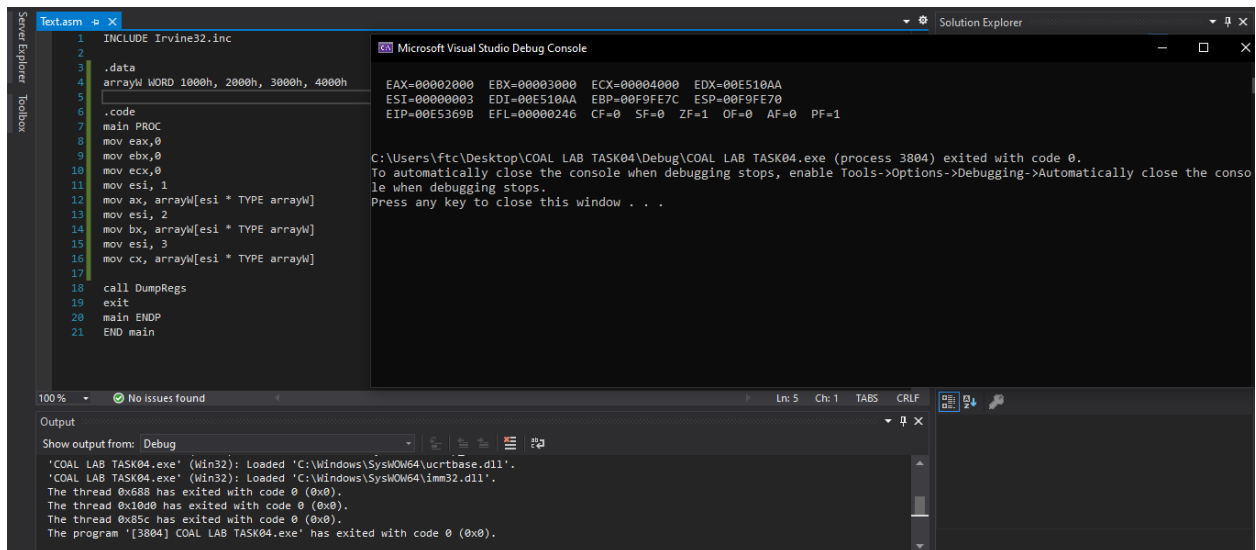
The **Microsoft Visual Studio Debug Console** shows the following output:

```
EAX=00001000 EBX=00002000 ECX=00003000 EDX=003410AA  
ESI=00346000 EDI=003410AA EBP=006FF8A8 ESP=006FF89C  
EIP=00343684 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1  
  
C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 1512) exited with code 0.  
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 . . .
```

The **Output** window shows the following messages:

```
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\ucrbase.dll'.  
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\imm32.dll'.  
The thread 0x1948 has exited with code 0 (0x0).  
The thread 0x1e5c has exited with code 0 (0x0).  
The thread 0x1e5c has exited with code 0 (0x0).  
The program '[1512] COAL LAB TASK04.exe' has exited with code 0 (0x0).
```

## Example#05:



The screenshot shows the Visual Studio IDE with the following components:

- Text.asm:**

```
1 INCLUDE Irvine32.inc
2
3 .data
4 arrayW WORD 1000h, 2000h, 3000h, 4000h
5
6 .code
7 main PROC
8 mov eax, 0
9 mov ebx, 0
10 mov ecx, 0
11 mov esi, 1
12 mov ax, arrayW[esi * TYPE arrayW]
13 mov esi, 2
14 mov bx, arrayW[esi * TYPE arrayW]
15 mov esi, 3
16 mov cx, arrayW[esi * TYPE arrayW]
17
18 call DumpRegs
19 exit
20 main ENDP
21 END main
```
- Microsoft Visual Studio Debug Console:**

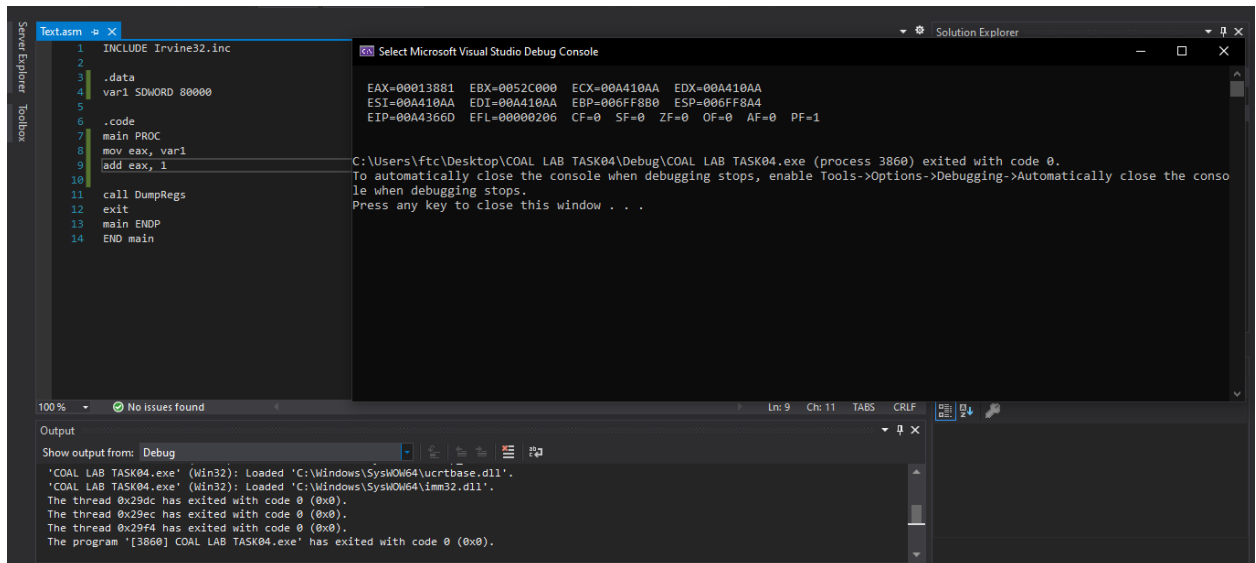
```
EAX=00002000 EBX=00003000 ECX=00004000 EDX=00E510AA
ESI=00000003 EDI=00E510AA EBP=00F9FE7C ESP=00F9FE70
EIP=00E5369B EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1

C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 3804) exited with code 0.
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 . . .
```
- Output:**

```
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\userbase.dll'.
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\imm32.dll'.
The thread 0x688 has exited with code 0 (0x0).
The thread 0x1000 has exited with code 0 (0x0).
The thread 0x85c has exited with code 0 (0x0).
The program '[3804] COAL LAB TASK04.exe' has exited with code 0 (0x0).
```

## Tasks

### Task#01:



The screenshot shows the Visual Studio IDE with the following components:

- Text.asm:**

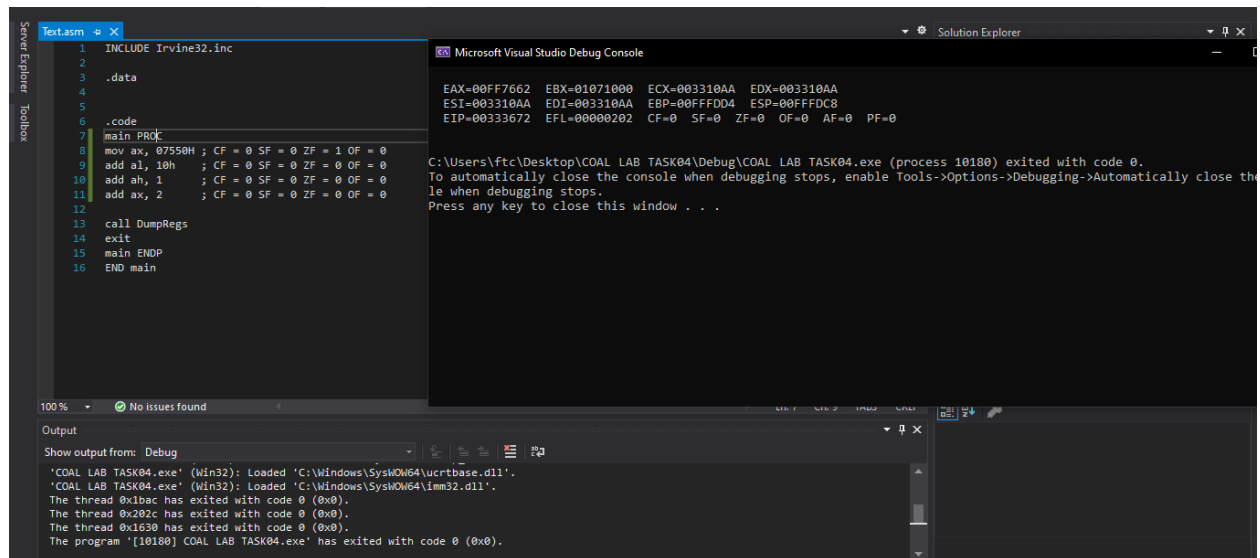
```
1 INCLUDE Irvine32.inc
2
3 .data
4 var1 SDWORD 80000
5
6 .code
7 main PROC
8 mov eax, var1
9 add eax, 1
10
11 call DumpRegs
12 exit
13 main ENDP
14 END main
```
- Select Microsoft Visual Studio Debug Console:**

```
EAX=00013881 EBX=0052C000 ECX=00A410AA EDX=00A410AA
ESI=00A410AA EDI=00A410AA EBP=006FF880 ESP=006FF8A4
EIP=00A4366D EFL=00000206 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=1

C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 3860) exited with code 0.
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 . . .
```
- Output:**

```
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\userbase.dll'.
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System64\imm32.dll'.
The thread 0x29dc has exited with code 0 (0x0).
The thread 0x29ec has exited with code 0 (0x0).
The thread 0x29f4 has exited with code 0 (0x0).
The program '[3860] COAL LAB TASK04.exe' has exited with code 0 (0x0).
```

## Task#02:



The screenshot shows the Visual Studio IDE with the assembly code for Task#02 in the Text.asm file and the Microsoft Visual Studio Debug Console showing the program's execution details.

```
1 INCLUDE Irvine32.inc
2
3 .data
4
5
6 .code
7 main PROC
8 mov ax, 07550h ; CF = 0 SF = 0 ZF = 1 OF = 0
9 add al, 10h ; CF = 0 SF = 0 ZF = 0 OF = 0
10 add ah, 1 ; CF = 0 SF = 0 ZF = 0 OF = 0
11 add ax, 2 ; CF = 0 SF = 0 ZF = 0 OF = 0
12
13 call DumpRegs
14 exit
15 main ENDP
16 END main
```

Microsoft Visual Studio Debug Console

```
EAX=00FF7662 EBX=01071000 ECX=003310AA EDX=003310AA
ESI=003310AA EDI=003310AA EBP=00FFFD04 ESP=00FFFD08
EIP=00333672 EFL=00000202 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=0
```

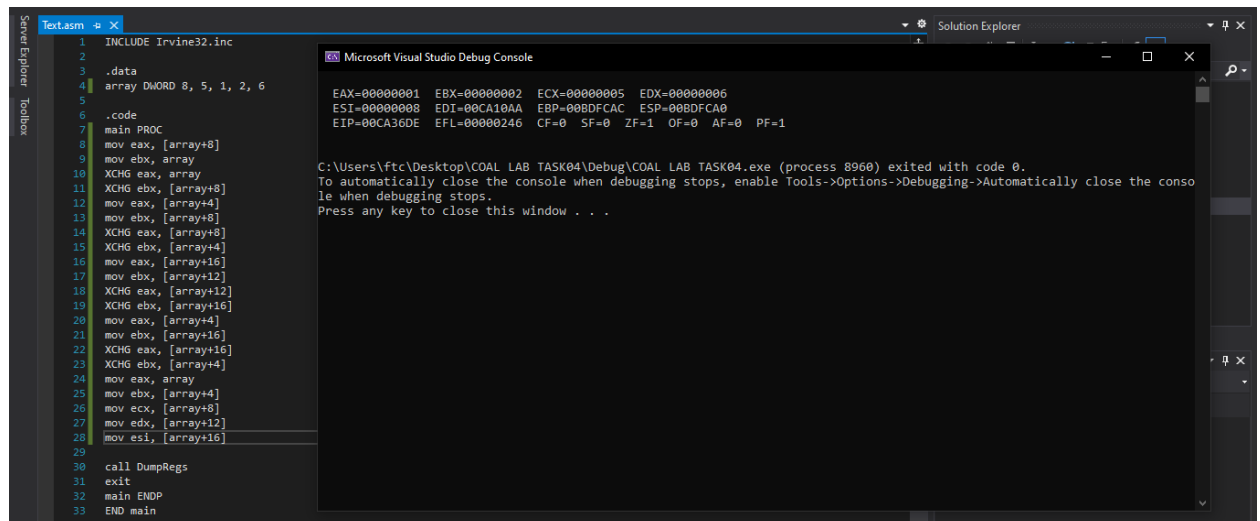
C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 10180) exited with code 0.  
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.  
Press any key to close this window . . .

Output

Show output from: Debug

```
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System32\user32.dll'.
'COAL LAB TASK04.exe' (Win32): Loaded 'C:\Windows\System32\GDI32.dll'.
The thread 0x10ac has exited with code 0 (0x0).
The thread 0x202c has exited with code 0 (0x0).
The thread 0x1630 has exited with code 0 (0x0).
The program '[10180] COAL LAB TASK04.exe' has exited with code 0 (0x0).
```

## Task#03:



The screenshot shows the Visual Studio IDE with the assembly code for Task#03 in the Text.asm file and the Microsoft Visual Studio Debug Console showing the program's execution details.

```
1 INCLUDE Irvine32.inc
2
3 .data
4 array DWORD 8, 5, 1, 2, 6
5
6 .code
7 main PROC
8 mov eax, [array+8]
9 mov ebx, array
10 XCHG ebx, [array+8]
11 XCHG ebx, [array+4]
12 mov eax, [array+4]
13 mov ebx, [array+8]
14 XCHG ebx, [array+8]
15 XCHG ebx, [array+4]
16 mov eax, [array+16]
17 mov ebx, [array+12]
18 XCHG ebx, [array+12]
19 XCHG ebx, [array+16]
20 mov eax, [array+4]
21 mov ebx, [array+16]
22 XCHG ebx, [array+16]
23 XCHG ebx, [array+4]
24 mov eax, array
25 mov ebx, [array+4]
26 mov ecx, [array+8]
27 mov edx, [array+12]
28 mov esi, [array+16]
29
30 call DumpRegs
31 exit
32 main ENDP
33 END main
```

Microsoft Visual Studio Debug Console

```
EAX=00000001 EBX=00000002 ECX=00000005 EDX=00000006
ESI=00000008 EDI=00CA10AA EBP=00BDFC4C ESP=00BDFC48
EIP=00CA36DE EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1
```

C:\Users\ftc\Desktop\COAL LAB TASK04\Debug\COAL LAB TASK04.exe (process 8960) exited with code 0.  
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 . . .

## Task#04:

