COAL LAB 04 - 27 Feb 2025

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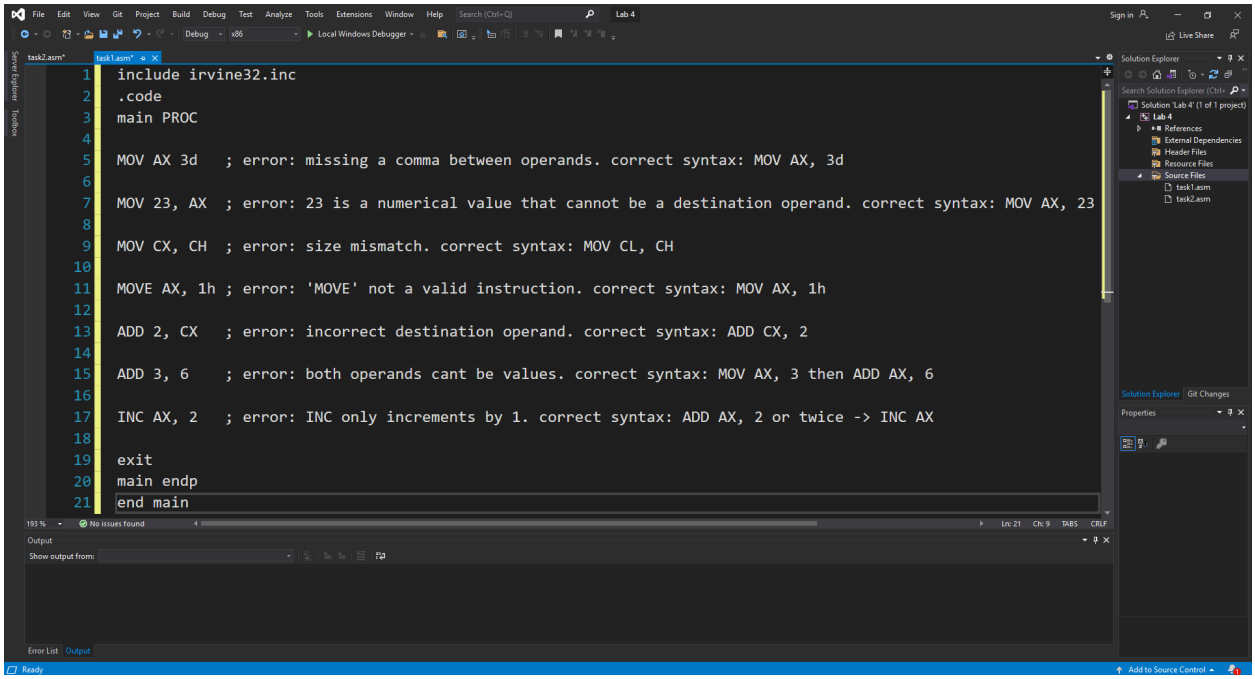
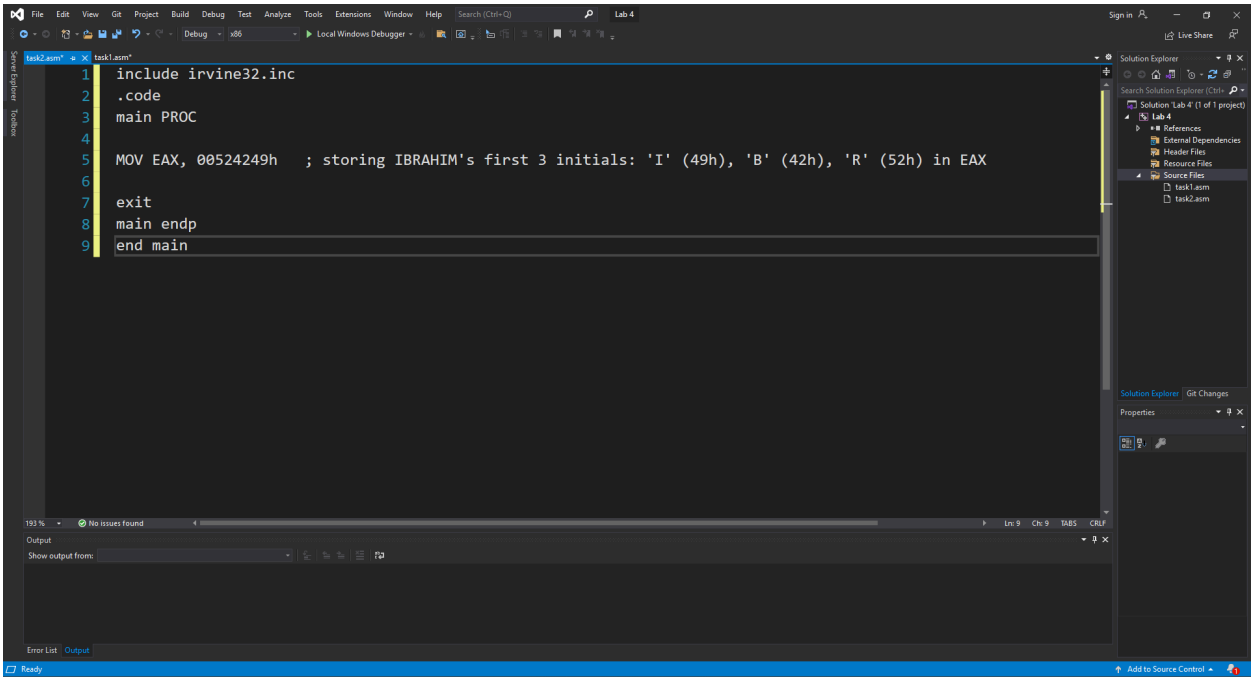
Task 1:



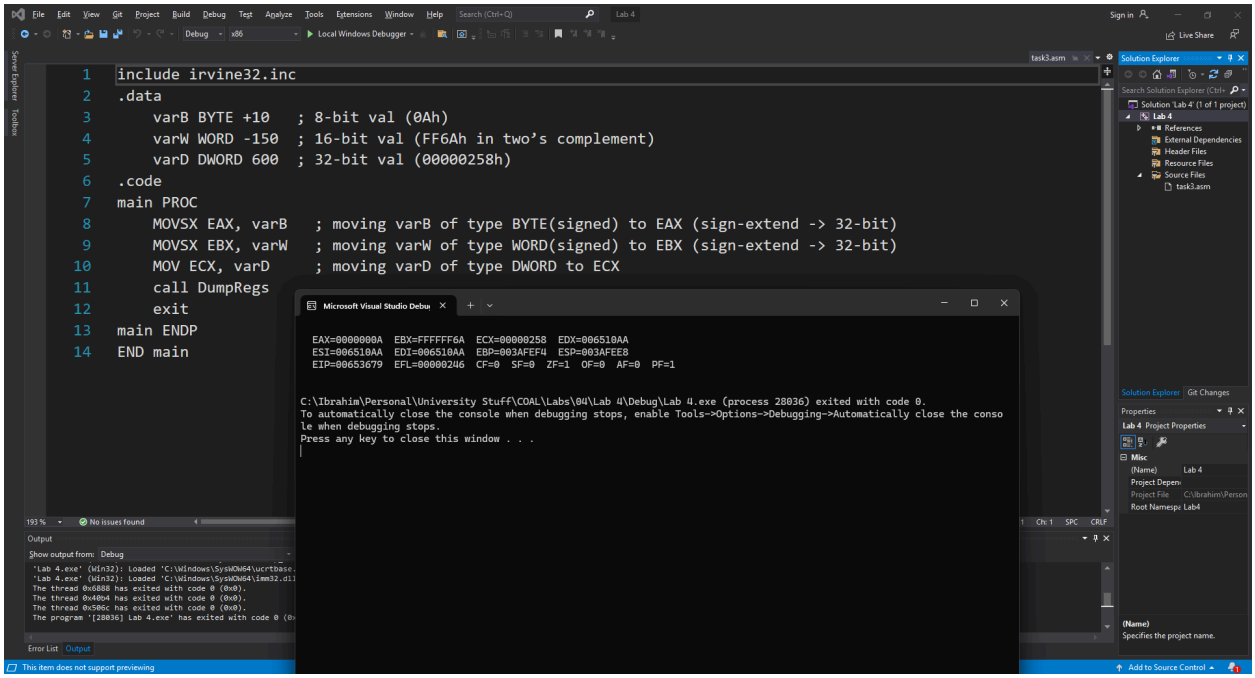
```
include irvine32.inc
.code
main PROC

MOV AX 3d   ; error: missing a comma between operands. correct syntax: MOV AX, 3d

MOV 23, AX  ; error: 23 is a numerical value that cannot be a destination operand. correct syntax: MOV AX, 23

MOV CX, CH  ; error: size mismatch. correct syntax: MOV CL, CH

MOVE AX, 1h ; error: 'MOVE' not a valid instruction. correct syntax: MOV AX, 1h

ADD 2, CX   ; error: incorrect destination operand. correct syntax: ADD CX, 2

ADD 3, 6    ; error: both operands cant be values. correct syntax: MOV AX, 3 then ADD AX, 6

INC AX, 2   ; error: INC only increments by 1. correct syntax: ADD AX, 2 or twice -> INC AX

exit
main endp
end main
```

Task 2:



```
include irvine32.inc
.code
main PROC

MOV EAX, 00524249h   ; storing IBRAHIM's first 3 initials: 'I' (49h), 'B' (42h), 'R' (52h) in EAX

exit
main endp
end main
```

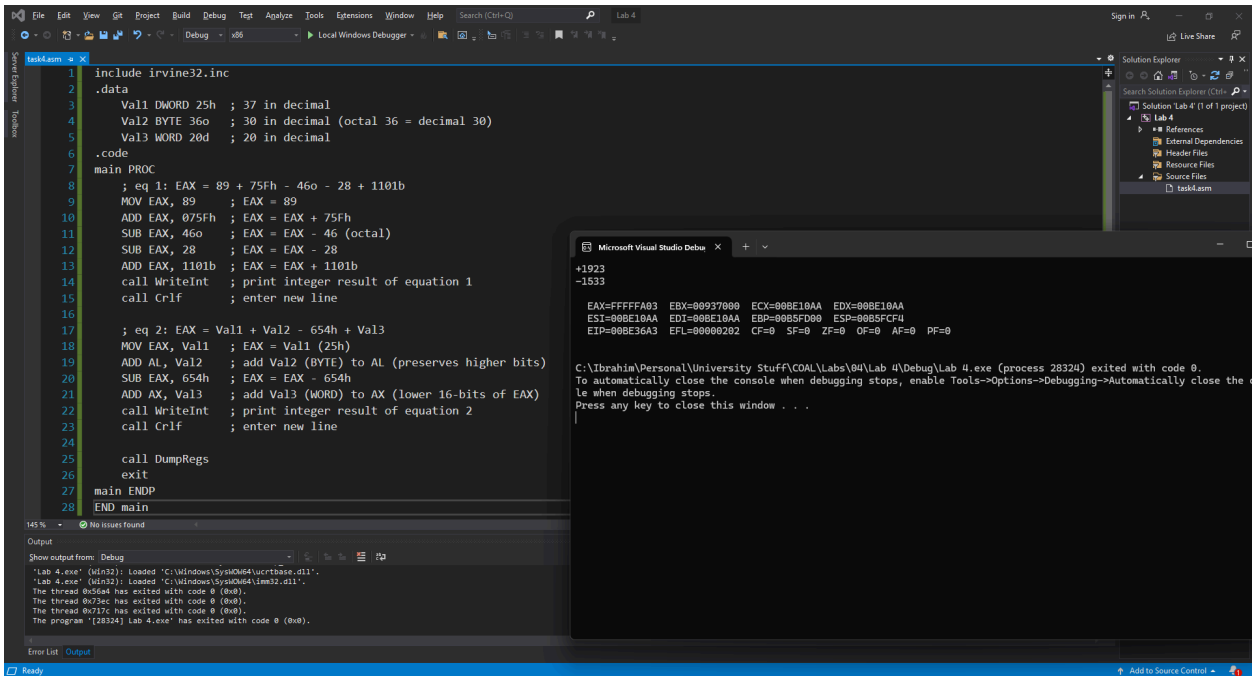
Task 3:



```
include irvine32.inc
.data
    varB BYTE +10   ; 8-bit val (0Ah)
    varW WORD -150  ; 16-bit val (FF6Ah in two's complement)
    varD DWORD 600  ; 32-bit val (00000258h)
.code
main PROC
    MOVSX EAX, varB   ; moving varB of type BYTE(signed) to EAX (sign-extend -> 32-bit)
    MOVSX EBX, varW   ; moving varW of type WORD(signed) to EBX (sign-extend -> 32-bit)
    MOV ECX, varD     ; moving varD of type DWORD to ECX
    call DumpRegs
    exit
main ENDP
END main
```

```
EAX=0000000A  EBX=FFFFFF6A  ECX=00000258  EDX=006510AA
ESI=006510AA  EDI=006510AA  EBP=003AFEF4  ESP=003AFEE8
EIP=00653679  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1

C:\Ibrahim\Personal\University Stuff\COAL\Labs\04\Lab 4\Debug\Lab 4.exe (process 28036) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Task 4:



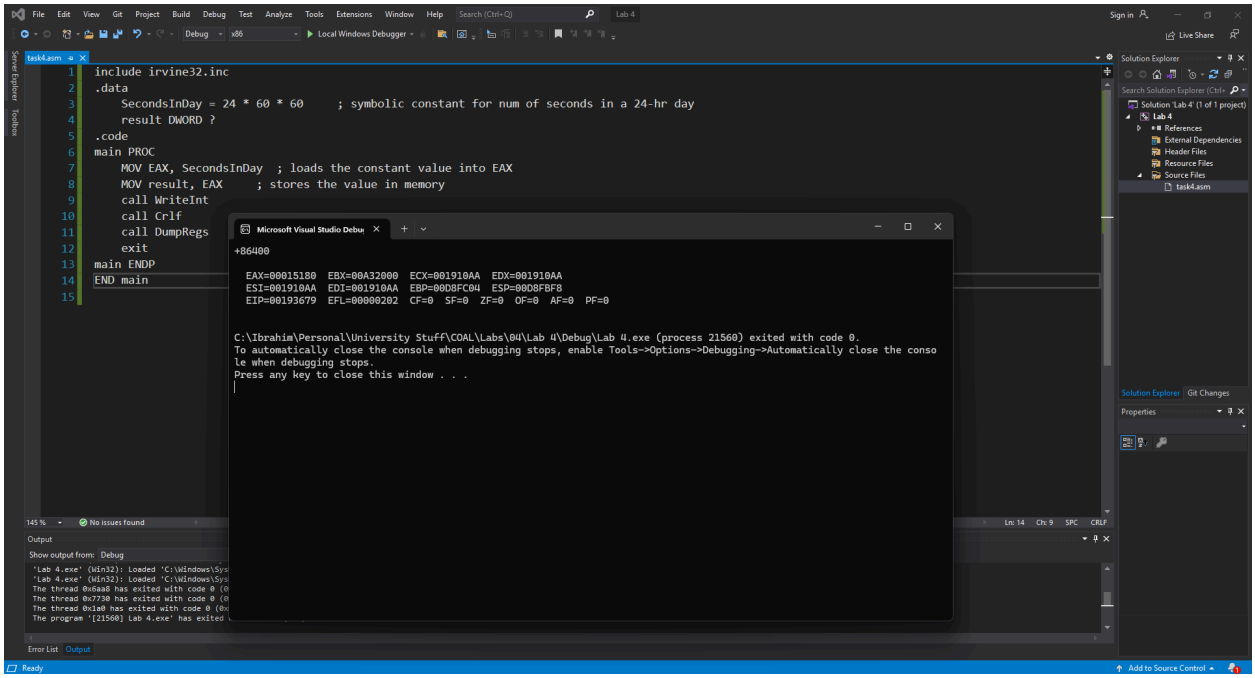
```
include irvine32.inc
.data
    Val1 DWORD 25h  ; 37 in decimal
    Val2 BYTE 36o   ; 30 in decimal (octal 36 = decimal 30)
    Val3 WORD 20d   ; 20 in decimal
.code
main PROC
    ; eq 1: EAX = 89 + 75Fh - 46o - 28 + 1101b
    MOV EAX, 89     ; EAX = 89
    ADD EAX, 075Fh  ; EAX = EAX + 75Fh
    SUB EAX, 46o    ; EAX = EAX - 46 (octal)
    SUB EAX, 28     ; EAX = EAX - 28
    ADD EAX, 1101b  ; EAX = EAX + 1101b
    call WriteInt   ; print integer result of equation 1
    call Crlf       ; enter new line

    ; eq 2: EAX = Val1 + Val2 - 654h + Val3
    MOV EAX, Val1   ; EAX = Val1 (25h)
    ADD AL, Val2    ; add Val2 (BYTE) to AL (preserves higher bits)
    SUB EAX, 654h   ; EAX = EAX - 654h
    ADD AX, Val3    ; add Val3 (WORD) to AX (lower 16-bits of EAX)
    call WriteInt   ; print integer result of equation 2
    call Crlf       ; enter new line

    call DumpRegs
    exit
main ENDP
END main
```

```
+1923
-1533

  EAX=FFFFFA03  EBX=00937000  ECX=00BE10AA  EDX=00BE10AA
  ESI=00BE10AA  EDI=00BE10AA  EBP=00B5FD00  ESP=00B5FCF4
  EIP=00BE36A3  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0

C:\Ibrahim\Personal\University Stuff\COAL\Labs\04\Lab 4\Debug\Lab 4.exe (process 28324) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the
le when debugging stops.
Press any key to close this window . . .
```

Task 5:

(no task 5 found in lab 4 document)

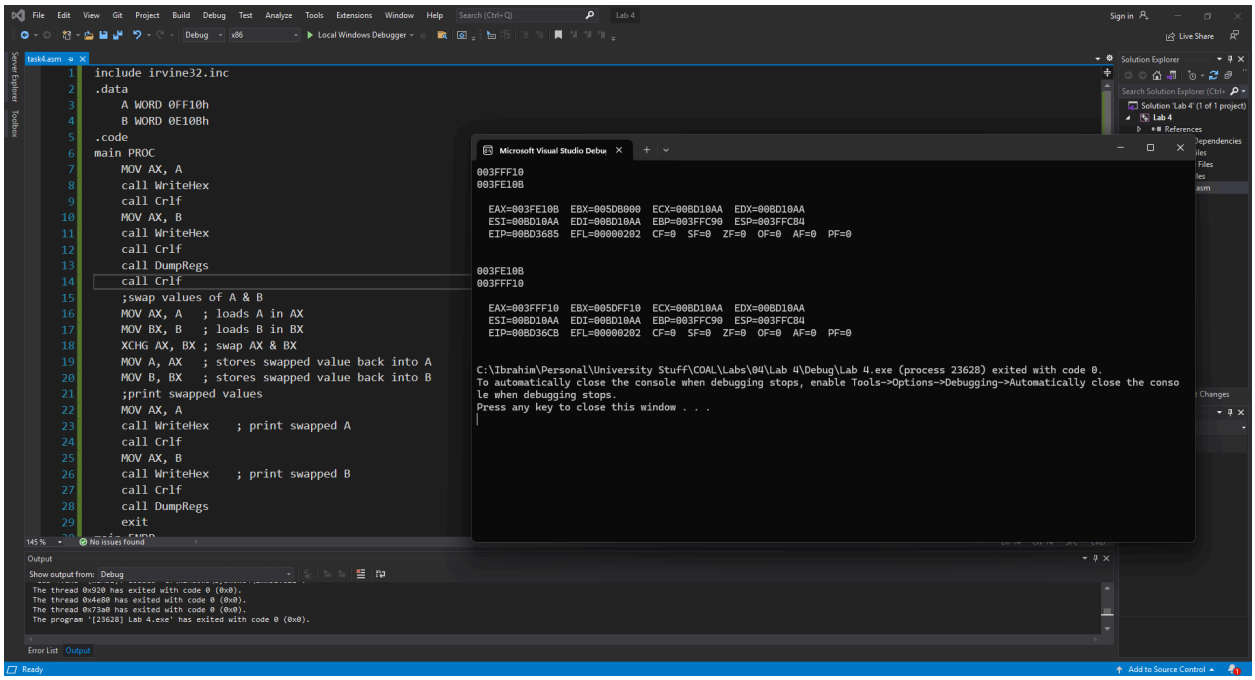
Task 6:



```
include irvine32.inc
.data
    SecondsInDay = 24 * 60 * 60     ; symbolic constant for num of seconds in a 24-hr day
    result DWORD ?
.code
main PROC
    MOV EAX, SecondsInDay  ; loads the constant value into EAX
    MOV result, EAX     ; stores the value in memory
    call WriteInt
    call Crlf
    call DumpRegs
    exit
main ENDP
END main
```

```
+86400

  EAX=00015180  EBX=00A32000  ECX=001910AA  EDX=001910AA
  ESI=001910AA  EDI=001910AA  EBP=00D8FC04  ESP=00D8FBF8
  EIP=00193679  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0


C:\Ibrahim\Personal\University Stuff\COAL\Labs\04\Lab 4\Debug\Lab 4.exe (process 21560) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

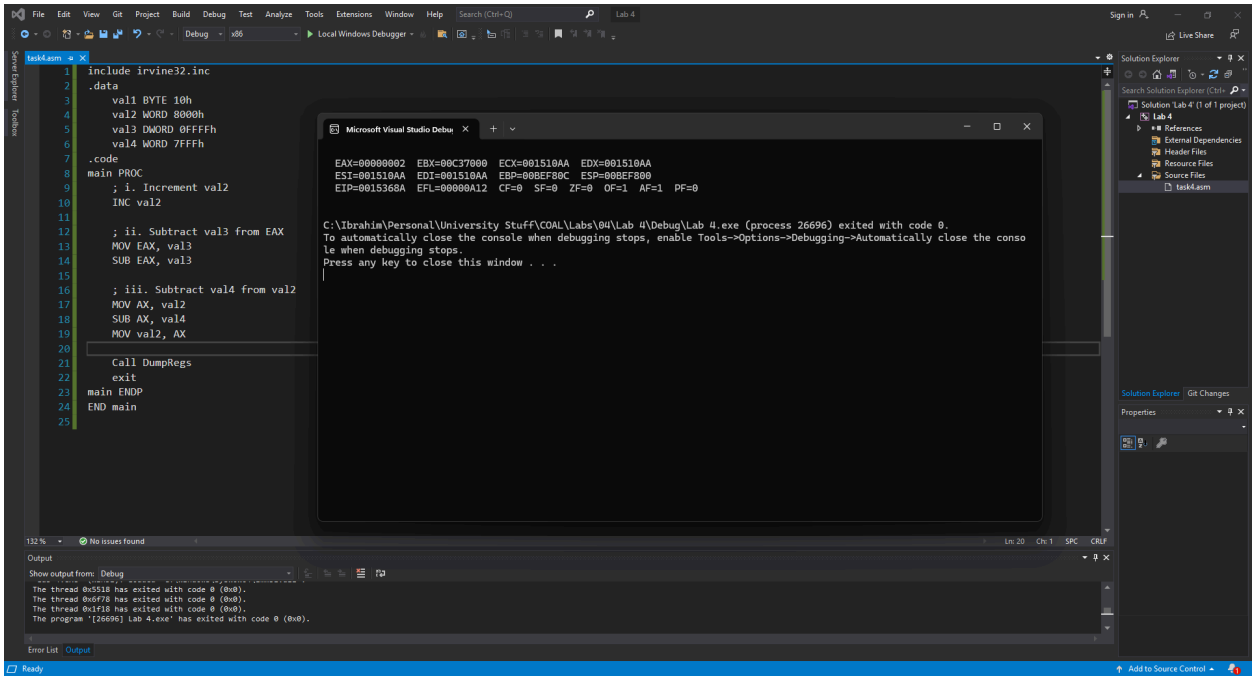
Task 7:



```
include irvine32.inc
.data
    A WORD 0FF10h
    B WORD 0E10Bh
.code
main PROC
    MOV AX, A
    call WriteHex
    call Crlf
    MOV AX, B
    call WriteHex
    call Crlf
    call DumpRegs
    call Crlf
    ;swap values of A & B
    MOV AX, A   ; loads A in AX
    MOV BX, B   ; loads B in BX
    XCHG AX, BX ; swap AX & BX
    MOV A, AX   ; stores swapped value back into A
    MOV B, BX   ; stores swapped value back into B
    ;print swapped values
    MOV AX, A
    call WriteHex    ; print swapped A
    call Crlf
    MOV AX, B
    call WriteHex    ; print swapped B
    call Crlf
    call DumpRegs
    exit
```

```
003FFF10
003FE10B

  EAX=003FE10B  EBX=005DB000  ECX=00BD10AA  EDX=00BD10AA
  ESI=00BD10AA  EDI=00BD10AA  EBP=003FFC90  ESP=003FFC84
  EIP=00BD3685  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0


003FE10B
003FFF10

  EAX=003FFF10  EBX=005DFF10  ECX=00BD10AA  EDX=00BD10AA
  ESI=00BD10AA  EDI=00BD10AA  EBP=003FFC90  ESP=003FFC84
  EIP=00BD36CB  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0


C:\Ibrahim\Personal\University Stuff\COAL\Labs\04\Lab 4\Debug\Lab 4.exe (process 23628) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Task 8:


task4.asm
include irvine32.inc
.data
val1 BYTE 10h
val2 WORD 8000h
val3 DWORD 0FFFFh
val4 WORD 7FFFh
.code
main PROC
; i. Increment val2
INC val2
; ii. Subtract val3 from EAX
MOV EAX, val3
SUB EAX, val3
; iii. Subtract val4 from val2
MOV AX, val2
SUB AX, val4
MOV val2, AX
Call DumpRegs
exit
main ENDP
END main
Microsoft Visual Studio Debu
EAX=00000002 EBX=00C37000 ECX=001510AA EDX=001510AA
ESI=001510AA EDI=001510AA EBP=00BEF80C ESP=00BEF800
EIP=0015368A EFL=00000A12 CF=0 SF=0 ZF=0 OF=1 AF=1 PF=0
C:\Ibrahim\Personal\University Stuff\COAL\Labs\04\Lab 4\Debug\Lab 4.exe (process 26696) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
Output
The thread 0x5518 has exited with code 0 (0x0).
The thread 0x6f78 has exited with code 0 (0x0).
The thread 0x1f18 has exited with code 0 (0x0).
The program '[26696] Lab 4.exe' has exited with code 0 (0x0).
Solution Explorer
Lab 4
References
External Dependencies
Header Files
Resource Files
Source Files
task4.asm
Properties
Ready