

## COAL LAB 4

Questions:

1. What errors are present in the following?

❑ MOV AX 3d

❑ MOV 23, AX

❑ MOV CX, CH

❑ MOVE AX, 1h

❑ ADD 2, CX

❑ ADD 3, 6

❑ INC AX, 2

2. Store the ASCII codes for starting three letters of your name in a register.

3. Use following array declarations:

varB BYTE +10

varW WORD -150

varD DWORD 600

Now move every element to EAX,EBX and ECX.

6. Write a program which declares a symbolic constant named SecondsInDay using the equal-sign

directive and assign it an arithmetic expression that calculates the number of seconds in a 24-

hour period.

7. Let A = 0FF10 h and B = 0E10B h, you need to write an assembly language code to swap the contents.

8. Use this data for the following questions:

- i. Write an instruction that increments val2.
- ii. Write an instruction that subtracts val3 from EAX.
- iii. Write instructions that subtract val4 from val2.

Q1

1. Comma is missing; correct code: MOV AX, 3d
2. We cannot move register into variable; correct code: MOV AX , 23
3. We cannot move 8 bit register into 16 bit register with MOV instruction.
4. Incorrect spelling of the MOV instruction.
5. We cannot store register into constant. Correct code: ADD CX , 2
6. A constant cannot be stored in a constant.
7. Syntax is wrong since we cannot increment register by any value other than 1.  
Correct code: INC AX

Q2

Code:

```
INCLUDE Irvine32.inc
```

```
.data
```

```
.code
main PROC
mov ax , 65
mov cx , 110
mov bx , 97
call Dumpregs
```

```
exit
main ENDP
END main
```

Microsoft Visual Studio Debug Console

```
EAX=859C0061 EBX=006A0041 ECX=0088006E EDX=0088100A
ESI=0088100A EDI=0088100A EBP=0098F7B8 ESP=0098F7A8
EIP=00883671 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1
```

Q3

Code:

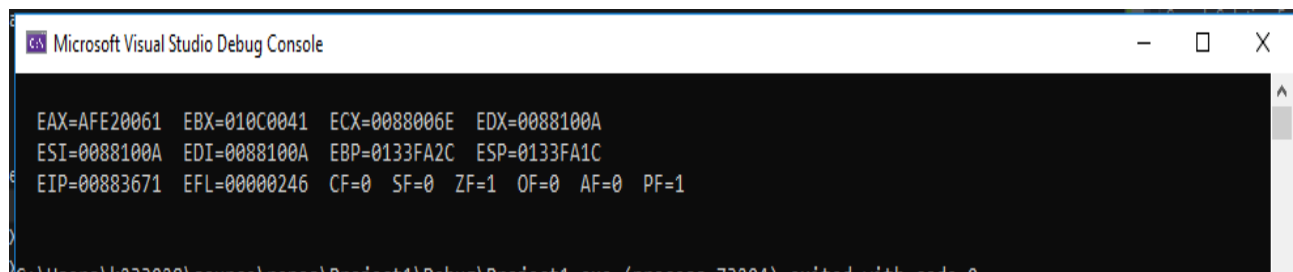
```
INCLUDE Irvine32.inc
```

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

```
.code
main PROC
MOVX EAX , varB
MOVX EBX , varW
MOVZX ECX , varD
```

```
call Dumpregs
```

```
exit
main ENDP
END main
```

A screenshot of the Microsoft Visual Studio Debug Console window. The window has a title bar with the text "Microsoft Visual Studio Debug Console" and standard window controls (minimize, maximize, close). The main area is a black console with white text displaying the following register values: EAX=AFE20061, EBX=010C0041, ECX=0088006E, EDX=0088100A, ESI=0088100A, EDI=0088100A, EBP=0133FA2C, ESP=0133FA1C, EIP=00883671, EFL=00000246, CF=0, SF=0, ZF=1, OF=0, AF=0, PF=1. The text is arranged in three lines.

```
EAX=AFE20061  EBX=010C0041  ECX=0088006E  EDX=0088100A
ESI=0088100A  EDI=0088100A  EBP=0133FA2C  ESP=0133FA1C
EIP=00883671  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

Q4

Equation 1

Code:

```
INCLUDE Irvine32.inc
```

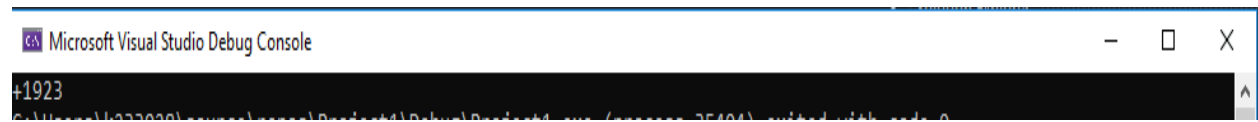
```
.data
```

```
.code
main PROC
MOV EAX , 0
MOV EAX , 89 ; eax = 89
ADD EAX , 75Fh
ADD EAX , 1101b
SUB EAX , 46o
SUB EAX , 28
```

```
call Writeint
```

```
exit
main ENDP
```

END main



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output displays the value "+1923" in white text on a black background. Below the output, a portion of the file path is visible: "C:\Users\H0230301\source\repos\Project4\Project4\Project4.asm (assembly 35104) - WriteInt.asm".

## Equation 2

Code:

```
INCLUDE Irvine32.inc
```

```
.data
```

```
Val1 DWORD 25h
```

```
Val2 BYTE 36o
```

```
Val3 WORD 20d
```

```
.code
```

```
main PROC
```

```
MOV EAX , 0
```

```
MOV EAX , Val1
```

```
MOVZX EBX , Val2
```

```
MOVZX ECX , Val3
```

```
ADD EAX , EBX
```

```
ADD EAX , ECX
```

```
SUB EAX , 654h
```

```
call Writeint
```

```
exit
```

```
main ENDP
```

```
END main
```



The screenshot shows the Microsoft Visual Studio Debug Console window. The title bar reads "Microsoft Visual Studio Debug Console". The console output displays the value "-1533" in white text on a black background. Below the output, a portion of the file path is visible: "C:\Users\H0230301\source\repos\Project4\Project4\Project4.asm (assembly 67102) - WriteInt.asm".

## Q5

```
INCLUDE Irvine32.inc
```

```
.data
```

```
SecondsInDay = 24*60*60
```

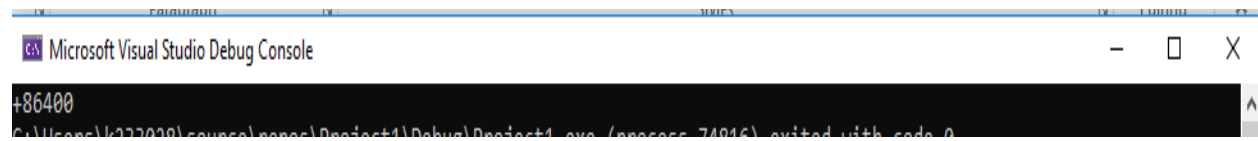
```
.code
```

```
main PROC
```

```
MOV EAX , SecondsInDay
```

```
call Writeint
```

```
exit
main ENDP
END main
```



```
Microsoft Visual Studio Debug Console
+86400
C:\Users\j\222020\source\repos\Project1\Debug\Project1.exe (process 74816) exited with code 0
```

Q7

Code:

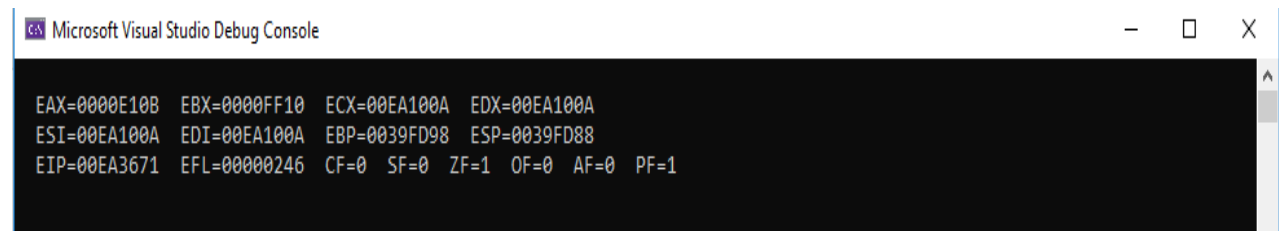
```
INCLUDE Irvine32.inc

.data
A DWORD 0FF10h
B DWORD 0E10Bh

.code
main PROC
MOV EAX , A
MOV EBX , B
XCHG EAX , EBX

call Dumpregs

exit
main ENDP
END main
```



```
Microsoft Visual Studio Debug Console
EAX=0000E10B  EBX=0000FF10  ECX=00EA100A  EDX=00EA100A
ESI=00EA100A  EDI=00EA100A  EBP=0039FD98  ESP=0039FD88
EIP=00EA3671  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

Q8

```
INCLUDE Irvine32.inc

.data
Val1 BYTE 10h
val2 WORD 8000h
val3 DWORD 0FFFFh
val4 WORD 7FFFh

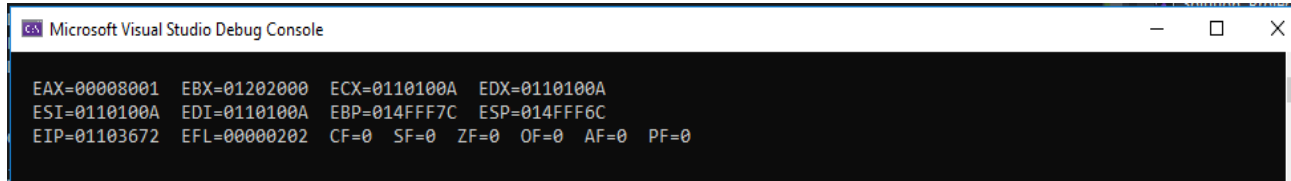
.code
main PROC
MOVZX EAX , val2
INC EAX
```

```
call Dumpregs
```

```
exit
```

```
main ENDP
```

```
END main
```



A screenshot of the Microsoft Visual Studio Debug Console window. The window has a title bar with the Visual Studio logo and the text "Microsoft Visual Studio Debug Console". The console area is black with white text displaying the following register values:

```
EAX=00008001  EBX=01202000  ECX=0110100A  EDX=0110100A  
ESI=0110100A  EDI=0110100A  EBP=014FFF7C  ESP=014FFF6C  
EIP=01103672  EFL=00000202  CF=0   SF=0   ZF=0   OF=0   AF=0   PF=0
```

ii)

Code:

```
INCLUDE Irvine32.inc
```

```
.data
```

```
vail BYTE 10h
```

```
val2 WORD 8000h
```

```
val3 DWORD 0FFFFh
```

```
val4 WORD 7FFFh
```

```
.code
```

```
main PROC
```

```
MOV EAX , 0
```

```
MOVZX EAX , val2
```

```
INC EAX
```

```
MOV EBX , val3
```

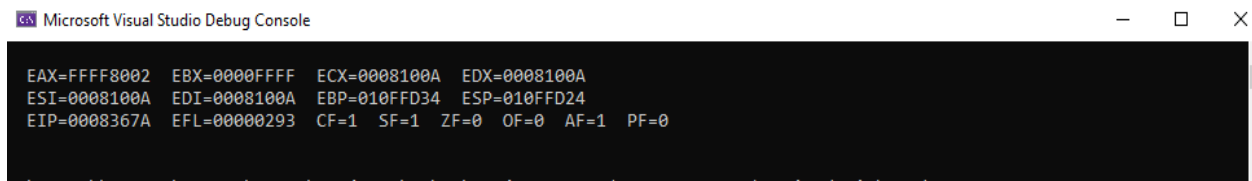
```
SUB EAX , EBX
```

```
call Dumpregs
```

```
exit
```

```
main ENDP
```

```
END main
```



A screenshot of the Microsoft Visual Studio Debug Console window. The window has a title bar with the Visual Studio logo and the text "Microsoft Visual Studio Debug Console". The console area is black with white text displaying the following register values:

```
EAX=FFFF8002  EBX=0000FFFF  ECX=0008100A  EDX=0008100A  
ESI=0008100A  EDI=0008100A  EBP=010FFD34  ESP=010FFD24  
EIP=0008367A  EFL=00000293  CF=1   SF=1   ZF=0   OF=0   AF=1   PF=0
```

iii)

Code:

```
INCLUDE Irvine32.inc
```

```
.data
```

```
val1 BYTE 10h
```

```
val2 WORD 8000h
val3 DWORD 0FFFFh
val4 WORD 7FFFh
```

```
.code
main PROC
MOV EAX , 0
MOVZX EAX , val2
INC EAX
MOV EBX , val3
SUB EAX , EBX
MOVZX ECX , val4
SUB EAX , ECX
```

```
call Dumpregs
```

```
exit
main ENDP
END main
```

Microsoft Visual Studio Debug Console

```
EAX=FFFF0003  EBX=0000FFFF  ECX=00007FFF  EDX=002D100A
ESI=002D100A  EDI=002D100A  EBP=012FFCC8  ESP=012FFCB8
EIP=002D3683  EFL=00000296  CF=0  SF=1  ZF=0  OF=0  AF=1  PF=1
```