

SAAD UR REHMAN  
19k-0218  
SEC C

## LAB TASK 9

### MUL EXAMPLES:

The first screenshot shows the assembly code in a file named 'please.asm'. The code includes Irvine32.inc, defines two words 'val1' (2000h) and 'val2' (0100h), and then multiplies them. The output window shows the following register values:

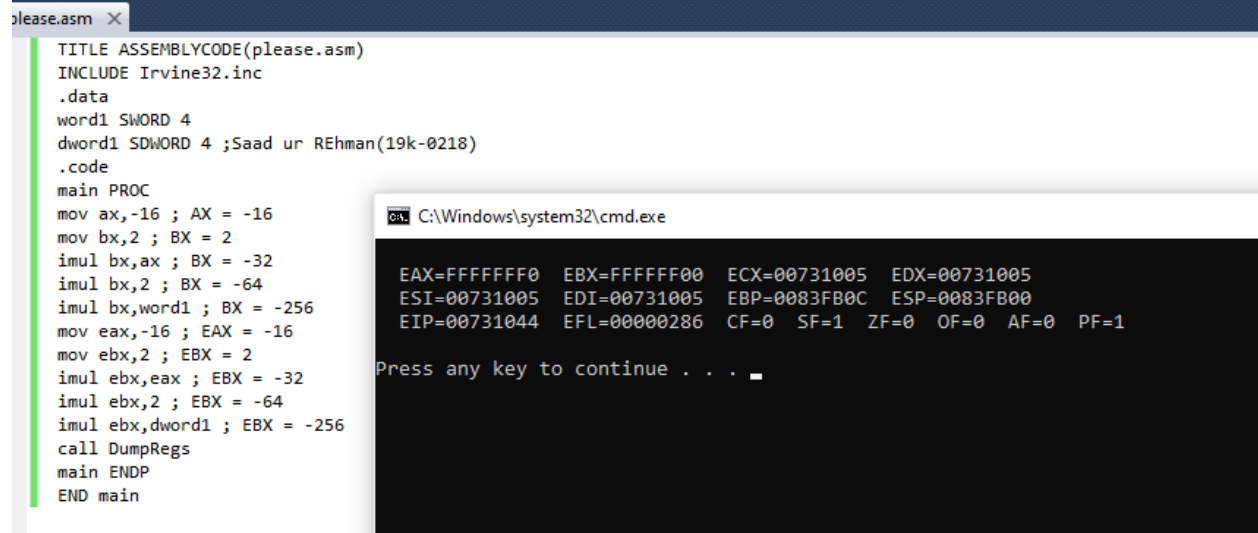
```
EAX=00AF0000 EBX=00846000 ECX=00541005 EDX=00540020  
ESI=00541005 EDI=00541005 EBP=00AFFC2C ESP=00AFFC20  
EIP=00541022 EFL=00000A07 CF=1 SF=0 ZF=0 OF=1 AF=0 PF=1
```

The second screenshot shows the same assembly code, but with different values for 'val1' and 'val2'. The output window shows the following register values:

```
EAX=12345000 EBX=00001000 ECX=007A1005 EDX=00000000  
ESI=007A1005 EDI=007A1005 EBP=005DFB48 ESP=005DFB3C  
EIP=007A1021 EFL=00000206 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=1
```

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## IMUL EXAMPLES:



The image shows a screenshot of an assembly program named 'please.asm' and its execution output in a Windows command prompt. The assembly code defines a data segment with a word 'SWORD' and a dword 'SDWORD', and a code segment with a 'main' procedure. The code performs several multiplication operations using the 'imul' instruction. The output shows the state of the CPU registers after the execution of the 'DumpRegs' call.

```
please.asm x
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
word1 SWORD 4
dword1 SDWORD 4 ;Saad ur REhman(19k-0218)
.code
main PROC
mov ax,-16 ; AX = -16
mov bx,2 ; BX = 2
imul bx,ax ; BX = -32
imul bx,2 ; BX = -64
imul bx,word1 ; BX = -256
mov eax,-16 ; EAX = -16
mov ebx,2 ; EBX = 2
imul ebx,eax ; EBX = -32
imul ebx,2 ; EBX = -64
imul ebx,dword1 ; EBX = -256
call DumpRegs
main ENDP
END main
```

```
C:\Windows\system32\cmd.exe

EAX=FFFFFFF0  EBX=FFFFFF00  ECX=00731005  EDX=00731005
ESI=00731005  EDI=00731005  EBP=0083FB0C  ESP=0083FB00
EIP=00731044  EFL=00000286  CF=0  SF=1  ZF=0  OF=0  AF=0  PF=1

Press any key to continue . . .
```

## DIV EXAMPLES:

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```
base.asm x
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
word1 SDWORD 4
dword1 SDWORD 4 ;Saad ur Rehman(19k-0218)
.code
main PROC
imul bx,word1,-16 ; BX = -64
imul ebx,dword1,-16 ; EBX = -64
imul ebx,dword1,-200000000 ; OF
call DumpRegs
main ENDP
END main
```

```
C:\Windows\system32\cmd.exe
EAX=0133F9A0  EBX=2329B000  ECX=00A41005  EDX=00A41005
ESI=00A41005  EDI=00A41005  EBP=0133F954  ESP=0133F948
EIP=00A4102E  EFL=00000A07  CF=1  SF=0  ZF=0  OF=1  AF=0  PF=1
```

```
base.asm x
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
byteVal SBYTE -101 ; 98h
.code
main PROC ;Saad ur Rehman(19k-0218)
mov al,byteVal ; AL = 98h
Cbw
call DumpRegs
main ENDP
END main
```

```
C:\Windows\system32\cmd.exe
EAX=004FFF9B  EBX=0038D000  ECX=007D1005  EDX=007D1005
ESI=007D1005  EDI=007D1005  EBP=004FF95C  ESP=004FF950
EIP=007D101C  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

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The screenshot displays an IDE with two windows. The top window shows the assembly code for 'please.asm', and the bottom window shows the output of the program's execution.

**Assembly Code (please.asm):**

```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
wordVal SWORD -101 ; FF9Bh
.code ;Saad ur Rehman(19k-0218)
main PROC
mov ax,wordVal ; AX = FF9Bh
cld
call DumpRegs
main ENDP
END main
```

**Output (Command Prompt):**

```
C:\Windows\system32\cmd.exe

EAX=010FFF9B  EBX=00E20000  ECX=00101005  EDX=0010FFFF
ESI=00101005  EDI=00101005  EBP=010FFDDC  ESP=010FFDD0
EIP=0010101D  EFL=00000246  CF=0  SF=0  ZF=1  OF=0  AF=0  PF=1
```

The IDE interface includes a 'Server Explorer' and 'Toolbox' on the left, and an 'Output' window showing 'Build started: 1>----- Build started:'. The assembly code is written in a green monospaced font.

## IDIV EXAMPLES:

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mid2 - Microsoft Visual Studio (Administrator)

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Debug Win32

please.asm

```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
byteVal SBYTE -48 ; D0 hexadecimal
.code
main PROC
mov al,byteVal ; lower half of dividend
cbw ; extend AL into AH
mov bl,+5 ; divisor ;SAAD UR REHMAN(19k-0218)
idiv bl
call DumpRegs
main ENDP
END main
```

C:\Windows\system32\cmd.exe

```
EAX=00DAFDF7 EBX=00F40005 ECX=00611005 EDX=00611005
ESI=00611005 EDI=00611005 EBP=00DAF868 ESP=00DAF85C
EIP=00611020 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1
```

mid2 - Microsoft Visual Studio (Administrator)

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Debug Win32

please.asm

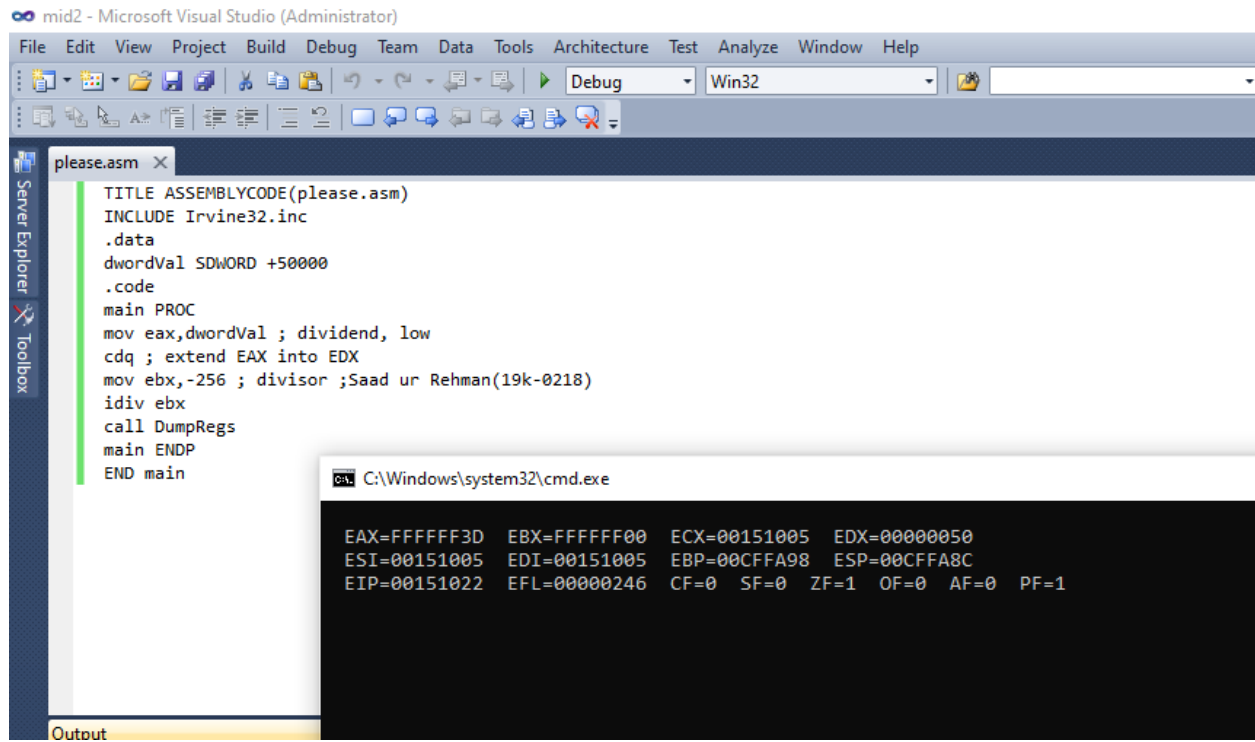
```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
wordVal SWORD -5000
.code
main PROC
mov ax,wordVal ; dividend, low
cwd ; extend AX into DX
mov bx,+256 ; divisor ;Saad ur Rehman(19k-0218)
idiv bx
call DumpRegs
main ENDP
END main
```

C:\Windows\system32\cmd.exe

```
EAX=010FFFFD EBX=00FF0100 ECX=00581005 EDX=0058FF78
ESI=00581005 EDI=00581005 EBP=010FF920 ESP=010FF914
EIP=00581024 EFL=00000246 CF=0 SF=0 ZF=1 OF=0 AF=0 PF=1
```

Press any key to continue . . .

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The screenshot shows the Microsoft Visual Studio (Administrator) interface. The main window displays the assembly file 'please.asm' with the following code:

```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.data
dwordVal SDWORD +50000
.code
main PROC
mov eax,dwordVal ; dividend, low
cdq ; extend EAX into EDX
mov ebx,-256 ; divisor ;Saad ur Rehman(19k-0218)
idiv ebx
call DumpRegs
main ENDP
END main
```

The 'Output' window at the bottom right shows the execution results in a command prompt:

```
C:\Windows\system32\cmd.exe

EAX=FFFFFF3D  EBX=FFFFFF00  ECX=00151005  EDX=00000050
ESI=00151005  EDI=00151005  EBP=00CFFA98  ESP=00CFFA8C
EIP=00151022  EFL=00000246  CF=0   SF=0   ZF=1   OF=0   AF=0   PF=1
```

ADC AND SBB EXAMPLES:

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```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.code
main PROC
mov dl,0 ;Saad ur Rehman(19k-0218)
mov al,0FFh
add al,0FFh ; AL = FEh
adc dl,0
call DumpRegs
main ENDP
END main
```

C:\Windows\system32\cmd.exe

```
EAX=00CFFAFE EBX=00A4B000 ECX=00FF1005 EDX=00FF1001
ESI=00FF1005 EDI=00FF1005 EBP=00CFFA24 ESP=00CFFA18
EIP=00FF101E EFL=00000202 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=0
```

mid2 - Microsoft Visual Studio (Administrator)

File Edit View Project Build Debug Team Data Tools Architecture Test Analyze Window Help

Debug Win32

Server Explorer Toolbox

please.asm

```
TITLE ASSEMBLYCODE(please.asm)
INCLUDE Irvine32.inc
.code
main PROC ;Saad ur Rehman(19k-0218)
mov edx,7 ; upper half
mov eax,1 ; lower half
sub eax,2 ; subtract 2
sbb edx,0
call DumpRegs
main ENDP
END main
```

C:\Windows\system32\cmd.exe

```
EAX=FFFFFFFF EBX=009BC000 ECX=00271005 EDX=00000006
ESI=00271005 EDI=00271005 EBP=007FF7C8 ESP=007FF7BC
EIP=00271025 EFL=00000206 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=1
```

Output