Virtual University	**Assignment No. 01** **Semester: Fall 2012** **CS401: Computer Architecture and Assembly Language Programming**	**Total Marks: 20** **Due Date:12 Nov,2012**

Instructions

- **Idea**

Assignment

Question No. 1: (10 mark)

Part (A):

Calculate physical address of the following segment offset pairs. Explain each and every step for calculating the physical address. (Calculation:3 marks, Explanation:2 marks)

1. 2C3E:0199
2. 8000:0250

Solution :

Qno.1-A
1) Physical address = 2C3E0 + 00199 = 2C579
2) Physical address = 80000 + 00250 = 80250
any one confirm these calculations.whether correct or not?

or

please offer your comments and also any body else Knows
1) Physical address = 02C3E + 01990 = 045CE
2) Physical address = 08000 +02500 = 0A500

Part (B):

Assemble the given program using NASM.

(5 marks)

```
ORG 0100H
MOV AX,5H
ADD AX,44ABH
MOV BX,10
ADD AX,BX
SUB AX,0F12H
MOV BX,15
ADD AX,BX
MOV AX,0X4C00
INT 0X21
```

Solution:

	Instruction	Register current value after the instruction execution		IP (Instruction Pointer)	Flags				
					CF	ZF	PF	SF	AF
1	ORG 0100H	AX	0000	0100	0	0	0	0	0
		BX	0000						
2	MOV AX,5H	AX	0005	0103	0	0	0	0	0
		BX	0000						
3	ADD AX,44ABH	AX	44B0	0106	0	0	0	0	1
		BX	0000						
4	MOV BX,10	AX	44B0	0109	0	0	0	0	1
		BX	000A						
6	ADD AX,BX	AX	44BA	010B	0	0	0	0	0
		BX	000A						
7	SUB AX,0F12H	AX	35A8	010E	0	0	0	0	0
		BX	000A						
8	MOV BX,15	AX	35A8	0111	0	0	0	0	0
		BX	000F						
9	ADD AX,BX	AX	35B7	0113	0	0	1	0	1
	....	BX	000F						

Other Sol

	Instruction	Register current value after the instruction execution		IP (Instruction Pointer)	Flags CF	ZF	PF	SF	AF
1	ORG 0100H	AX BX	0000 0000	0100	0	0	0	0	0
2	MOV AX,5H	AX BX	0005 0000	0103	0	0	0	0	0
3	ADD AX,44ABH	AX BX	44B0 0000	0106	0	0	0	0	1
4	MOV BX,10	AX BX	44B0 000A	0109	0	0	0	0	1
6	ADD AX,BX	AX BX	44BA 000A	010B	0	0	0	0	0
7	SUB AX,0F12H	AX BX	35A8 000A	010E	0	0	0	0	0
8	MOV BX,15	AX BX	35A8 000F	0111	0	0	0	0	0
9	ADD AX,BX	AX BX	35B7 000F	0113	0	0	1	0	1

1. After that load the Debugger by typing AFD in the command prompt like in Fig 1.

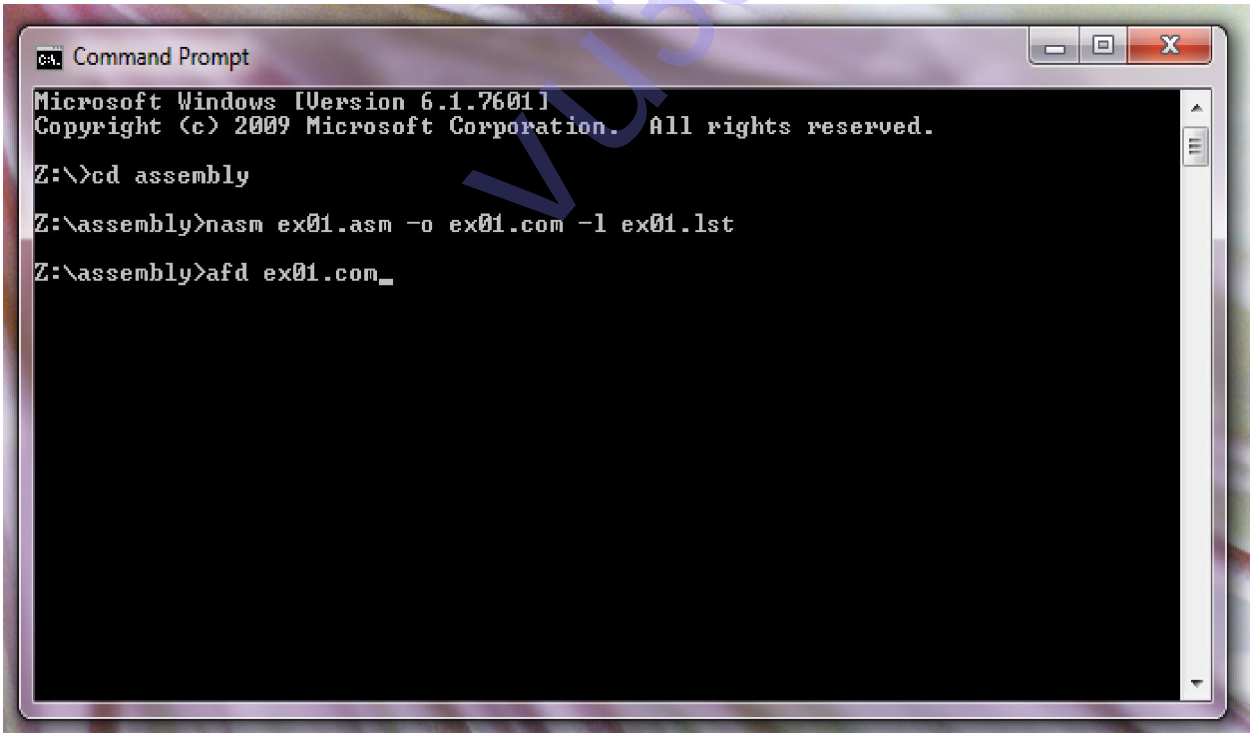

Fig 1: Loading debugger.

2. The AFD window will be opened. The complete description is given below in fig 2

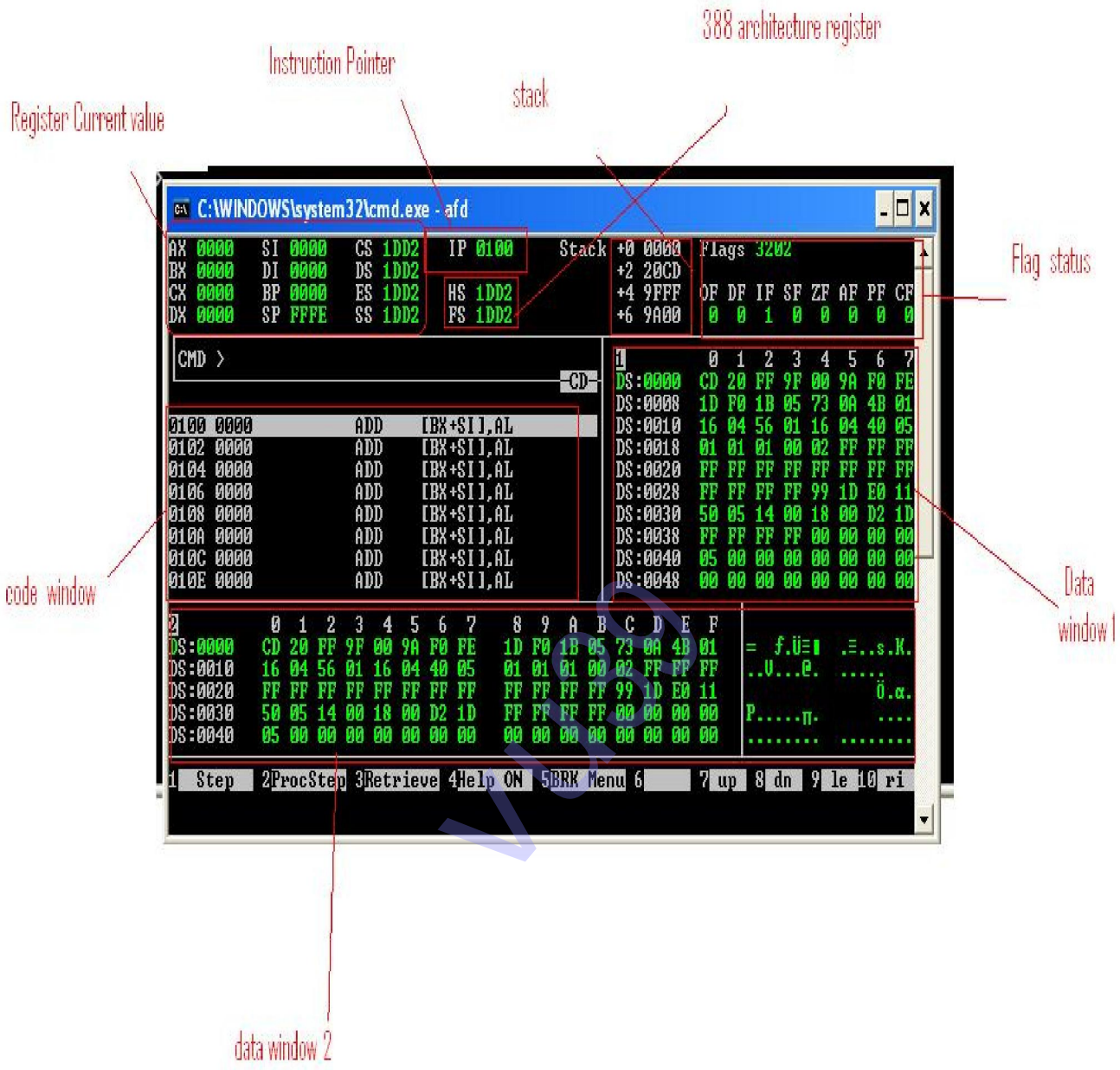

Fig 2: AFD description.

3. When the program is loaded in the debugger, it is loaded at offset 0100, which displaces all memory accesses in our program. Execute the program step by step and examine how the memory is read and the registers are updated, how the instruction pointer moves forward.

4. Now we execute the program with F2 key (instruction will move one by one) and write down the contents of the specified registers in the given table.

	Instruction	Register current value after the instruction execution		IP (Instruction Pointer)	Flags				
					CF	ZF	PF	SF	AF
1	ORG 0100H	AX							
		BX							
2	MOV AX,5H	AX							
		BX							
3	ADD AX,44ABH	AX							
		BX							
4	MOV BX,10	AX							
		BX							
6	ADD AX,BX	AX							
		BX							
7	SUB AX,0F12H	AX							
		BX							
8	MOV BX,15	AX							
		BX							
9	ADD AX,BX	AX							
		BX							

Table: Register contents after the execution of each instruction.

Question No. 2: (10 mark)

Now after attempting previous question, You are able to write, assemble and debug a program. So write a program using Conditional Jump instructions that will add all odd numbers between 1 to 20 (not including 1 & 20). Explain each instruction of program in your own words and also attach the snapshot of your AFD showing the executed code results.

(Program:5 marks, Explanation: 3 marks & Snapshot: 2 marks)

Note: Provide snapshot of your program which will be run in AFD window. It is strictly prohibited the copied assignment.