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**10:20** 

# Micro: Assembly: Lab3

## Problem one:

The program adds the 2 numbers using the traditional method starting from the right adding two bytes and stores them in "AX" then stores the "AL' in the result and sets the "AH" as the carry for the next iteration.

★ As not mentioned to ignore the carry or not .

I reserved 11 byte for the result to store every byte starting from the end"300A" to the start "3001". the address "3000" contains the last carry or "00" if no carry exists .

#### The CODE:

- MOV DX,0
- MOV BX,9
- MOV AL,[1000+BX]
- ADD AX,DX
- MOV DL,[2000+BX]
- ADD AX,DX
- MOV [3001+BX],AL
- MOV DL,AH
- MOV AX,0
- SUB BX,1
- CMP BX,0
- JGE 106
- MOV [3000],DL
- INT 3

### The program:

- Set the carry **DX** equals zero .
- Set the counter **BX** = 9 to iterate reversely on the 2 numbers .
- Read one byte from the first number and store it in AL.
- Add this byte to the previous carry **Dx** and store in **AX**.
- Read one byte from the second number and store it in **DL**.
- Add this byte to **AX**.
- Store the AL in the index
   [3001+BX].
- Store the AH in DL to be used as a carry in the next iteration.

```
073F:0100 MOV DX,0
073F:0103 MOV BX,9
073F:0106 MOV AL,[1000+BX]
073F:010A ADD AX,DX
073F:0110 ADD AX,DX
073F:0112 MOV [2000+BX],AL
073F:0118 MOV AX,0
073F:0118 MOV AX,0
073F:0118 SUB BX,1
073F:011E CMP BX,0
073F:0121 JGE 106
073F:0123 MOV [3000],DL
073F:0128
```

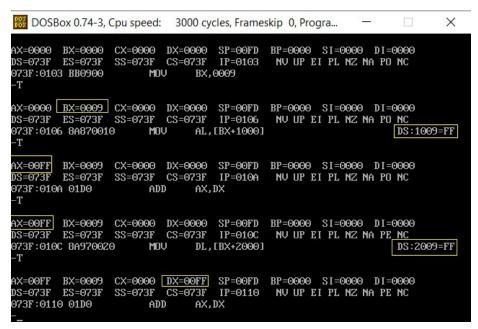
- Empty the **AX** register .
- Decrement the counter **BX** with 1.
- Compare the counter **BX** with zero .
- If the counter is still greater than or equal to zero, back to the loop "106".
- If the loop ends, set the address 3000 equals to the last carry.
- End the program .

## Sample run:

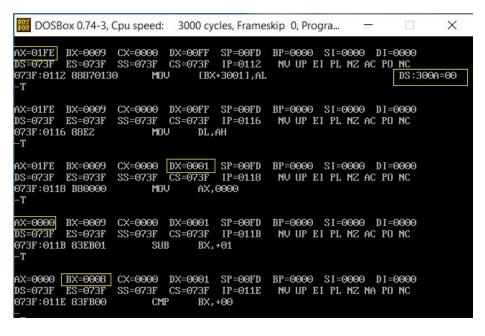
•

С	1	1	1	1	1	1	1	1	1	1	
N1		FF									
N2		FF									
=	01	FF	FE								

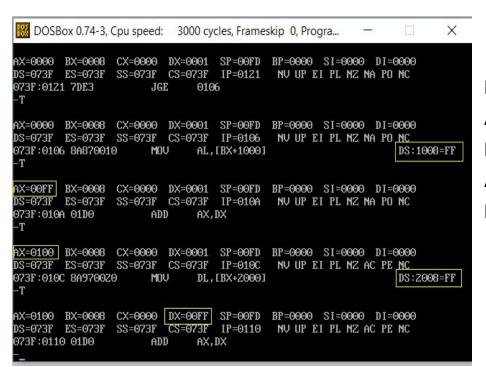
```
D:\>debug.exe
-E 1000 FF FF FF FF FF FF FF FF FF
-E 2000 FF FF FF FF FF FF FF FF
-A 100
073F:0100 MOV DX,0
073F:0103 MOV BX,9
073F:0106 MOV AL,[1000+BX]
073F:010A ADD AX,DX
073F:010C MOV DL,[2000+BX]
073F:0110 ADD AX,DX
073F:0112 MOV [3001+BX],AL
073F:0116 MOV DL,AH
073F:0118 MOV AX,0
073F:011B SUB BX,1
073F:011E CMP BX,0
073F:0121 JGE 106
073F:0123 MOV [3000],DL
073F:0127 INT 3
073F:0128
```



DX=0 BX =9 AL=[1009] = FF AX=FF+0=FF DL= [2009] =FF



AX=FF+FF=01FE [300A] = FE DX=carry=01 AX=0 BX=9-1=8



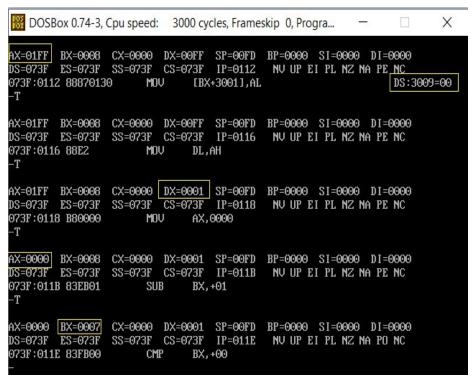
BX >=0 complete loop

AX = [1008]=FF

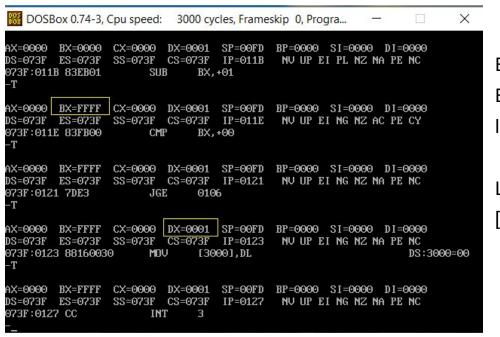
DX=01 "prev. Carry"

AX=FF+01=0100

DL=[2008]=FF

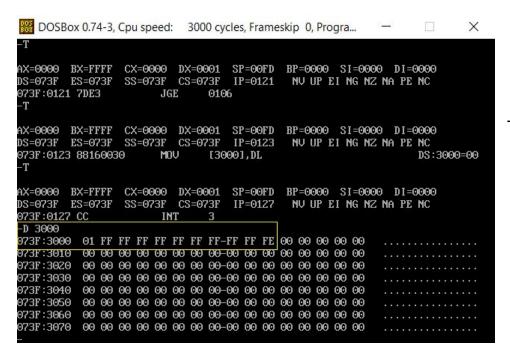


AX=100+FF=01FF [3009]=FF DL=01 AX=0 BX=8-1=7 And so on the next 7 iterations with the same results.



BX=0-1=FFFF BX<0 then the loop is ended.

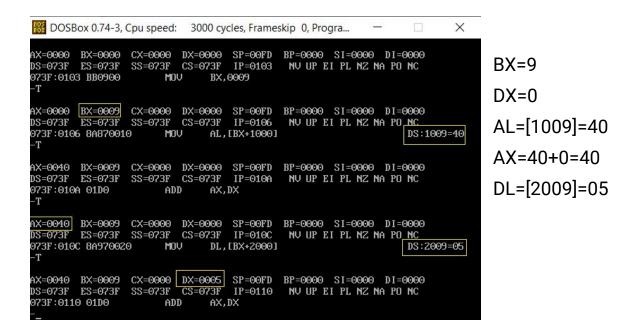
Last carry =DL=01 [3000]=01

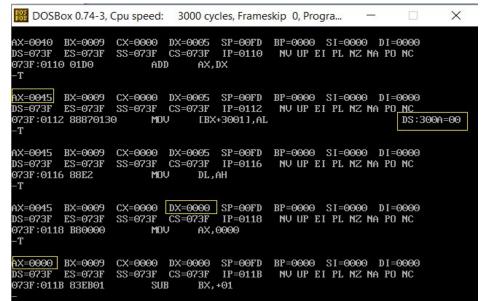


THe RESULT

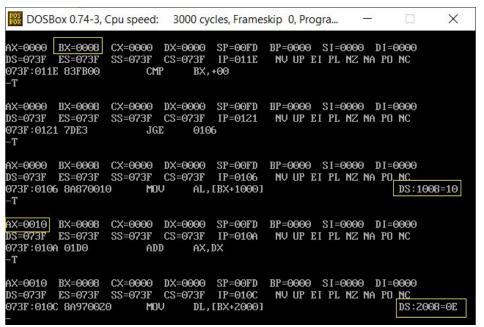
С	0	0	0	0	1	1	0	1	0	0	
N1		01	32	20	66	FF	CD	ВС	05	10	40
N2		06	12	11	40	05	DF	02	FF	0E	05
=	00	07	44	31	<b>A</b> 7	05	AC	BF	04	1E	45

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip (
Z:\>mount d d:\
Drive D is mounted as local directory d:\
Z:\>d:
D:\>debug.exe
E 1000 01 32 20 66 FF CD BC 05 10 40
E 2000 06 12 11 40 05 DF 02 FF 0E 05
A 100
073F:0100 MOV DX,0
073F:0103 MOV BX,9
073F:0106 MOV AL,[1000+BX]
973F:010A ADD AX,DX
073F:010C MOV DL,[2000+BX]
073F:0110 ADD AX,DX
073F:0112 MOV [3001+BX],AL
073F:0116 MOV DL,AH
073F:0118 MOV AX,0
073F:011B SUB BX,1
073F:011E CMP BX,0
073F:0121 JGE 106
073F:0123 MOV [3000],DL
073F:0127 INT 3
073F:0128
```





AX=40+5=45 [300A]=45 DL=CARRY=00 AX=0



BX=9-1=8 AL=[1008]=10 DL=[2008]=0E

AND SO ON .....

# THE RESULT:

oosb	ox 0.7	4-3,	Срі	u sp	eed	:	300	0 су	cle	s, Fr	ame	eskip	0,	Pro	gra		-			>	X
Т																					
X=0000	BX=FI	FFF	C	<b>&lt;=00</b>	900	D	<b>&lt;=00</b>	900	SI	P=00	OFD	BI	9=00	900	S	I=00	90	D I =0	9000		
S=073F				CS=073F IP=0123					1	IU I	JP I		IG N								
73F : 012: T	8816	5003			MC	)Ų		[36	000	I , DI										3000=0	0
X=0000	BX=FFFF CX=0000			900	DX=0000 SP=00FD					BP=0000 SI=0000 DI=0000											
S=073F	ES=073F SS=073F			CS=073F IP=0127					NU UP EI NG NZ NA PE NC												
73F:012	7 CC				II	T		3													
Т																					
X=0000	BX=FI	FFF	C>	<b>&lt;=00</b>	900	D	<=00	900	SI	P=00	F7	BI	9=00	900	S	I=00	90	D I =0	9000		
S=073F	ES=07	73F	SS	3=07	73F				IP=13B1		NU UP DI NG NZ NA PE N						NC				
1A3:13B	1 55				PL	JSH		BP													
D 3000																					
73F:300	9 00	07	44	31	<b>A7</b>	05	AC	BF-	-04	1E	45	00	00	00	00	00		D1.		.E	
73F:301	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					
73F:3020	9 00	00	00	00	00	$\Theta\Theta$	00	00-	-00	00	00	00	00	00	00	00					
73F:303	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					
73F:304	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					
73F:305	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					
73F:306	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					
73F : 307	9 00	00	00	00	00	00	00	00-	-00	00	00	00	00	00	00	00					