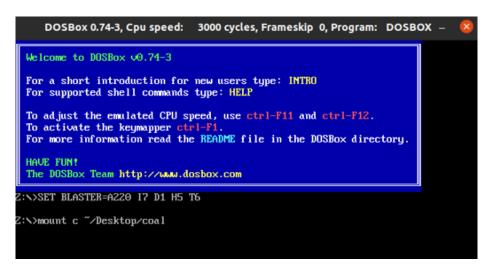
Lab Report#2 Saad Ahmad (20P-0051)

- 1. First, we install dosbox on our system.
- 2. To install dosbox on ubuntu type the following sudo apt install dosbox

```
(base) ayyzenn@Saadii:~$ sudo apt install dosbox
Reading package lists... Done
Building dependency tree
Reading state information... Done
dosbox is already the newest version (0.74-3-1build1).
0 to upgrade, 0 to newly install, 0 to remove and 0 not to upgrade.
(base) ayyzenn@Saadii:~$
```

- 3. After that run the dosbox.
- 4. Then we will mount the directory containing **nasm** and **Advance free debugger(afd).**
- 5. To mount the directory, type the following command c {path of the nasm}



6. Now open the virtual directory where we mounted nasm:

```
Welcome to DOSBox v0.74-3

For a short introduction for new users type: INTRO
For supported shell commands type: HELP

To adjust the emulated CPU speed, use ctrl-F11 and ctrl-F12.
To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

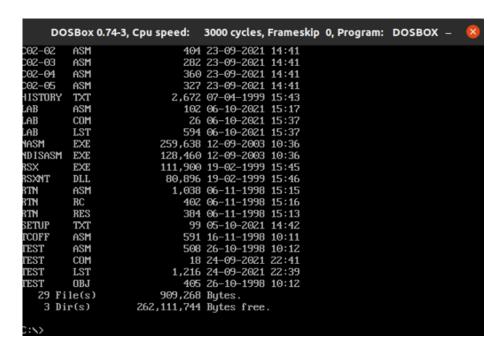
HAUE FUN!
The DOSBox Team http://www.dosbox.com

Z:\>SET BLASTER=AZZO I7 D1 H5 T6

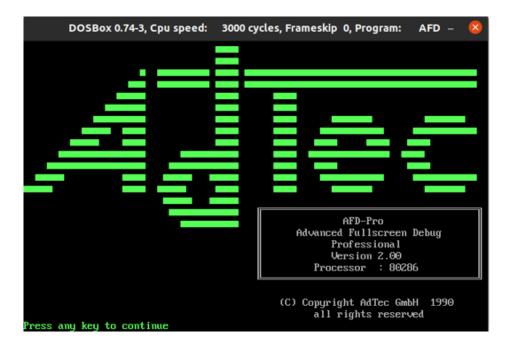
Z:\>mount c ~/Desktop/coal
Drive C is mounted as local directory /home/ayyzenn/Desktop/coal/

Z:\>C:\>_
```

7. Now we will check whether the directory is successfully mounted or not so for that type **dir**



8. Now we will check our debugger so for that type **afd**



9. now let's run our first code so for that type nasm{filename}.asm -o {output filename}.com

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX -
LAB
                                 26 06-10-2021 15:37
                           594 06-10-2021 15:37
259,638 12-09-2003 10:36
LAB
          LST
          EXE
NASM
NDISASM
          EXE
                           128,460 12-09-2003 10:36
111,900 19-02-1999 15:45
RSX
          EXE
                            80,896 19-02-1999 15:46
rsxnt
          DLL
                              1,038 06-11-1998 15:15
RTN
          asm
RTN
          RC
                                402 06-11-1998 15:16
RTN
          RES
                                384 06-11-1998
SETUP
          TXT
                                 99 05-10-2021 14:42
                                591 16-11-1998
TCOFF
          asm
                                                 10:11
                                508 26-10-1998 10:12
TEST
          ASM
                              18 24-09-2021 22:41
1,216 24-09-2021 22:39
          COM
TEST
          LST
TEST
                                405 26-10-1998 10:12
          OBJ
TEST
   29 File(s)
                           909,268 Bytes.
                      262,111,744 Bytes free.
    3 Dir(s)
C:\>afd
AFD-Pro is done
C:\>nasm c01-01.com -o c01-01.com
```

10. Now we will run our debugger so run the following command **afd {filename}.com**

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX -
LAB
                                  26 06-10-2021 15:37
                                594 06-10-2021
LAB
          LST
                                                  15:37
nasm
          EXE
                           259,638 12-09-2003 10:36
                            128,460 12-09-2003 10:36
111,900 19-02-1999 15:45
NDISASM
          EXE
RSX
          EXE
                            80,896 19-02-1999 15:46
1,038 06-11-1998 15:15
RSXNT
          DLL
RTN
          ASM
                                 402 06-11-1998 15:16
          RC
RTN
          RES
                                384 06-11-1998
                                                  15:13
RTN
SETUP
          TXT
                                 99 05-10-2021
                                                  14:42
                                591 16-11-1998
TCOFF
          asm
                                                  10:11
TEST
          ASM
                                508 26-10-1998 10:12
                              18 24-09-2021 22:41
1,216 24-09-2021 22:39
TEST
          COM
          LST
TEST
                            405 26-10-1998 10:12
909,268 Bytes.
          obj
TEST
   29 File(s)
                       262,111,744 Bytes free.
    3 Dir(s)
C:\>afd
AFD-Pro is done
C:\>nasm c01-01.com -o c01-01.com
C:\>AFD C01-01.COM
```

Sample codes

Code#1

```
[org 0x0100]

mov ax, 10

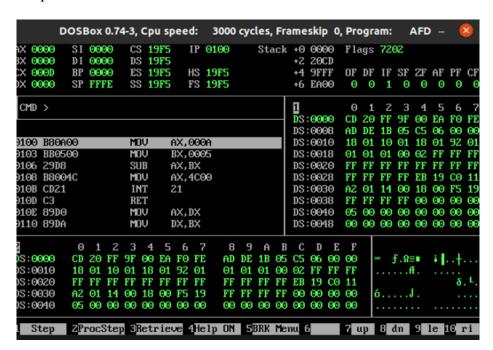
mov bx, 5

sub ax, bx

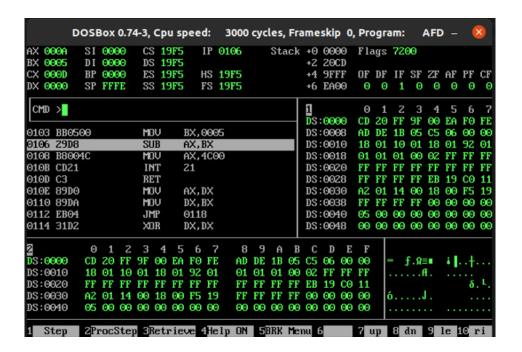
mov ax, 0x4c00

int 0x21
```

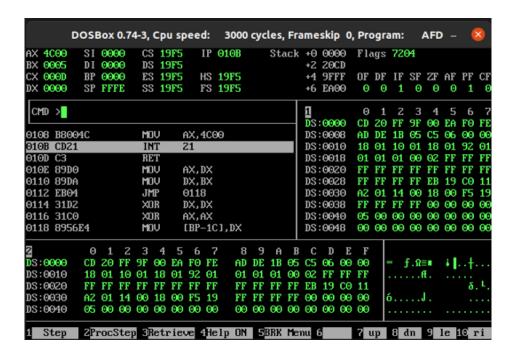
Output:



	DOSE	Зох	0.7	4-3,	Ср	u sp	eed	d:	3000	сус	les,	Fra	me	skip	0,	Pro	ogr	am:	4	AFC	-	(×
AX 000A		000			1		1	IP 6	103		Sta	ack	+0			Fla	ags	72	90				
BX 0000		000			1			10.4	one					200		0.75		***	07	-m	A 77	nn	
CX 000D DX 0000	BP	000 FFI	-	_	19				9F5 9F5				+4 +6	9FI EAG		OF O	DF O	IF 1	SF 0	ZF 0	AF 0	PF O	CF 0
DA 0000	- 01	111	L	0.	, 1	лэ		0 1	213			_		LIII	~_	_	_		_		_	_	
CMD >												-1	1			0	1	2	3	4	5	6	7
												\dashv		000		CD	20	$\mathbf{F}\mathbf{F}$	9F	00	ΕA	F0	FΕ
0100 B8				MC				000A				_		:000	-	ΑD	DE	1 B	05		96	00	0 0
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0108 B8				MO				1C00	1					:002		FF	FF	FF	FF	FF	FF	FF	FF
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010D C3 010E 89	DO.			RI Mo			. ·					-1		:000 :000	-	AZ PP	01 EE	14	00 FF	18 00	00 00	F5 00	19 00
0110 89				MC			ix,I IXI							:00:		05	90	00	ο ΘΘ	00	00	00	90
0112 EB				Jh			9118					-1		:00		00	00	00	00	00		00	
0112 110	01			- 01	<u> </u>	`	7110					Щ	р3				•					-	•
2	0	1	2	3	4	5	6	7	8	9	A	В	С	D	E	F	- 1						
DS:0000	CD	20	$\mathbf{F}\mathbf{F}$	9F	00	EΑ	FΘ	FE	AD	DE	1B	05	C5	96	00	00	- 1	- :	f.n		i I	+	
DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	02	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	- 1		1	Æ.			
DS:0020		$\mathbf{F}\mathbf{F}$	$\mathbf{E}\mathbf{B}$	19	C0	11	_					δ	٠٠.										
DS:0030		01	14	00	18		F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	00	00	00		ó		J.			
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	DOSE	Зох	0.7	4-3,	Ср	u sp	ee	d:	3000	сус	les	Fra	me	skip	0,	Pro	ogr	am:		AFD	-	(×
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BX 0005	DI				19									200	_								
CX 000D	BP	000			1				19F5				+4	9FI		OF	DF	\mathbf{IF}	SF	ΖF	ΑF	PF	CF
DX 0000	SP	FFI	Œ	25	19	JF5	I	FS :	19F5				+6	EA(90	0	0	1	Θ	0	0	1	Θ
CMD >												Т	1	. ~~	~	0	1	2	3	4	5	6	7
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0106 291 0108 BB				SL			iX,I		2			_		: 000 : 000		AD 18	DΕ Θ1	10	05 01	18	06 01	92	00 01
0108 CD				M	TT.		AX,4	icu	9					: 00: : 00:		01	01	01	00	02	EE.	ᅜ	FF
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010E 89	no			MC			i,Xi	NΥ				- 1		:002		FF	FF	FF	FF	EB	19	CO	11
0110 89				MC			X,1					- 1		:00		AZ.	Θ1	14	99	18	00	F5	19
0112 EB				Jì			9118							:000		FF	FF	FF	FF	00	00	00	00
0114 31	DZ.			X			I,XC					- 1	DS	:00	10	05	00	00	00	00	00	00	$\Theta\Theta$
0116 310	CO			ΧI)R	f	ìX,f	ìΧ				-1	DS	:004	18	00	00	00	00	00	00	00	00
												_					\neg						
2	Θ	1	2	3	4	5	6	7	8	9	Ĥ	В	С	D	\mathbf{E}	\mathbf{F}	-1						
DS:0000		20	$\mathbf{F}\mathbf{F}$	9F	90	EΑ	FΘ	FΕ	AD	DΕ	1B	05	C5	96	90	00	- 1		f.Ω		÷,	†	
DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	02	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	-1		1	ŧ.			
DS:00Z0	FF	FF	FF	FF	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	FF	FF	FF	FF	EB	19	CO	11	_					δ	. ե.
DS:0030	AZ	01	14	00	18	00	F5	19	$\mathbf{F}\mathbf{F}$	FF	FF	FF	00	00	00	00	_ ·	ó.,		J.			
DS:0040	05	00	9 0	0 0	00	9 0	9 0	Θ Θ	00	Θ Θ	00	9 0	9 0	00	00	9 0							
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Code#2

```
[org 0x0100]

mov ax , 0

mov ax , 5

add ax , 2

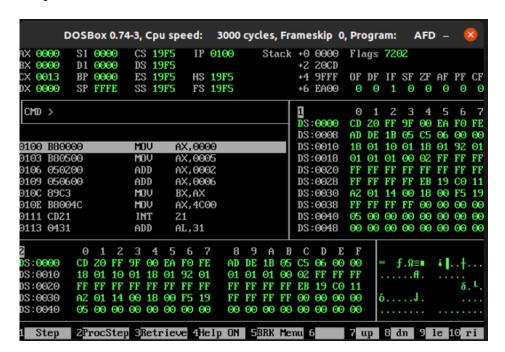
add ax , 6

mov bx , ax

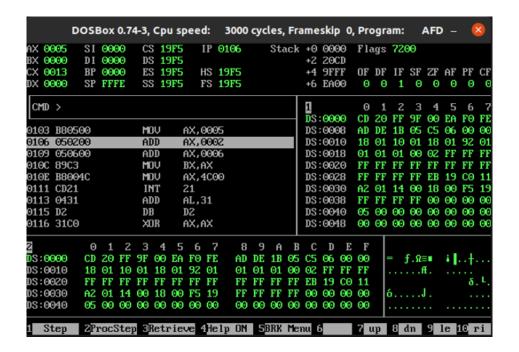
mov ax , 0x4c00

int 0x21
```

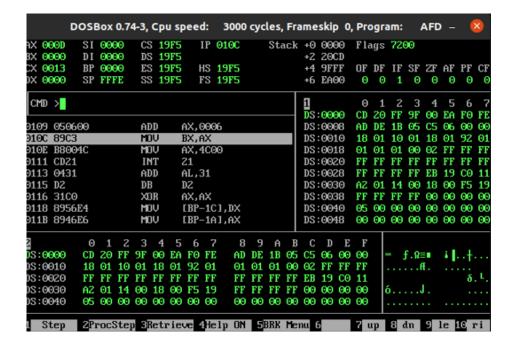
Output:



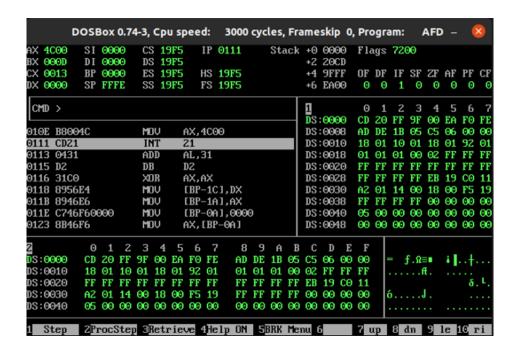
	DOSE	Зох	0.7	4-3,	Ср	u sp	ee	d:	3000	cyc	les,	Fra	me	skip	0,	Pro	ogra	am:	4	AFD) –	(×
AX 0000		000			1			IP 6	103		Sta	ack		000		Fla	ags	720	90				
BX 0000		900			15			10 4	OPE					200		OF	D.F.	1.12	or	FZID	AF	DE	OF
CX 0013 DX 0000		000 FFI			19			1S 1 FS 1					+4 +6	9FE EAG		OF O	DF O	11	SF 0	2ľ 0	AF 0	PF O	CF
DA 0000	- 01	111	L	30	, 1	713			713			_	-0	LITE	~_	_	_		_		_	_	Ľ
CMD >												- 1	1			0	1	2	3	4	5	6	7
												\dashv	$\overline{ extbf{D}} ext{S}$	000	-	CD	20	$\mathbf{F}\mathbf{F}$	9F	00	ΕA	F0	FΕ
0100 B8				MC				9000				_		:000	-	AD	DE	1B	05	C5	06	00	00
0103 B8				M				9005						:001		18	01	10	01	18	01	92	01
	0200			ΑI				9002				- 1		:001		01	01	01	00	02	FF	FF	FF
0109 050 0100 890				ΑI				9006				- 1		:002		11	11	FF	FF	11	19	FF CO	FF
010C B3				MC MC			8X,6	1A 1000				- 1		: 002 : 003		FF AZ	PT	14	90	EB 18	00	F5	11 19
0111 CD				I			21	icoc				- 1		:003		FF	FF	FF	FF	90	00		90
0113 043				ΑI			iL,3	31				- 1		:004		05	00	00	00	00	00	00	99
0115 D2				DI			02	-				- 1		:004		00	00	00	00	00	00	00	$\widetilde{00}$
												_					$\overline{}$						
2	0	1	2	3	4	5	6	7	8	9	Ĥ	В	C	D	\mathbf{E}	F	-1						
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DS:0020		FF	FF	FF 00	FF 40	FF	FF	FF	FF	FF	FF	FF	EB	19	co	11						ð.	ч.
DS:0030 DS:0040		01 00	14 00	90	18 00		F5 00	19 00	FF 00	FF 00	FF 00	FF 00	00 00	00 00	00 00	00 00		J.,	• • • •	١.			
D3.0010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00				• •			
1 Step	Z _P	roci	Ste	3	Reti	riev	æ (Hel	p ON	5	BRK	Men	nu (6		7 (ιp	8	dn	9	le	10 1	ri

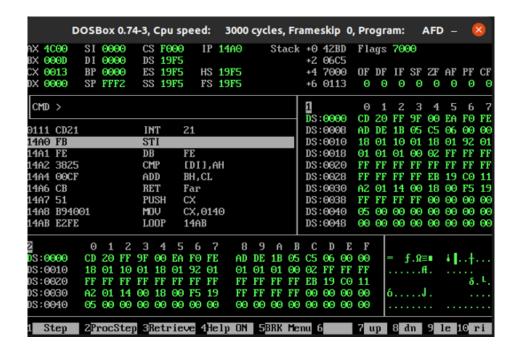


		DOSE	Зох	0.7	4-3,	Ср	u sp	ee	d:	3000	сус	les,	Fra	me	skip	0,	Рг	одга	am:	4	AFD	-	•	X
AX O	907	SI	00	90	CS	1	F5		IP 0	109		Sta	ack	+0	000	00	Fla	ags	72	90				
BX 00	900	DI	000	90	\mathbf{D}_{2}	1	9F5							+2	200	CD								
CX 00		\mathbf{BP}	00			1				.9F5				+4	9FF		$\mathbf{0F}$	DF	\mathbf{IF}	SF	ΖF	ΑF	\mathbf{PF}	CF
DX 00	900	SP	FF	Œ	25	1	9F5	I	FS 1	.9F5				+6	EA6	90	0	0	1	0	0	0	0	Θ
CMD	>												Т	1			0	1	2	3	4	5	6	7
						_							\dashv		000		CD	20	$\mathbf{F}\mathbf{F}$	9F	00	EΑ	F0	FΕ
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0109					ΑI				9006						:001		18	01	10	01	18	01	92	01
010C					MC			BX,f							:001		01	01	01	00	02	FF	FF	FF
010E 0111					MC				1C00	ļ			- 1		:002		FF	FF	FF	FF	FF	• •	FF	FF
0111						T		21	14						:002	-	FF	F F	11	FF ~	EB	19	CO	11
0115		1			AI Di			AL,3 DZ	31						:003 :003		AZ FF	01 EE	14 EE	99 PE	18 00	00 00	F5 00	19 00
0116		00			Χ			υ <u>ς</u> ΑΧ. 6							: 003 : 004		05	90	00	00	9	00	00	00
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DS:00	900	CD	20	$\mathbf{F}\mathbf{F}$	9F	00	ΕA	FΘ	FE	AD	DE	1B	05	C5	96	00	00	١.	- :	f.Ω		i I	+.	
DS:00	910	18	01	10	01	18	01	92	01	01	01	01	00	02	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	- 1		1	Ŧ.		:	
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DS:00	030	A2	01	14	00	18	00	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	00	$\Theta\Theta$	00	00		ó.,		J.			
DS:00	940	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							
1 St	tep	2P	roci	Ste	3	Reti	rie	æ 4	Hel	p ON	5	BRK	Me	nu (5		7 (ιp	8	dn	9	le	10 1	ri



	DOSE	Зох	0.7	4-3,	Ср	u sp	ee	d:	3000	сус	les,	Fra	me	ski	0,	Pro	ogra	am:	-	AFD	-	(X
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CX 0013 DX 0000	BP	000 FFI	90	ES	1	9F5 9F5			.9F5 .9F5				+4	9FI EAC	FF	0F 0	DF O	IF 1	SF 0	ZF 0	AF 0	PF O	CF ©
CMD >												Т	1	~~	~	0	1	2	3	4	5	6	7
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0113 043	31			ΑI	DD	1	AL,3	31				- 1	DS:	:00	20	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$
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0116 310	CO			X	\mathbf{R}	1	AX,f	ìΧ					DS:	:00	30	AZ	01	14	$\Theta\Theta$	18	$\Theta\Theta$	F5	19
0118 899	56E4			MO	JŲ		[BP-	-1C]	,DX				DS:	:00	38	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	00	00	9 0
011B 894	16E6			MO	JŲ		CBP-	-1A]	,AX				DS:	:00	10	05	00	$\Theta\Theta$	$\Theta\Theta$	00	00	00	9 0
011E C74	16F600	900		MC	JŲ		CBP-	-0A]	,0000	9		- 1	DS:	:00	18	00	00	00	00	90	90	00	00
2	0	1	2	3	4	5	6	7	8	9	A	В	С	D	Е	F	Т						
DS:0000	CD	20	$\mathbf{F}\mathbf{F}$	9F	00	EΑ	FΘ	FE	AD	DE	1B	05	C5	06	00	90	١.	- :	f . Ω≡		i I	+.	
DS:0010	18	01	10	01	18	01	92	01	01	01	01	00	02	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	П		f				
DS:0020	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	FF	$\mathbf{E}\mathbf{B}$	19	CO	11						δ	١.
DS:0030	AZ	01	14	00	18	$\Theta\Theta$	F5	19	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	$\mathbf{F}\mathbf{F}$	00	$\Theta\Theta$	$\Theta\Theta$	00	H	ó.,		١.			
DS:0040	05	9 0	0 0	00	00	00	00	00	00	0 0	00	00	00	00	00	00	П						
1 Step	2Pı	rocs	Ste	j 3	Ret	rie	ve 4	He l	p ON	5	BRK	Men	nu (5		7 (ιp	8	dn	9	le i	[O 1	ri





Code#3

```
[org 0x0100]

mov ax , 0

mov ax , 5

mov bx , 10

mov cx , ax

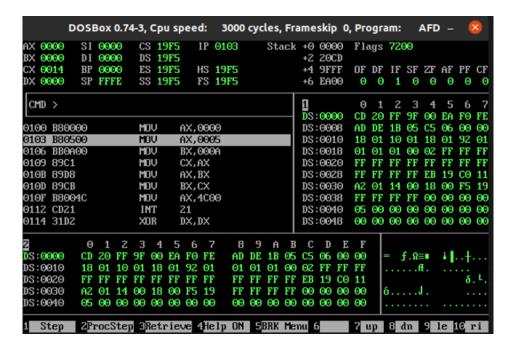
mov ax , bx

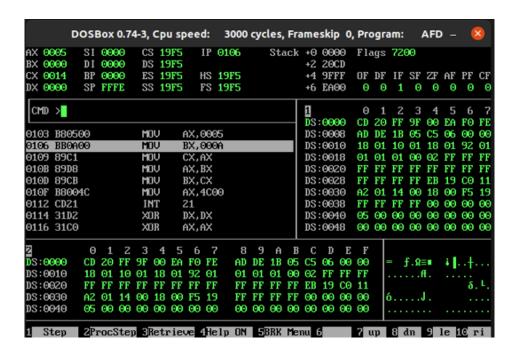
mov bx , cx

mov ax , 0x4c00

int 0x21
```

Output:





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