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SECTION : BS-AI-4A

LAB TASK 1

Guide for Ubuntu Linux (LTS)

NASM Assembler :

First you need to install **NASM** assembler in order to make the computer understand , An assembler will convert assembly code to machine code

You can install **NASM** from this following github repository or you can install it from the files provided by your instructor

- [whiz-coder/NASM](https://github.com/whiz-coder/NASM)
- <https://github.com/shafeenyousafzai/COAL>

After downloading the files , look for **NASM** folder and copy it into the home directory

Dosbox :

Now you need to install **DOSBOX** , it is an emulator used to run MS-DOS applications.

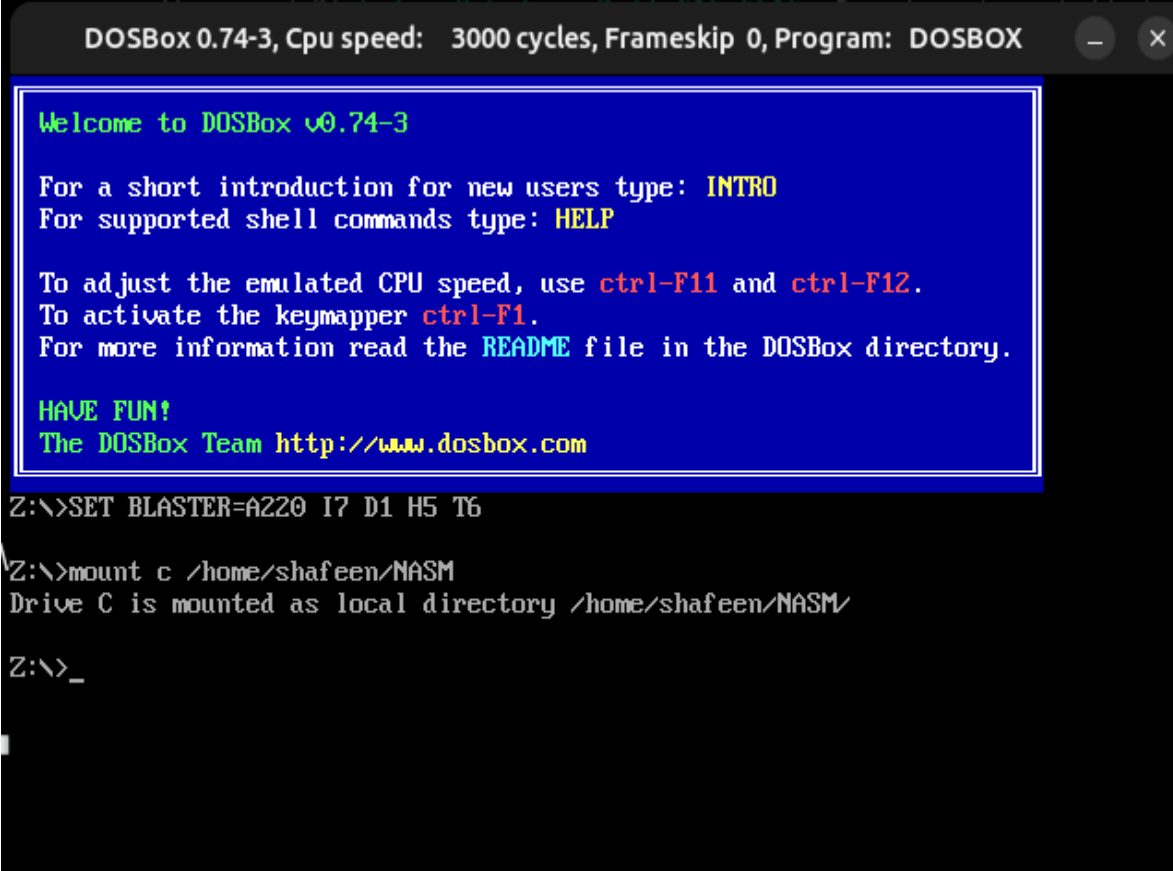
- Run the following command on linux terminal
 - ***sudo apt install dosbox***

```
(anaconda3)shafeen@shafeen-Dell-G15-5515:~$ sudo apt install dosbox
[sudo] password for shafeen:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
dosbox is already the newest version (0.74-3-4).
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
(anaconda3)shafeen@shafeen-Dell-G15-5515:~$ |
```

- It is already installed on my laptop...

Working :

- Open **DOSBOX** , and mount the folder you just copied into the HOME directory
- Write the following command to do so
 - `mount c /home/YOUR_USERNAME/NASM`



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

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.

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

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>mount c /home/shafeen/NASM
Drive C is mounted as local directory /home/shafeen/NASM/

Z:\>_
```

- If you cannot find your laptop's username , type " whoami " in the terminal

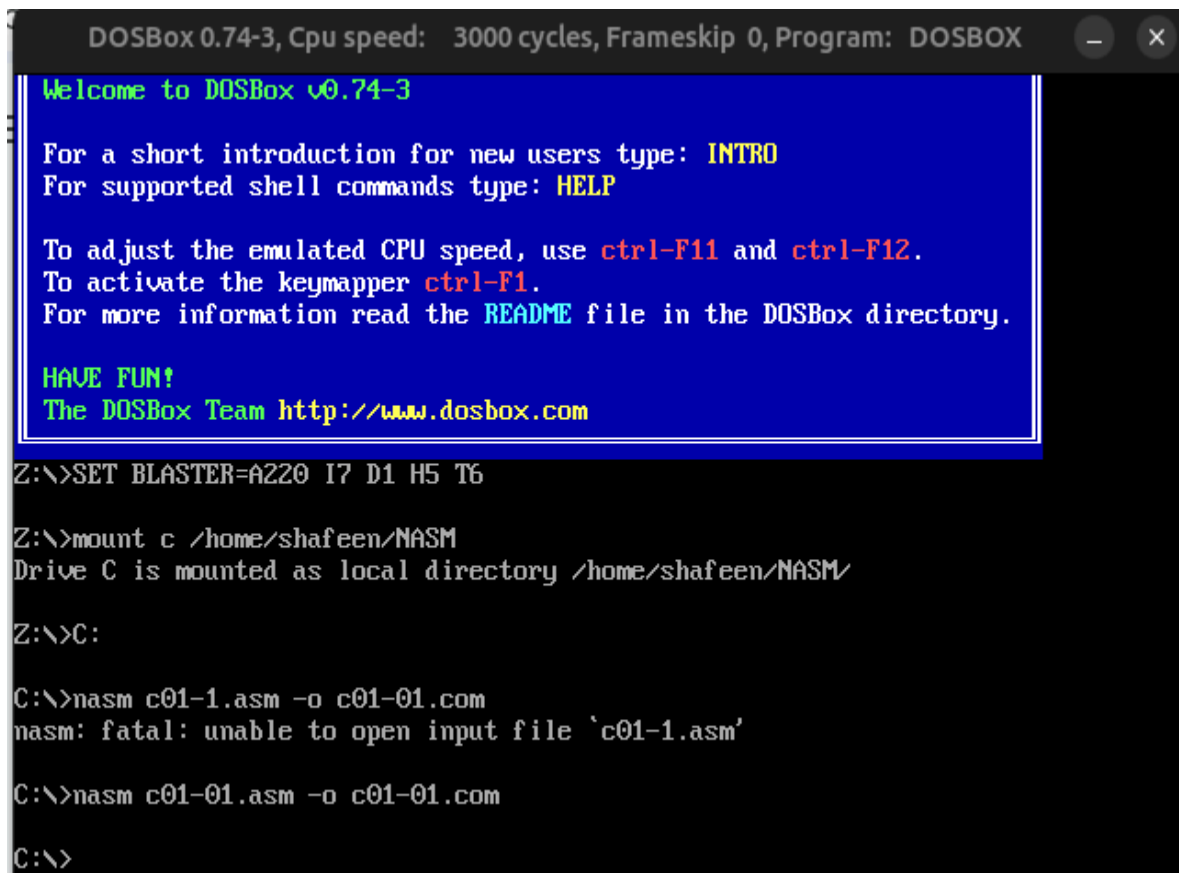
```
shafeen@shafeen-Dell-G15-5515: ~  
(anaconda3)shafeen@shafeen-Dell-G15-5515:~$ whoami  
shafeen  
(anaconda3)shafeen@shafeen-Dell-G15-5515:~$ |
```

- Now go to the C drive you just mounted to do that type the following command
 - C:

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX  
  
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.  
  
HAVE FUN!  
The DOSBox Team http://www.dosbox.com  
  
Z:\>SET BLASTER=A220 I7 D1 H5 T6  
  
Z:\>mount c /home/shafeen/NASM  
Drive C is mounted as local directory /home/shafeen/NASM/  
  
Z:\>C:  
  
C:\>
```

- You can write your assembly code in a text file and save it with .asm extension
- To run it you can do the following

- `nasm <filename> -o <filename>.com`
-



The screenshot shows a DOSBox window titled "DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX". The window has a blue background with white and green text. The text inside the window is as follows:

```

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.

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

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>mount c /home/shafeen/NASM
Drive C is mounted as local directory /home/shafeen/NASM/

Z:\>C:

C:\>nasm c01-1.asm -o c01-01.com
nasm: fatal: unable to open input file 'c01-1.asm'

C:\>nasm c01-01.asm -o c01-01.com

C:\>
  
```

- Now to make the listing file you can run the following

- `nasm <filename> -o <filename>.com -l <filename>.lst`

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

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.

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

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>mount c /home/shafeen/NASM
Drive C is mounted as local directory /home/shafeen/NASM/

Z:\>C:

C:\>nasm c01-1.asm -o c01-01.com
nasm: fatal: unable to open input file 'c01-1.asm'

C:\>nasm c01-01.asm -o c01-01.com

C:\>nasm c01-01.asm -o c01-01.com -l c01-01.lst

C:\>
```

- Now to open it in the advance debugger which will tell us about the details you can run the following command

- *afd <filename>.com*

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

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

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>mount c /home/shafeen/NASM
Drive C is mounted as local directory /home/shafeen/NASM/

Z:\>C:

C:\>nasm c01-1.asm -o c01-01.com
nasm: fatal: unable to open input file 'c01-1.asm'

C:\>nasm c01-01.asm -o c01-01.com

C:\>nasm c01-01.asm -o c01-01.com -l c01-01.lst

C:\>afd c01-01.com
```

- The debugger will look like this

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: AFD

AX 0000

SI 0000

CS 19F5

IP 0100

Stack +0 0000

Flags 7202

BX 0000

DI 0000

DS 19F5

+2 20CD

CX 0012

BP 0000

ES 19F5

HS 19F5

+4 9FFF

OF DF IF SF ZF AF PF CF

DX 0000

SP FFFE

SS 19F5

FS 19F5

+6 EA00

0 0 1 0 0 0 0 0

CMD >

0100 B80500

MOV

AX,0005

0103 BB0A00

MOV

BX,000A

0106 01D8

ADD

AX,BX

0108 BB0F00

MOV

BX,000F

010B 01D8

ADD

AX,BX

010D B8004C

MOV

AX,4C00

0110 CD21

INT

21

0112 EB04

JMP

0118

1

0 1 2 3 4 5 6 7

DS:0000

CD 20 FF 9F 00 EA F0 FE

DS:0008

AD DE 1B 05 C5 06 00 00

DS:0010

18 01 10 01 18 01 92 01

DS:0018

01 01 01 00 02 FF FF FF

DS:0020

FF FF FF FF FF FF FF FF

DS:0028

FF FF FF FF EB 19 C0 11

DS:0030

A2 01 14 00 18 00 F5 19

DS:0038

FF FF FF FF 00 00 00 00

DS:0040

05 00 00 00 00 00 00 00

DS:0048

00 00 00 00 00 00 00 00

2

0 1 2 3 4 5 6 7 8 9 A B C D E F

DS:0000

CD 20 FF 9F 00 EA F0 FE AD DE 1B 05 C5 06 00 00

DS:0010

18 01 10 01 18 01 92 01 01 01 01 00 02 FF FF FF

DS:0020

FF FF FF FF FF FF FF FF FF FF FF FF EB 19 C0 11

DS:0030

A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00

DS:0040

05 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

= f.Ω≡■ i|.†...

.....ff.

δ.L.

ó.....J.

.....

1 Step

2ProcStep

3Retrieve

4Help ON

5BRK Menu

6

7 up

8 dn

9 le

10 ri s

- DONE!

Thanks!