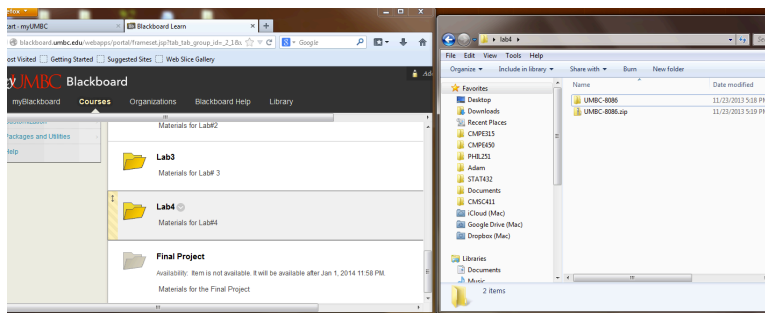


The UMBC trainer board takes Intel Hex program files over serial (RS232). Unfortunately, the files needed to convert the NASM .asm files into Intel .hex files are 16-bit DOS executables and will not run on Windows natively. The following shows a work-around to enable you to successfully produce .hex files given an .asm file. Essentially, a DOS emulator, DOSBox, is used to run the 16-bit DOS EXEs. Producing the hex files on your own will be helpful since it will give you warnings if it finds errors in your assembly file.

Step 1: Downloading UMBC-8086 files

Download the UMBC-8086.zip from lab4 folder in the laboratory section on blackboard. Place the folder (and contents) contained in the zip file somewhere meaningful and take note of its path for a later step.



Step 2: Downloading DOSBox

Download DOSBox (<http://www.dosbox.com>).

The following is the link for the windows version.

<http://sourceforge.net/projects/dosbox/files/dosbox/0.74/DOSBox0.74-win32-installer.exe/download>

(The remainder of this tutorial assumes you are using the windows version. Linux and Mac should be similar.)



Step 3: Installing DOSBox

Install DOSBox onto your machine.

Step 4 (optional): Setting up DOSBox

Locate and open DOSBox configuration file (dosbox-.74.conf). It should be in Windows -> All Programs -> DOSBox-0.74 -> Options.

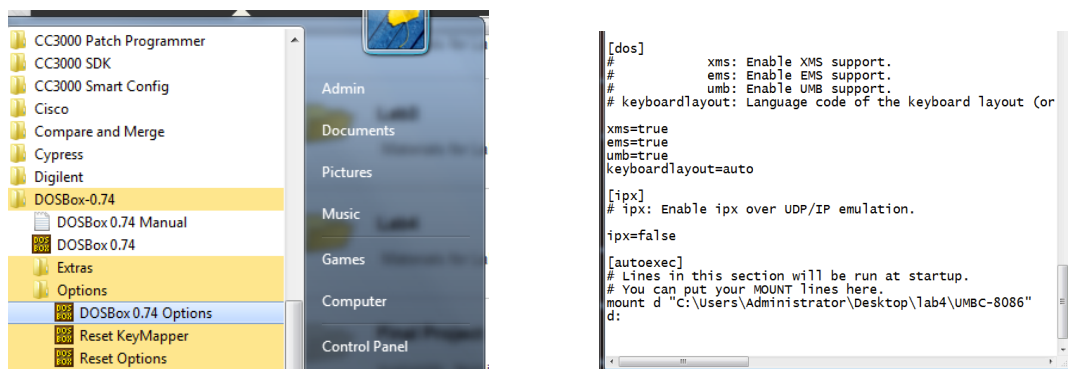
Add the following lines to the end of the file under [autoexec]:

mount d "UMBC-8086_directory "

d:

where UMBC-8086_directory is the full path to the UMBC-8086 directory (keep the quotations).

This will automatically change the starting directory when DOSBox is launched.



Step 5: Running DOSBox

Launch DOSBox. Two windows should appear. One simply gives the state of DOSBox and the other should give you a DOS command prompt. We will only be working with the DOS command prompt.

If you are not already in UMBC-8086 directory, then move to that directory.

List the contents of the directory using dir command.

The important files you care about are nasm.exe, LINK86.exe, OH86.exe, LOC86.exe, and run.bat.

The image shows two windows from the DOSBox application. The left window, titled 'DOSBox Status Window', displays version information and configuration details. The right window, titled 'DOSBox 0.74 Cpu speed: 3000 cycles, Frameskip: 0, Program: DOSBOX', shows the command prompt output for running and linking the assembly file.

```

DOSBox version 0.74
Copyright 2002-2010 DOSBox Team, published under GNU GPL.

CONFIG: Loading primary settings from config file C:\Users\Administrator\AppData\
Local\DOSBox\dosbox-0.74.conf
MIDI: Opened device:win32
DOSBox switched to max cycles, because of the setting: cycles=auto. If the game
runs too fast try a fixed cycles amount in DOSBox's options.

Z:\>mount d "C:\Users\Administrator\Desktop\lab4\NUPBC-0006"
Drive D is mounted as local directory C:\Users\Administrator\Desktop\lab4\NUPBC-0
006\

Z:\>d:

D:\>RUN.BAT LAB4
D:\>nasm.exe -f obj -I LAB4.lst LAB4.asm
Warning: cannot open swap file c:\nwspmi.swap

D:\>LINK36.EXE LAB4.obj TO LAB4.lnk NOBIND
DOS 5.0 (838-N) 8086 LINKER, U2.7
Copyright 1984 Intel Corporation

D:\>LOC86.exe LAB4.lnk TO LAB4.exe AD(SM(PROGRAMM(100000H), CONSTSEG(100000H)))
DOS 5.0 (838-N) 8086 LOCATER, U2.5
Copyright 1984 Intel Corporation

D:\>OH86.EXE LAB4.exe
DOS 5.0 (838-N) 8086 OBJECT TO HEX FILE CONVERTER, U1.0
CONVERSION COMPLETE, NO ERRORS

D:\>

```

Step 6: Compiling .asm to Intel .hex file

To compile an .asm file, enter

RUN.BAT LAB4

where lab4 is the name of your NASM assembly file. (Do not include the .asm extension or else it will fail to compile). A simple .asm file is included named lab4.asm.

If there are no errors with your program you should get a *No Errors* message; otherwise, it will inform you of the errors it came across.

This screenshot is identical to the one above, showing the DOSBox status and CPU windows with the same command prompt output for running and linking the assembly file.