Title: **Your first bootloader**

Course: **Operating Systems**

Lab No.: **02**

Date: **17 Mar.2016**   *Due:* **25 Mar. 2015**   *Time:* **1 Week**

Assignment:

Write a bootloader that uses interrupts to read a character form the keyboard then displays it on the screen.

Remember that we are in 16-bit mode, interrupts are available, while in 32-bit mode they are disabled, we use Port mapping in order to access and communicate with any hardware

Submission:

Send your project to: *omar.shaaban@live.co.uk*

Rules:

1- Teams are maximum of 3 students only

2- Comment each line of code and explain what exactly each line represent, non-commented code will lose 25% of the project marks (in assembly language we comment suing the **;** character).

Tools used:

1- Netwide Assembler (NASM)

2- DD utility for windows

3- Oracle VM VirtualBox

4- Any text editor (notepad, notepad++, …etc)

Instructions:

1- Use your text editor to write/edit your source code.

2- Create a folder on your desktop called **MyBootloader** for example, and let this be our working directory.

3- Save the source code file as .asm file inside this folder.

4- Copy the **NASM.exe** and **dd.exe** programs into this folder also.

5- Open your **CMD** console , and set the current directory as **MyBootloader** folder as in the picture:

```
C:\Windows\system32\cmd.exe

C:\Users\Omar\Desktop\MyBootLoader>
```
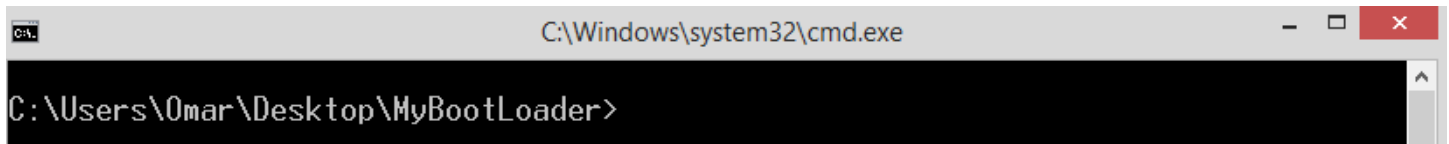
6- Use NASM to assemble your code into binary (**.bin**) file with the following command

   nasm yourSourceCodeFileName.asm -f bin -o outputFileName.bin

the output of this step is **.bin** file

7- Use dd utility to copy the bin bootloader file into a virtual flopy disk by the following command

    dd if= outputFileName.bin bs=512 of=bootimage.ima

the output of this step is **.ima** file , and that is the file you are going to use to boot from

8- Creat a new Virtual Machine using VirtualBox , don't create a hard disk , and finally use the **.ima** floppy from step 4 to boot from your machine.
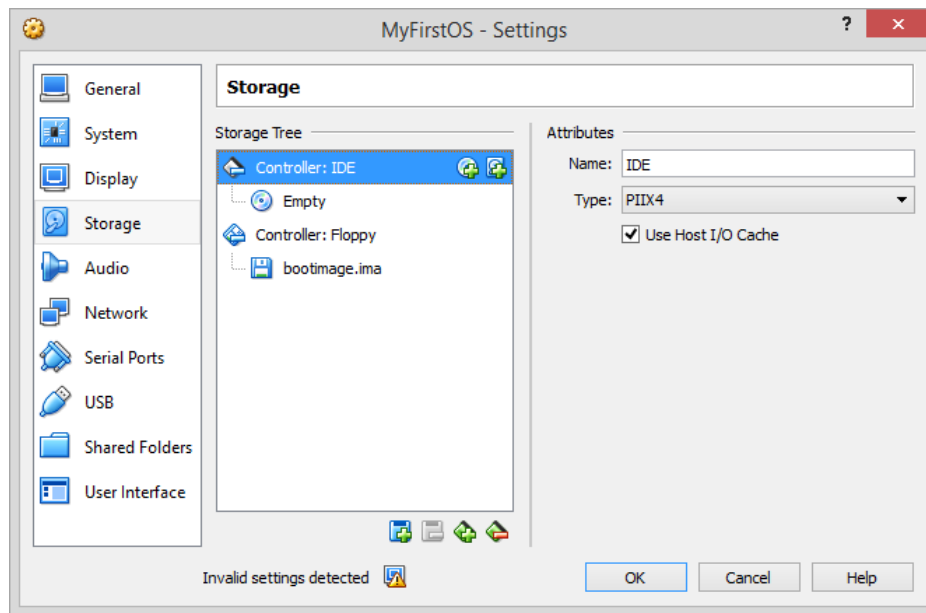
9- Run your machine and check your results.

Tips:

1- **Google** is your friend; try to search for any problem that faces you before asking me.

2- For information about the interrupts and how to use them, refer to the help of the emu8086 software (under tab interrupts in the main page of the help) – the software can be found on the GitHub page or downloaded from **others** section at the end of this document.

Ex:

Others:

1- GitHub page https://github.com/Omargw/Minia-CSE-OS-CLASS-2016

2- GitHub application for windows users https://github-windows.s3.amazonaws.com/GitHubSetup.exe

3- NASM http://www.nasm.us/pub/nasm/releasebuilds/2.12/win64/nasm-2.12-win64.zip

4- DD for windows http://www.chrysocome.net/downloads/dd-0.6beta3.zip

5- emu8086 http://www.emu8086.com/files/emu8086v408r11.zip