

University of Khartoum

Faculty of Engineering

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## Microprocessor and Assembly Language Project

### Keyboard working in the Virtual Machine Box

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## Objective:

Make the Screen of Virtual Box machine displays what we pressed in the Computer Keyboard .

## Our Objective:

We intended to do it to work with as much hardware as we could and to understand how they can be coordinated to produce a useful output . In our case the user can writes and reads by our program what he can do with the basic keyboard of the computer .

## Software Description :

The program is a bootable bare machine program.

The things the program do are, write the Capital and Small Letters , the Numbers .. that we have pressed in the computer keyboard .

The program also would copy and paste or cut what we selected before.

Not everything was working as expected ,there are some features extension we intend to do if we had more time and like adding some hotkeys like Ctrl+C , Ctrl+V , Ctrl+X , Ctrl+N , Ctrl+A , ..etc .

## Problems we have faced :

- 1 . VirtualBox wasn't working on some of the teams' computers, so they couldn't debug what they've written.
2. Working with on a bare machine is little difficult, in our case debugging was very tedious and time consuming, knowing a register content or a memory variable value at a certain place needed a lot of thinking and work.
3. At the beginning the code was written without interrupts , and then we divide the code to many parts (loops) , then add it to the virtual machine code .

## Conclusion :

We have learned beside the patience , and the team work , the basics for interaction of computer with IO devices to be of any use .

System programming is very interesting, as the programmer knows the underling details of the computer hardware which are hidden normally in application programming .

We have chosen this project specifically to have deeper understanding of how the computer deals with I/O.

what we gained is a good understanding of device drivers and how they can be developed, we got a better understanding of the idea of virtual machines .