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Kelas : C

Modul 3

- Masuk ke direktori C:/OS, lakukan setpath dan masuk ke direktori lab/lab3

```
Bochs for Windows - Console
Microsoft Windows [Version 10.0.17763.805]
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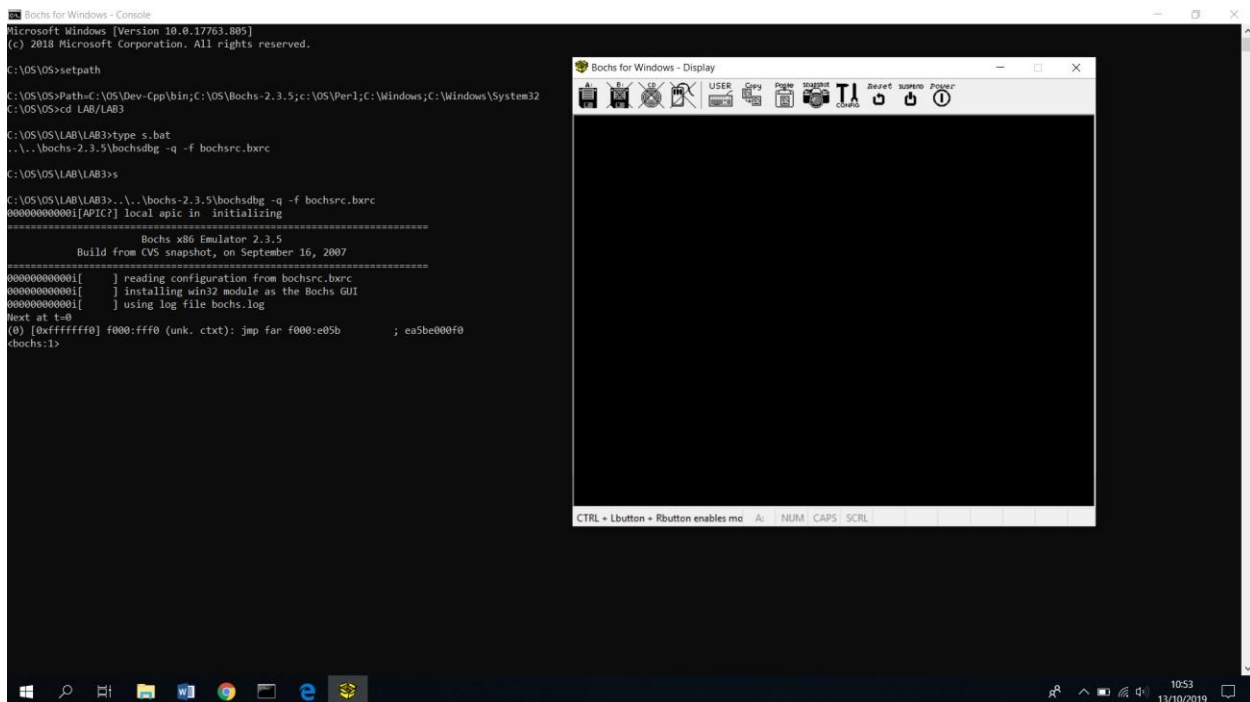
C:\OS\OS>setpath

C:\OS\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;c:\Windows;c:\Windows\System32
C:\OS\OS>cd LAB/LAB3
```

- Ketik 'type s.bat'

```
C:\OS\OS\LAB\LAB3>type s.bat
..\..\bochs-2.3.5\bochsdbg -q -f bochsrc.bxrc
```

- Lakukan debugging dengan cara ketik 's'



- Ketikkan 'r' untuk melihat isi register CS dan IP

```
Bochs for Windows - Console
C:\OS\OS\LAB\LAB3>.\..\bochs-2.3.5\bochsrc -q -f bochsrc.bsrc
000000000000[APICT] local api in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000000[ ] reading configuration from bochsrc.bsrc
000000000000[ ] installing win32 module as the bochs GUI
000000000000[ ] using log file bochs.log
Next at t=0
(0) [0xffffffff] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be00f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000f20 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000fff0
eflags 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> _
```

- Mengeksekusi perintah selanjutnya, ketikkan 's' <ENTER> lalu ketikkan 'r' <ENTER>

```
Bochs for Windows - Console
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000fff0
eflags 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> s
Next at t=1
(0) [0x000fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
<bochs:3> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000f20 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:4> _
```

- The screenshot shows a Windows 10 desktop with a taskbar at the bottom. Two windows are open:

 - Bochs for Windows - Display:** This window shows the boot screen of a Bochs UGA BIOS. The text displayed is:


```

      FlexB6/Bochs UGBios 0.6a 19 Aug 2006
      This UGA/UE Bios is released under the GNU LGPL

      Please visit :
      . http://bochs.sourceforge.net
      . http://www.nongnu.org/ugabios

      Bochs UBE Display Adapter enabled

      Bochs BIOS - build: 09/10/07
      $Revision: 1.183 $ $Date: 2007/09/10 20:06:29 $
      Options: apmbios pcibios eltorito rombios32

      Booting from Floppy...
      -
      
```

 At the bottom of the window, a status bar indicates: `CTRL + Lbutton = Rbutton enables me` and `NUM / CAPS / SCRL`.
 - Bochs for Windows - Console:** This window shows assembly code and register values for a Bochs UGA BIOS adapter. The text displayed is:


```

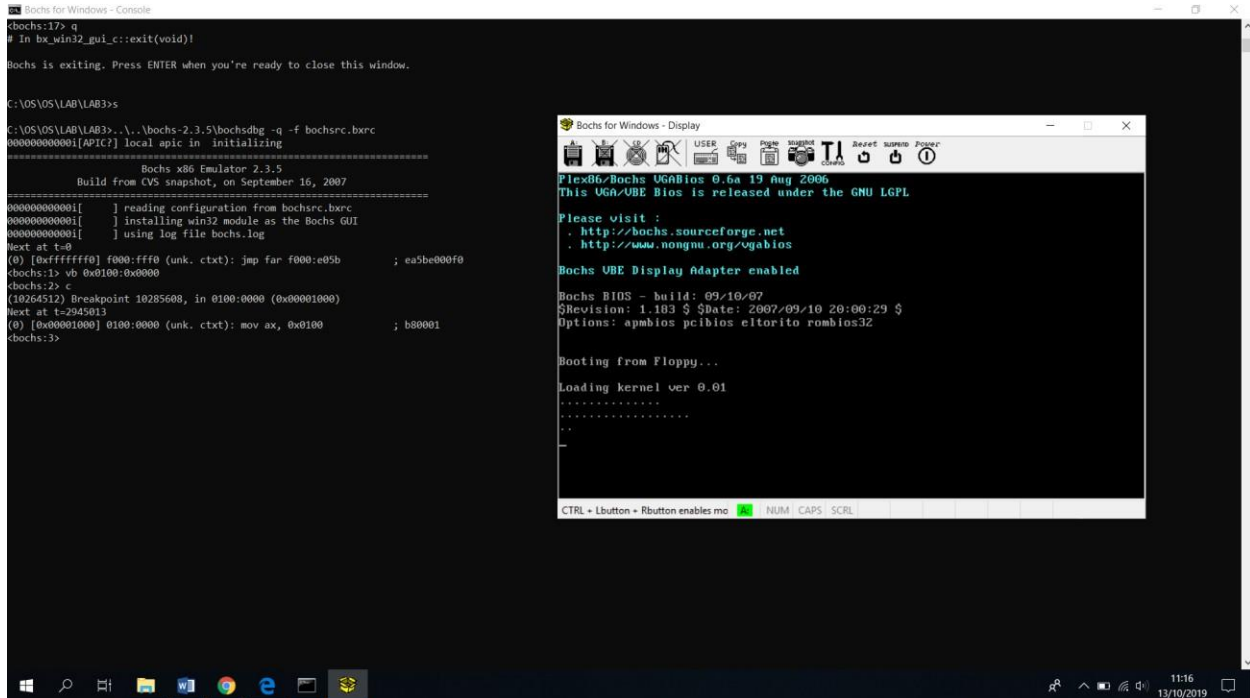
      r12: 0x00000000:00000000 r13: 0x00000000:00000000
      r14: 0x00000000:00000000 r15: 0x00000000:00000000
      rbp: 0x00000000:0000ffff
      eflags 0x00000002
      IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
      <bochs>:2> s
      Next at t=1
      (0) [0x000fe05b] f000:e05b (unk. ctxt): xor ax, ax
      ; 31c0
      <bochs>:3> r
      rcx: 0x00000000:00000000 rcx: 0x00000000:00000000
      rdx: 0x00000000:000000f0 rbx: 0x00000000:00000000
      rbp: 0x00000000:00000000 rbp: 0x00000000:00000000
      rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
      r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
      r10: 0x00000000:00000000 r11: 0x00000000:00000000
      r12: 0x00000000:00000000 r13: 0x00000000:00000000
      r14: 0x00000000:00000000 r15: 0x00000000:00000000
      rbp: 0x00000000:0000e05b
      eflags 0x00000002
      IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
      <bochs>:4> vb 0:0x7c00
      <bochs>:5> c
      (1995963961) Breakpoint 10285608, in 0000:7c00 (0x00007c00)
      Next at t=2082128
      (0) [0x00007c00] 0000:7c00 (unk. ctxt): jmp .+0x003b (0x00007c3e) ; e93b00
      <bochs>:6>
      
```

- ```

Select Bochs for Windows - Console
bochs:2> s
Next at t=1
(0) [0x000fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
bochs:3> r
eax: 0x00000000:00000000 rcx: 0x00000000:00000000
edx: 0x00000000:00000f20 rbx: 0x00000000:00000000
rcp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
rsd: 0x00000000:00000000 r9: 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags 0x00000002
IOPML0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
bochs:4> v0 0:0x7c00
bochs:5> c
(1995963961) Breakpoint 10285608, in 0000:7c00 (0x00007c00)
Next at t=2082128
(0) [0x00007c00] 0000:7c00 (unk. ctxt): jmp .+0x003b (0x00007c3e) ; e93b00
bochs:6> s
Next at t=2082129
(0) [0x00007c3e] 0000:7c3e (unk. ctxt): cli ; fa
bochs:7> s
Next at t=2082130
(0) [0x00007c3f] 0000:7c3f (unk. ctxt): mov ax, 0x07c0 ; b8c007
bochs:8> s
Next at t=2082131
(0) [0x00007c42] 0000:7c42 (unk. ctxt): mov ds, ax ; 8ed8
bochs:9> s
Next at t=2082132
(0) [0x00007c44] 0000:7c44 (unk. ctxt): mov es, ax ; 8ec0
bochs:10> s
Next at t=2082133
(0) [0x00007c46] 0000:7c46 (unk. ctxt): mov fs, ax ; 8ee0
bochs:11> s
Next at t=2082134
(0) [0x00007c48] 0000:7c48 (unk. ctxt): mov gs, ax ; 8ee8
bochs:12> s
Next at t=2082135
(0) [0x00007c4a] 0000:7c4a (unk. ctxt): mov ax, 0x0000 ; b80000
bochs:13> s
Next at t=2082136
(0) [0x00007c4d] 0000:7c4d (unk. ctxt): mov ss, ax ; 8ed0
bochs:14> s
Next at t=2082137
(0) [0x00007c4f] 0000:7c4f (unk. ctxt): mov sp, 0xffff ; bcffff
bochs:15> s
Next at t=2082138
(0) [0x00007c52] 0000:7c52 (unk. ctxt): sti ; fb

```

- Ketikkan 'q' untuk menghentikan debugging. Kemudian lakukan debugging lagi dengan cara ketikkan 's', kemudian ketikkan 'vb 0x0100:0x0000' untuk menghentikan langkah saat PC mulai mengeksekusi instruksi dari program 'kernel.bin', lalu ketikkan 'c'



- Kemudian ketikkan 's' minimal 10x. Lalu bandingkan hasilnya dengan isi file kernel.asm

