

PRAKTIKUM SISTEM OPERASI
MODUL 2
MENGENAL PROSES PEMBUATAN ‘DISK BOOT’



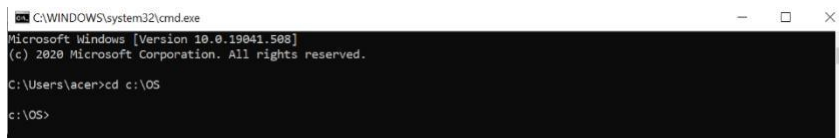
DISUSUN OLEH :

UCOK SAYUTI
L200210239
KELAS E

PROGRAM STUDI INFORMATIKA FAKULTAS KOMUNIKASI DAN
INFORMATIKA UNIVERSITAS MUHAMMADIYAH SURAKARTA

Langkah Kerja

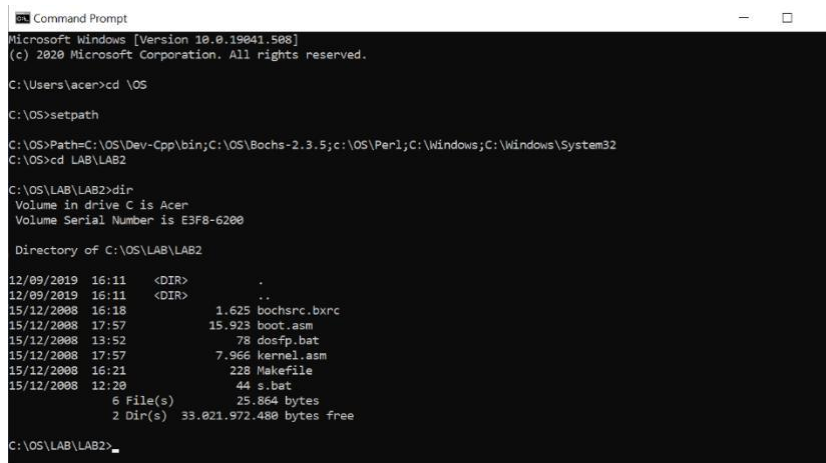
1. Jalankan program “Command Promp” atau “cmd”.
2. Masuk ke direktori kerja “C:\OS” seperti pada gambar dibawah, dan kemudian tekan <ENTER>



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\acer>cd c:\OS
c:\OS>
```

3. Masukkan perintah “setpath”, untuk melihat isi direktori di dalam folder OS-nya. Dan kemudian masukkan ke direktori kerja “C: \OS>” dengan perintah “cd LAB\LAB2”. dan Jalankan file set path dengan mengetik “dir” dan kemudian di <ENTER>.



```
Command Prompt
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

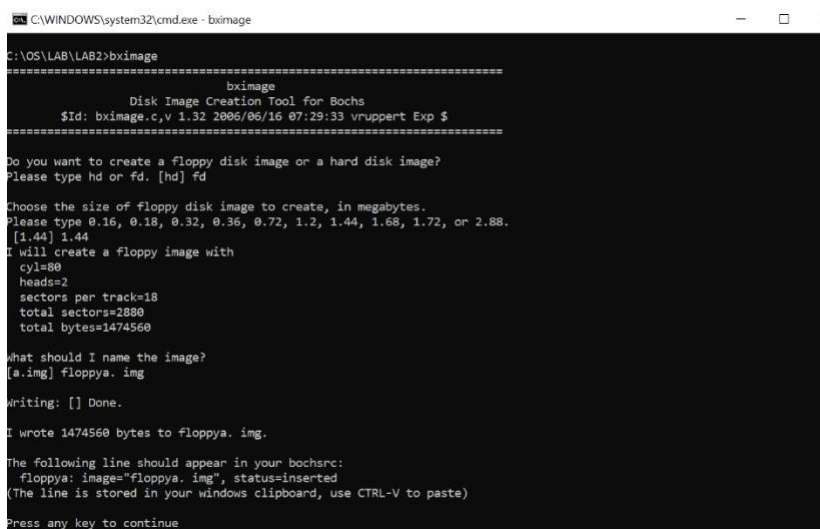
C:\Users\acer>cd \OS
C:\OS>setpath
C:\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Windows\System32
C:\OS>cd LAB\LAB2
C:\OS\LAB\LAB2>dir
Volume in drive C is Acer
Volume Serial Number is E3F8-6200

Directory of C:\OS\LAB\LAB2

12/09/2019  16:11    <DIR>          .
12/09/2019  16:11    <DIR>          ..
15/12/2008  16:18                1.625 bochsrc.bxrc
15/12/2008  17:57                15.923 boot.asm
15/12/2008  13:52                 78 dosfp.bat
15/12/2008  17:57                7.966 kernel.asm
15/12/2008  16:21                 228 Makefile
15/12/2008  12:20                 44 s.bat
               6 File(s)                25.864 bytes
               2 Dir(s)  33.021.972.480 bytes free

C:\OS\LAB\LAB2>
```

4. Kemudian menyiapkan file “floppya.img”. dan Namanya harus “floppya.img”. Lalu jalankan “bximage” selanjutnya pada urutan berikutnya ketik “fd”, “1.44”, dan “floppya.img”, dan tekan <ENTER> setelahnya.



```
C:\WINDOWS\system32\cmd.exe - bximage
C:\OS\LAB\LAB2>bximage
=====
                bximage
        Disk Image Creation Tool for Bochs
        $Id: bximage.c,v 1.32 2006/06/16 07:29:33 vrupper Exp $
=====

Do you want to create a floppy disk image or a hard disk image?
Please type hd or fd. [hd] fd

Choose the size of floppy disk image to create, in megabytes.
Please type 0.16, 0.18, 0.32, 0.36, 0.72, 1.2, 1.44, 1.68, 1.72, or 2.88.
[1.44] 1.44
I will create a floppy image with
  cyl=80
  heads=2
  sectors per track=18
  total sectors=2880
  total bytes=1474560

What should I name the image?
[a.img] floppya. img

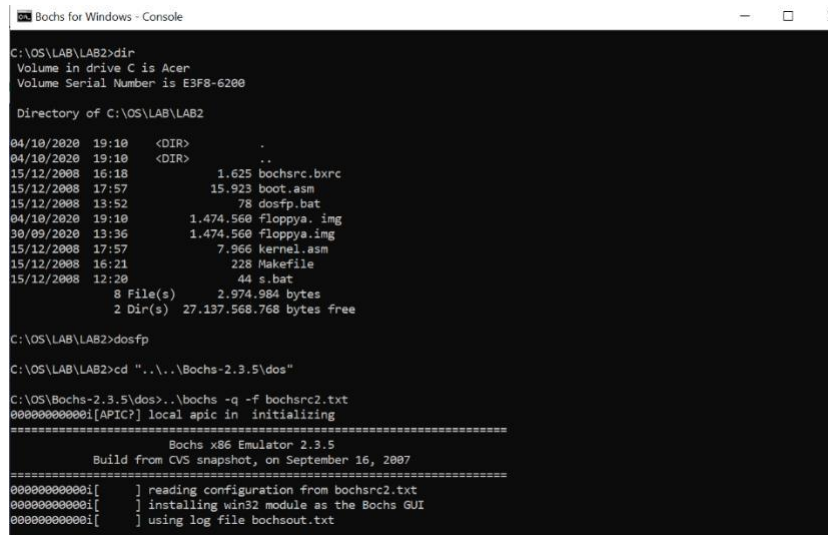
Writing: [] Done.

I wrote 1474560 bytes to floppya. img.

The following line should appear in your bochsrc:
  floppya: image="floppya. img", status=inserted
(The line is stored in your windows clipboard, use CTRL-V to paste)

Press any key to continue
```

5. Selanjutnya mem-format “floppya.img” dan mengisinya dengan system operasi DOS versi 7. Jalankan perintah dengan mengetikkan “dosfp”. Setelah itu akan pindah ke Windows ‘Boschs’ (PC-Simulator), klik menu gambar floppy disk.



```
C:\OS\LAB\LAB2>dir
Volume in drive C is Acer
Volume Serial Number is E3F8-6200

Directory of C:\OS\LAB\LAB2

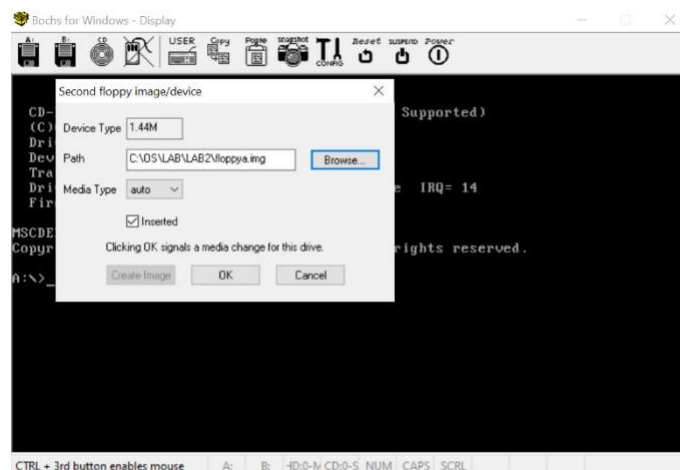
04/10/2020  19:10    <DIR>          .
04/10/2020  19:10    <DIR>          ..
15/12/2008  16:18                1.625 bochsrc.bxrc
15/12/2008  17:57                15.923 boot.asm
15/12/2008  13:52                 78 dosfp.bat
04/10/2020  19:10            1.474.560 floppya. img
30/09/2020  13:36            1.474.560 floppya.img
15/12/2008  17:57                7.966 kernel.asm
15/12/2008  16:21                 228 Makefile
15/12/2008  12:20                 44 s.bat
               8 File(s)      2.974.984 bytes
               2 Dir(s)      27.137.568.768 bytes free

C:\OS\LAB\LAB2>dosfp

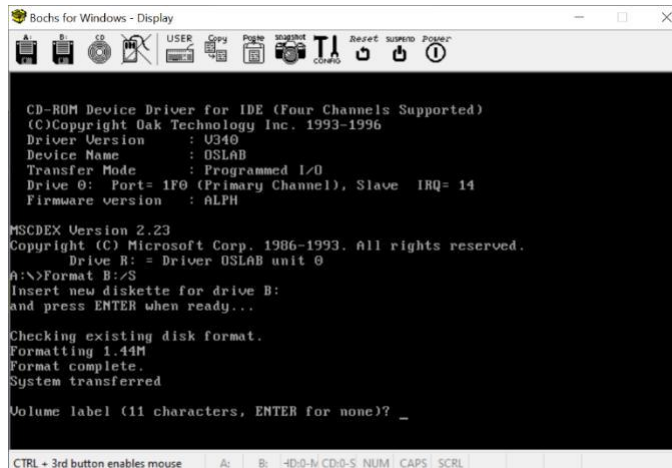
C:\OS\LAB\LAB2>cd "..\..\Bochs-2.3.5\dos"

C:\OS\Bochs-2.3.5\dos>..bochs -q -f bochsrc2.txt
000000000000i[APIC?] local apic in  initializing
=====
                Bochs x86 Emulator 2.3.5
                Build from CVS snapshot, on September 16, 2007
=====
000000000000i[      ] reading configuration from bochsrc2.txt
000000000000i[      ] installing win32 module as the Bochs GUI
000000000000i[      ] using log file bochsout.txt
```

6. Lalu atur lokasi file image sehingga menunjuk ke file “floppya.img” yang terdapat pada derektori kerja “LAB2”, klik tombol “BROWSE” dan atur sehingga seperti pada gambar di bawah ini, dan lanjutkan dengan klik “OK”.



7. Dari prompt “A:>” ketikkan perintah “A:>Format B: /S” selesaikan prosesnya. Jika tidak ada kesalahan maka “floppya.img” sekarang dapat digunakan untuk proses booting. Tutup windows”Boschs”, klik menu power. Pada window “cmd” akan tampak bekas aktifitas “Boschs” seperti pada gambar di bawah.



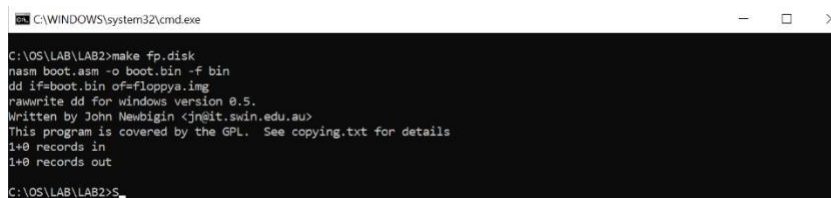
```
Bochs for Windows - Display
CD-ROM Device Driver for IDE (Four Channels Supported)
(C)Copyright Oak Technology Inc. 1993-1996
Driver Version : 0340
Device Name : OSLAB
Transfer Mode : Programmed I/O
Drive 0: Port= 1F0 (Primary Channel), Slave IRQ= 14
Firmware version : ALPM

MSCDEX Version 2.23
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
Drive R: = Driver OSLAB unit 0
A:>Format B: /S
Insert new diskette for drive B:
and press ENTER when ready...

Checking existing disk format.
Formatting 1.44M
Format complete.
System transferred
Volume label (11 characters, ENTER for none)? _

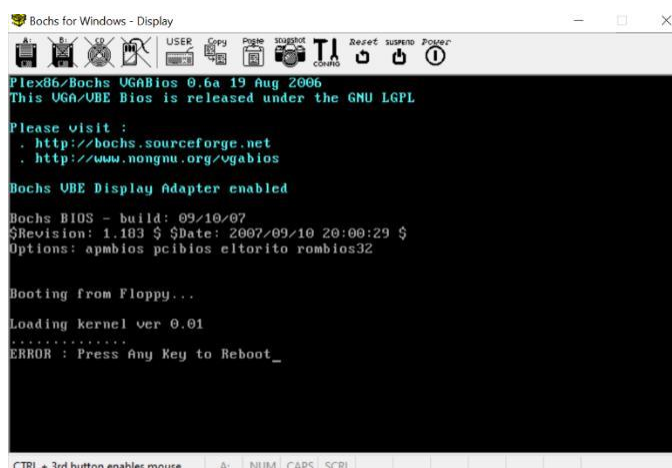
CTRL + 3rd button enables mouse | A: | B: | -D:0-M:CD:0-S: NUM | CAPS | SCRL
```

8. Kompilasi source code “boot.asm” dan memindah hasilnya ke bootsector “floppya.img”. Pindah ke direktori kerja “LAB2” ketikkan perintah “cls” untuk membersihkan layer. Selanjutnya jalankan perintah “make fp.disk” jika Langkah ini berhasil, pada layer akan ditampilkan tesk seperti dibawah ini.



```
C:\WINDOWS\system32\cmd.exe
C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out
C:\OS\LAB\LAB2>S_
```

9. Boot PC-Simulator dengan program bootstaploader yang baru. Jalankan PC-Simulator ketik “S”. Tampilan pada PC-Simulator sekarang seperti dambar dibawah.



```
Bochs for Windows - Display
Plex86/Bochs UGABios 0.6a 19 Aug 2006
This UGA/UBE 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: 1.103 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

Booting from Floppy...
Loading kernel ver 0.01
.....
ERROR : Press Any Key to Reboot_

CTRL + 3rd button enables mouse | A: | NUM | CAPS | SCRL
```

10. Menyunting file “boot.asm”, ketikkan “notepad boot.asm”,

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

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>S

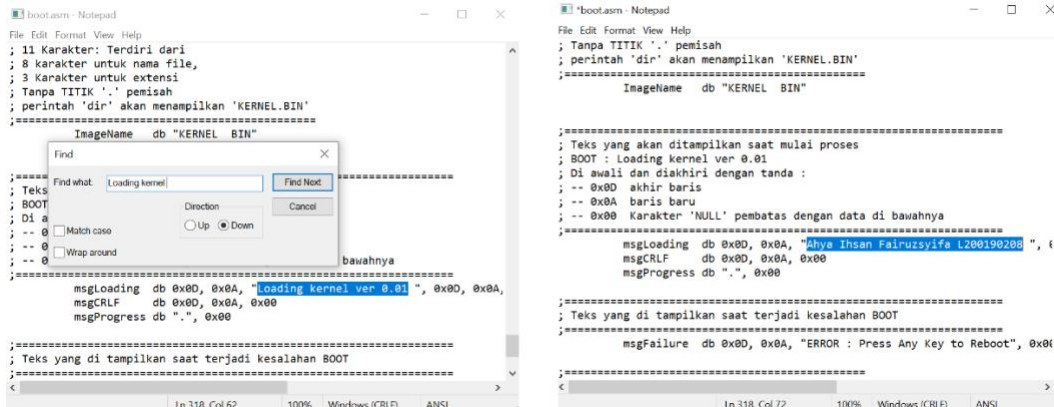
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
000000000000[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000000[ ] reading configuration from bochsrc.bxrc
000000000000[ ] installing win32 module as the Bochs GUI
000000000000[ ] using log file bochs.log
# In bx_win32_gui.c:exit(void)!
=====
Bochs is exiting with the following message:
[VGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad boot.asm

C:\OS\LAB\LAB2>
```

Cari teks “Loading kernel” kelompok baris bawah, pada windows “Notepad”, tekan tombol <CTRL + F> masukkan kata kunci “Loading kernel”, klik “CANCEL”.

Sekarang sunting baris belakang variable “msgloading” sehingga menjadi Nama dan NIM.



```
boot.asm - Notepad
File Edit Format View Help
; 11 Karakter: Terdiri dari
; 8 karakter untuk nama file,
; 3 Karakter untuk ekstensi
; Tanpa TITIK '.' pemisah
; perintah 'dir' akan menampilkan 'KERNEL.BIN'
;=====
ImageName db "KERNEL.BIN"

;=====
; Teks yang akan ditampilkan saat mulai proses
; BOOT : Loading kernel ver 0.01
; Di awali dan diakhiri dengan tanda :
; -- 0x0D akhir baris
; -- 0x0A baris baru
; -- 0x00 Karakter 'NULL' pembatas dengan data di bawahnya
;=====
msgloading db 0x0D, 0x0A, "Nama NIM", 0x0D, 0x0A, 0x00
msgCRLF db 0x0D, 0x0A, 0x00
msgProgress db ".", 0x00

;=====
; Teks yang di tampilkan saat terjadi kesalahan BOOT
;=====
msgFailure db 0x0D, 0x0A, "ERROR : Press Any Key to Reboot", 0x00
```

Simpan file “boot.asm”, tekan <CTRL + S> pada notepad dan pindag ke window “cmd” direktori 30 Sistem Operasi-Modul Praktikum kerja, ulanig proses kompilasi file “boot.asm”, jalankan perintah “Make fp.disk” dan <ENTER>.

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

Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>S

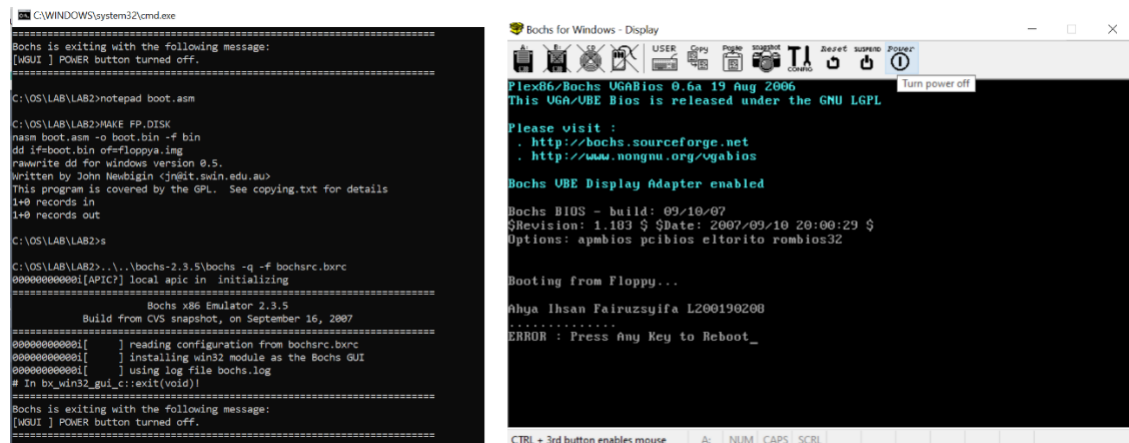
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
000000000000[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000000[ ] reading configuration from bochsrc.bxrc
000000000000[ ] installing win32 module as the Bochs GUI
000000000000[ ] using log file bochs.log
# In bx_win32_gui.c:exit(void)!
=====
Bochs is exiting with the following message:
[VGUI ] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad boot.asm

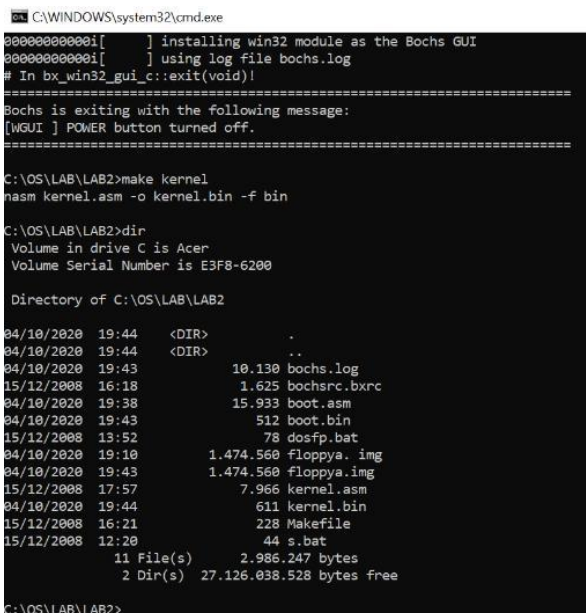
C:\OS\LAB\LAB2>MAKE FP.DISK
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>
```

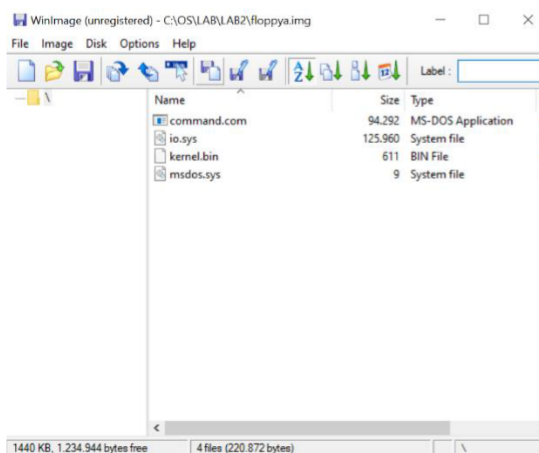
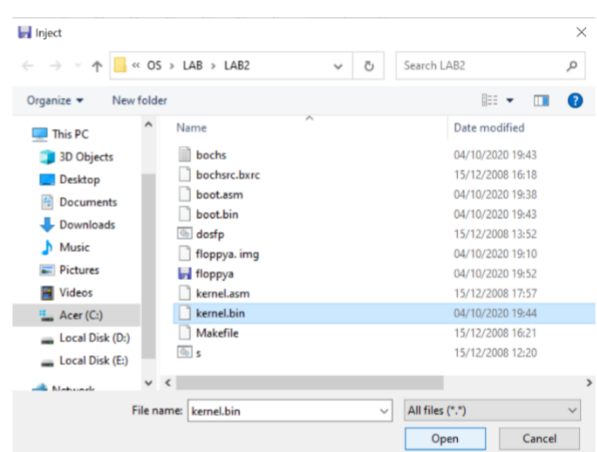
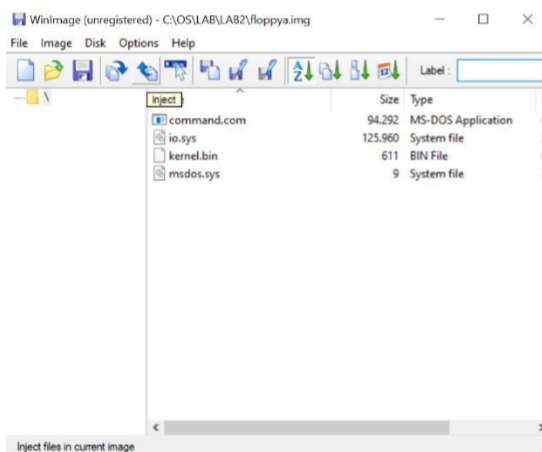
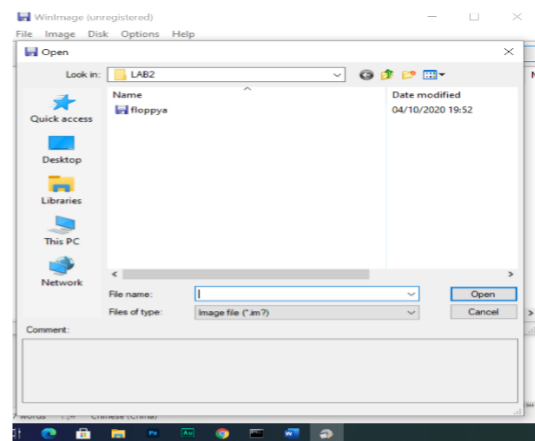
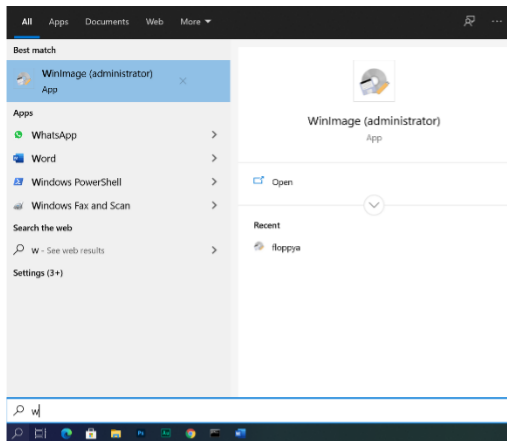
Setelah proses kompilasi, jalankan PC-Simulator “S”. Sekarang teks yang ditampilkan di layer adalah seperti yang dituliskan pada file “boot.asm” seperti gambar di bawah ini.



11. Menyiapkan file “KERNEL.BIN” : Prototype source code program kernel di simpan pada file “kernel.asm”, periksa keberadaanya pada direktori kerja. Selanjutnya lakukan proses kompilasi untuk menghasilkan dile “KERNEL.BIN”, huruf besar atau kecil pada nama file tidak berpengaruh. Jalankan perintah “make kernel” pada layer tampak seperti ini.



12. Memindahkan file “kernel.bin” ke dalam file image “floppya.img”. Proses ini sedikit rumit, seperti proses kompresi sebuah file ke dalam file “zip”. Untuk melakukan hal ini gunakan program shareware Namanya “winimage”. Bukanlah direktori kerja “C:\OS\LAB\LAB2” dengan menggunakan “Windows Sistem Operasi-Modul Praktikum 31 Explorer” kemudian klik 2x pada file “floppya.img” atau panggil dari program winimage klik “Start|All Programs|Winimage|winimage” selanjutnya klik menu “open” dan cari file “floppya.img” pada direktori kerja. Untuk memasukkan file “kernel.bin”, pada window ”WinImage” klik menu “image|inject” cari file “kernel.bin” pada direktori kerja dan OK. Selanjutnya lakukan proses penyimpanan “File|Save” dan keluar dari “WinImage”. Hasil akhir seperti di tampilan ini.



-

- ```
C:\WINDOWS\system32\cmd.exe
04/10/2020 19:43 10.136 bochs.log
15/12/2008 16:18 1.625 bochsrtc.bsrc
04/10/2020 19:38 15.933 boot.asm
04/10/2020 19:43 512 boot.bin
15/12/2008 13:52 78 dosfst.pat
04/10/2020 19:10 1.474.560 floppy.a.img
04/10/2020 19:43 1.474.560 floppy.a.img
15/12/2008 17:57 7.966 kernel.asm
04/10/2020 19:44 611 kernel.bin
15/12/2008 16:21 228 Makefile
15/12/2008 12:29 44 s.bat
 11 File(s) 2.886.247 bytes
 2 Dir(s) 27.126.038.528 bytes free

C:\OS\LAB\LAB2>
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochs
000000000000[APIC?] local apic in initializing
=====
 Bochs x86 Emulator 2.3.5
 Build from CVS snapshot, on September 1
=====
000000000000[] reading configuration from bochs
000000000000[] installing win32 module as the
000000000000[] using log file bochs.log
In bx_win32_gui.c:exit(void)
=====
Bochs is exiting with the following message:
[MSGU] POWER button turned off.
=====

C:\OS\LAB\LAB2>notepad kernel.asm

*kernel.asm - Notepad
File Edit Format View Help
 mov ah, 0x0E ; aksi mulai dari baris baru dari BIOS telet
 mov al, 0x0A
 mov bh, 0x0E
 mov bl, 0x07
 int 0x10
 ret

_display_prompt:
 mov si, strPrompt
 mov al, 0x01
 int 0x21
 ret

[SEGMENT .data]
strWelcomeMsg db "Ahyu Ihsan Fairuzsyifa L200190208", 0x00
strPrompt db "MY KERNEL$>", 0x00 ; maksimum (
cmdMaxLen db 255

strOsName db "MY KERNEL", 0x00 ;OS details
strMajorVer db "0", 0x00
strMinorVer db ".03", 0x00

cmdVer db "ver", 0x00 ; COMMANDN ir
cmdExit db "exit", 0x00

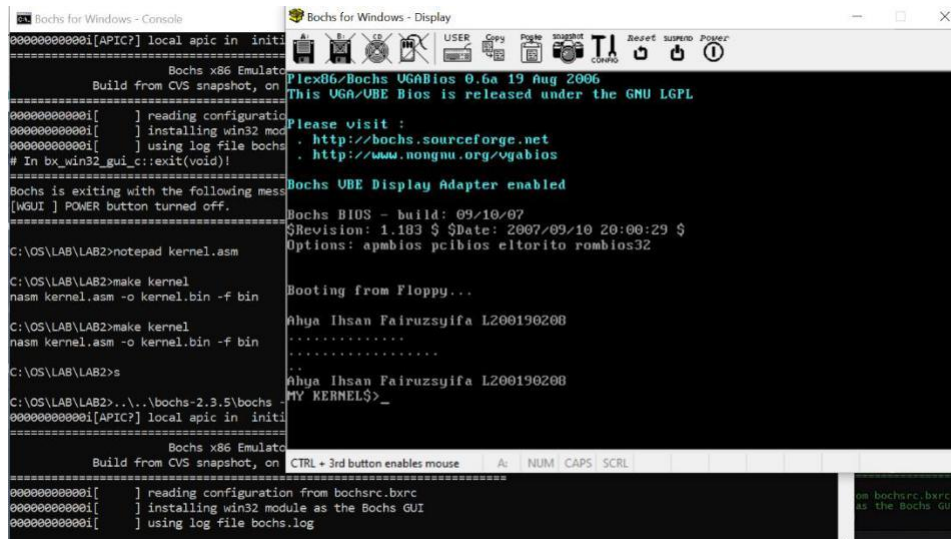
<----->
Ln 362, Col 59 100% Windows (CRLF) UTF-8

C:\OS\LAB\LAB2>
```

Simpan file “kernel.asm”, tekan <CTRL + S>, tutup windows “Notepad dan kembali ke”cmd” direktori kerja. Ulangi proses kompilasi, jalankan perintah “make kernel”, selanjutnya ulangi proses yang dilakukan pada perintah nomer 12 (memindahkan file “kernel.bin” ke dalam file “floppya.img” dengan “WinImage”).



Terakhir jalankan PC-Simulator, “S”. Jika Langkah tidak ada kesalahan maka pada layar PC-Simulator akan menampilkan teks seperti ini.



```
Bochs for Windows - Console
=====
Bochs x86 Emulator
Build from CVS snapshot, on 09/10/07
=====
000000000001[APIC?] local apic in init
000000000001[] reading configuration
000000000001[] installing win32 module
000000000001[] using log file bochs.log
In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[VGUI] POWER button turned off.
=====
C:\OS\LAB\LAB2>notepad kernel.asm
C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin
C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin
C:\OS\LAB\LAB2>s
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -s
000000000001[APIC?] local apic in init
=====
Bochs x86 Emulator
Build from CVS snapshot, on 09/10/07
=====
000000000001[] reading configuration from bochsrc.bxrc
000000000001[] installing win32 module as the Bochs GUI
000000000001[] using log file bochs.log
=====

Bochs for Windows - Display
=====
Plex86/Bochs UGA BIOS 0.6a 19 Aug 2006
This UGA/UBE Bios is released under the GNU LGPL

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

Bochs UBE Display Adapter enabled

Bochs BIOS - build: 09/10/07
$Revision: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

Booting from Floppy...

Ahya Ihsan Fairuzsyifa L200190200
.....
Ahya Ihsan Fairuzsyifa L200190200
MY KERNEL$>_

CTRL + 3rd button enables mouse A: NUM CAPS SCRL
```