

**LAPORAN PRAKTIKUM
SISTEM OPERASI
MODUL 2
MENGENAL PROSES PEMBUATAN
'DISK BOOT'**



**Disusun Oleh :
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Kelas E**

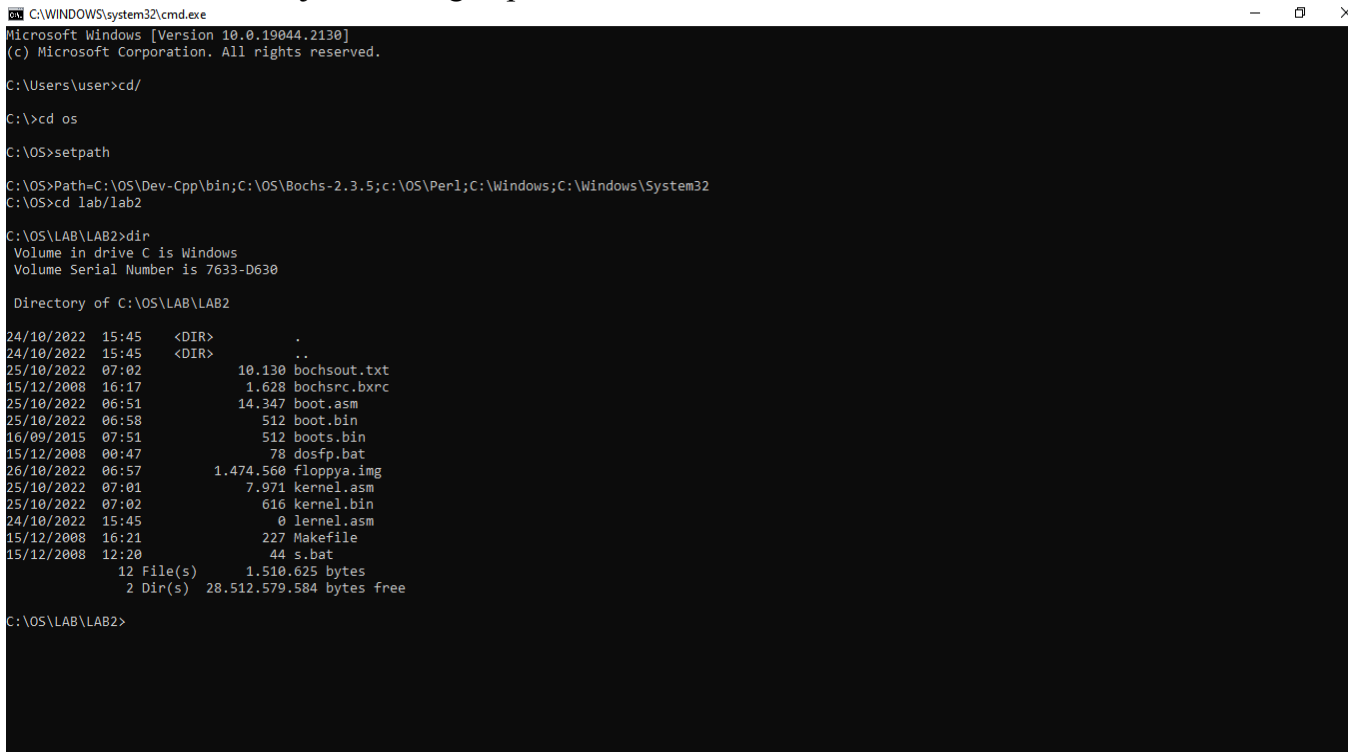
**PROGRAM STUDI TEKNIK INFORMATIKA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
UNIVERSITAS MUHAMMADIYAH SURAKARTA
TAHUN 2022/2023**

Lembar Kerja Praktikum Modul 2

NIM	: L200210227	Nilai praktek	:
Nama	: Yesy Lely Yestiana		
Dosen Pengampu	: Heru Setiya N., ST, M.Kom	Tanda tangan	:
Nama Asisten	: -		
Tanggal Praktikum	: 20/09/2022		

Berikut ini merupakan *screen shoot* dari hasil pemrograman kegiatan modul 2

1. Prosedur awal dengan ketik 'cd os' dan jalankan perintah setpath, terakhir ketik 'cd lab/lab2' dilanjutkan dengan perintah 'dir'.



```
Microsoft Windows [Version 10.0.19044.2130]
(c) Microsoft Corporation. All rights reserved.

C:\Users\user>cd/

C:\>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 Windows
Volume Serial Number is 7633-D630

Directory of C:\OS\LAB\LAB2

24/10/2022  15:45    <DIR>          .
24/10/2022  15:45    <DIR>          ..
25/10/2022  07:02             10.130 bochsout.txt
15/12/2008  16:17             1.628 bochsrc.bxrc
25/10/2022  06:51            14.347 boot.asm
25/10/2022  06:58             512 boot.bin
16/09/2015  07:51             512 boots.bin
15/12/2008  00:47             78 dosfp.bat
26/10/2022  06:57          1.474.560 floppy.img
25/10/2022  07:01             7.971 kernel.asm
25/10/2022  07:02             616 kernel.bin
24/10/2022  15:45              0 lernel.asm
15/12/2008  16:21             227 Makefile
15/12/2008  12:20              44 s.bat
               12 File(s)          1.510.625 bytes
               2 Dir(s)  28.512.579.584 bytes free

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

2. Jalankan 'bimage' kemudian mengecek floppy.img dan pastikan dengan perintah 'dir'.



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

C:\OS\LAB\LAB2>bimage

=====
                    bimage
          Disk Image Creation Tool for Bochs
    $Id: bimage.c,v 1.32 2006/06/16 07:29:33 vruppert 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]
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] floppy.img

The disk image 'floppy.img' already exists. Are you sure you want to replace it?
Please type yes or no. [no] yes

Writing: [] Done.

I wrote 1474560 bytes to floppy.img.

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

Press any key to continue

C:\OS\LAB\LAB2>dir
Volume in drive C is Windows
Volume Serial Number is 7633-D630

Directory of C:\OS\LAB\LAB2
```



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

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

Press any key to continue

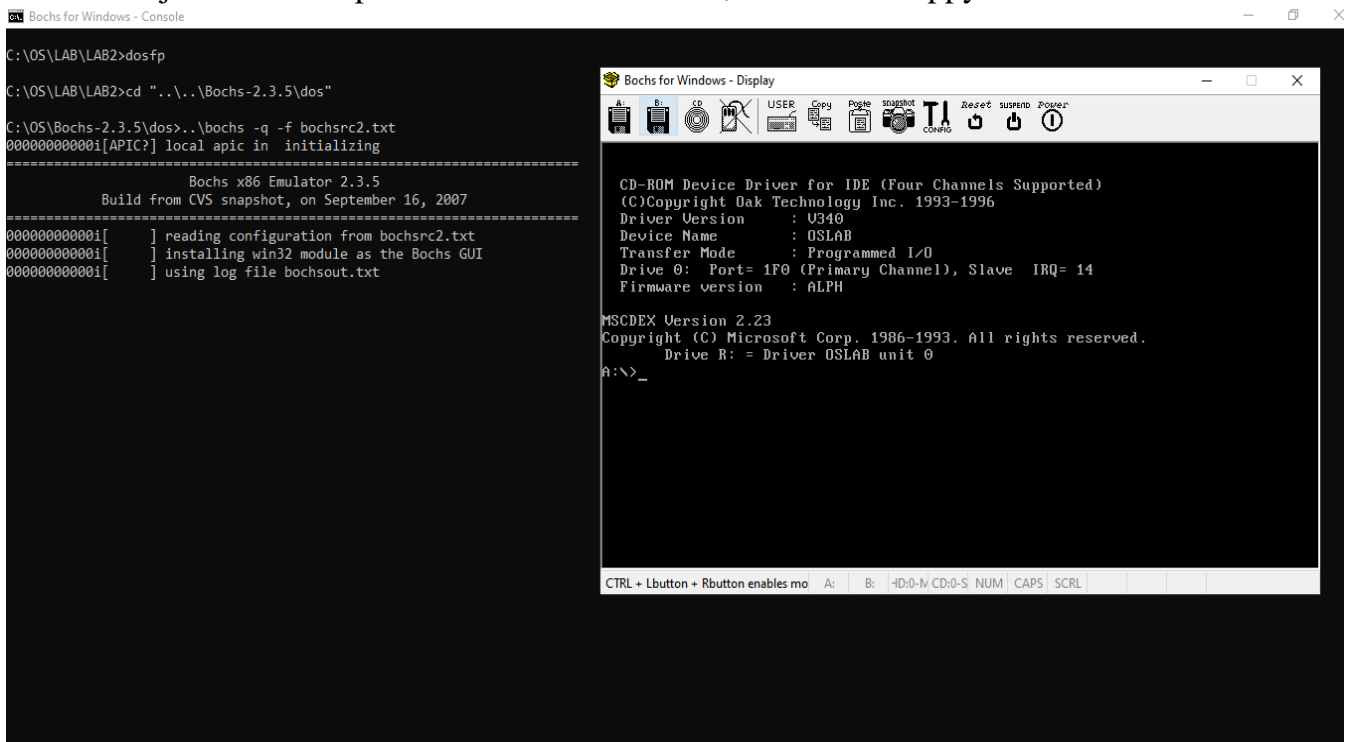
C:\OS\LAB\LAB2>dir
Volume in drive C is Windows
Volume Serial Number is 7633-D630

Directory of C:\OS\LAB\LAB2

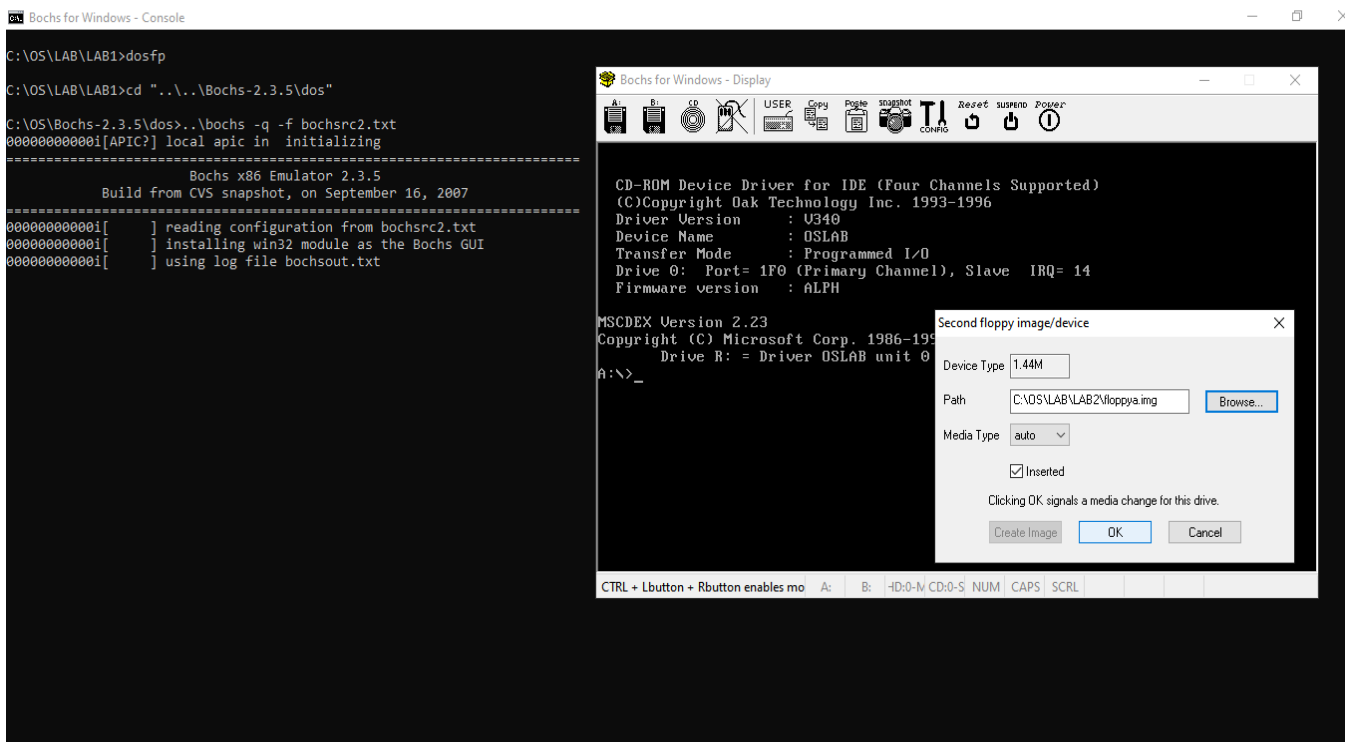
24/10/2022  15:45    <DIR>        .
24/10/2022  15:45    <DIR>        ..
25/10/2022  07:02             10.130 bochsout.txt
15/12/2008  16:17             1.628 bochsrc.bxrc
25/10/2022  06:51             14.347 boot.asm
25/10/2022  06:58              512 boot.bin
16/09/2015  07:51              512 boots.bin
15/12/2008  00:47              78 dosfp.bat
26/10/2022  07:00           1.474.560 floppy.img
25/10/2022  07:01             7.971 kernel.asm
25/10/2022  07:02             616 kernel.bin
24/10/2022  15:45              0 lernel.asm
15/12/2008  16:21             227 Makefile
15/12/2008  12:20              44 s.bat
               12 File(s)          1.510.625 bytes
               2 Dir(s)  28.512.595.968 bytes free

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

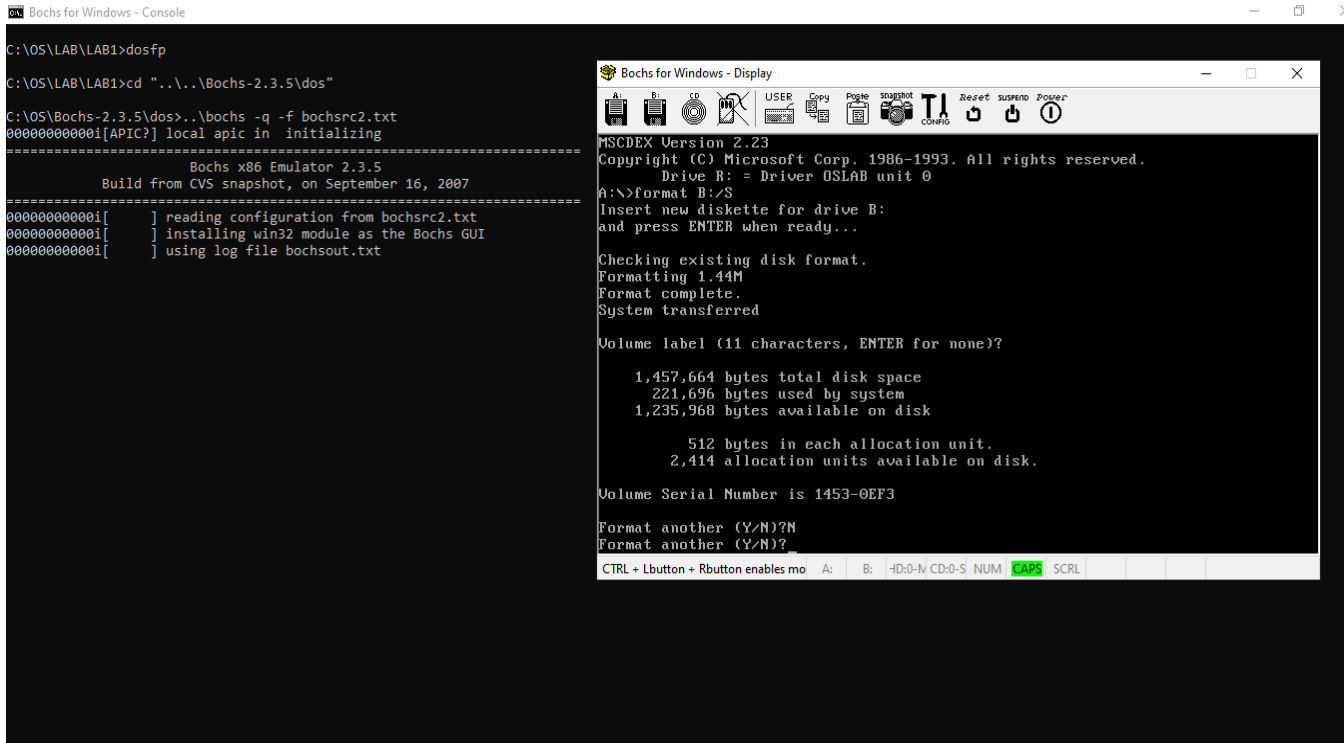
- Memformat 'floppya.img' dan mengisi dengan system operasi dos versi 7. Dengan menjalankan dosFp. Pindah ke PC Simulator, klik menu floppy disk No. 2 dari kanan.



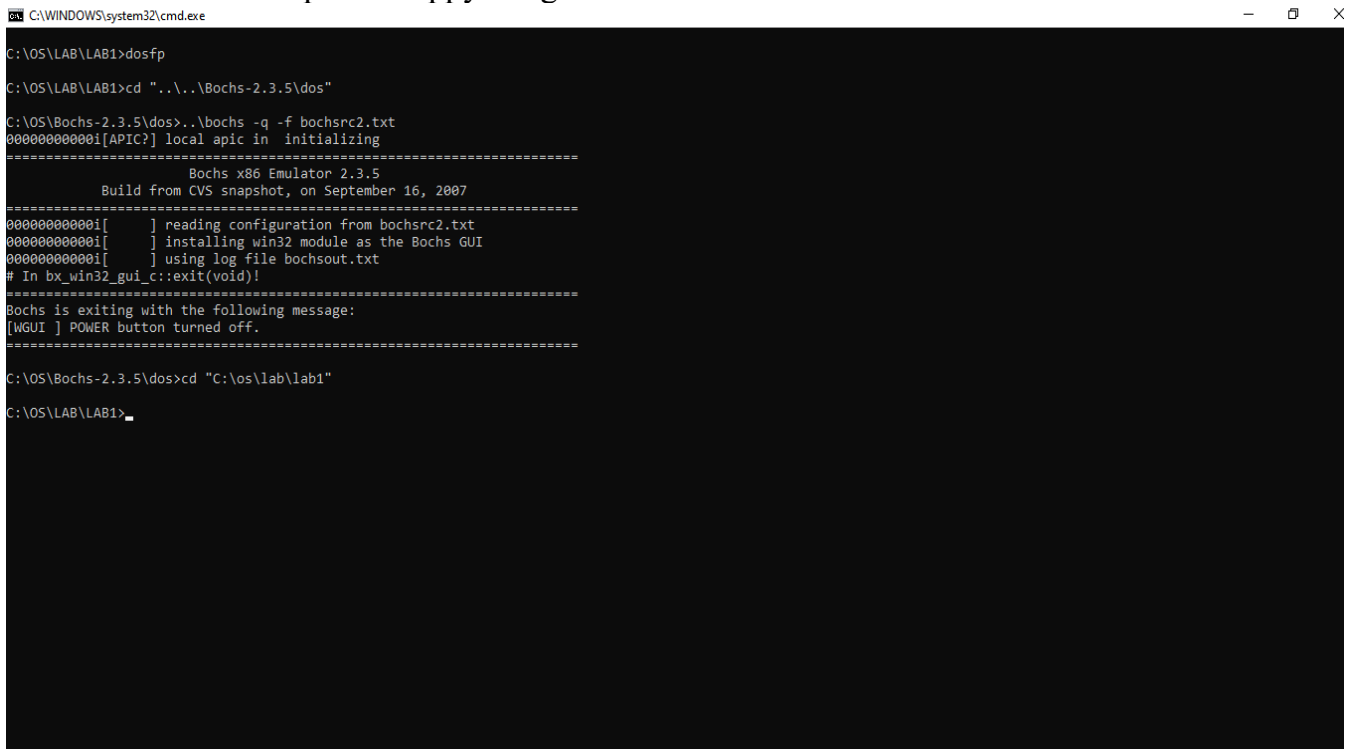
- Atur lokasi file image menunjuk ke 'floppya.img' terdapat pada direktori lab2, klik 'browse' dan atur lalu klik 'ok'.



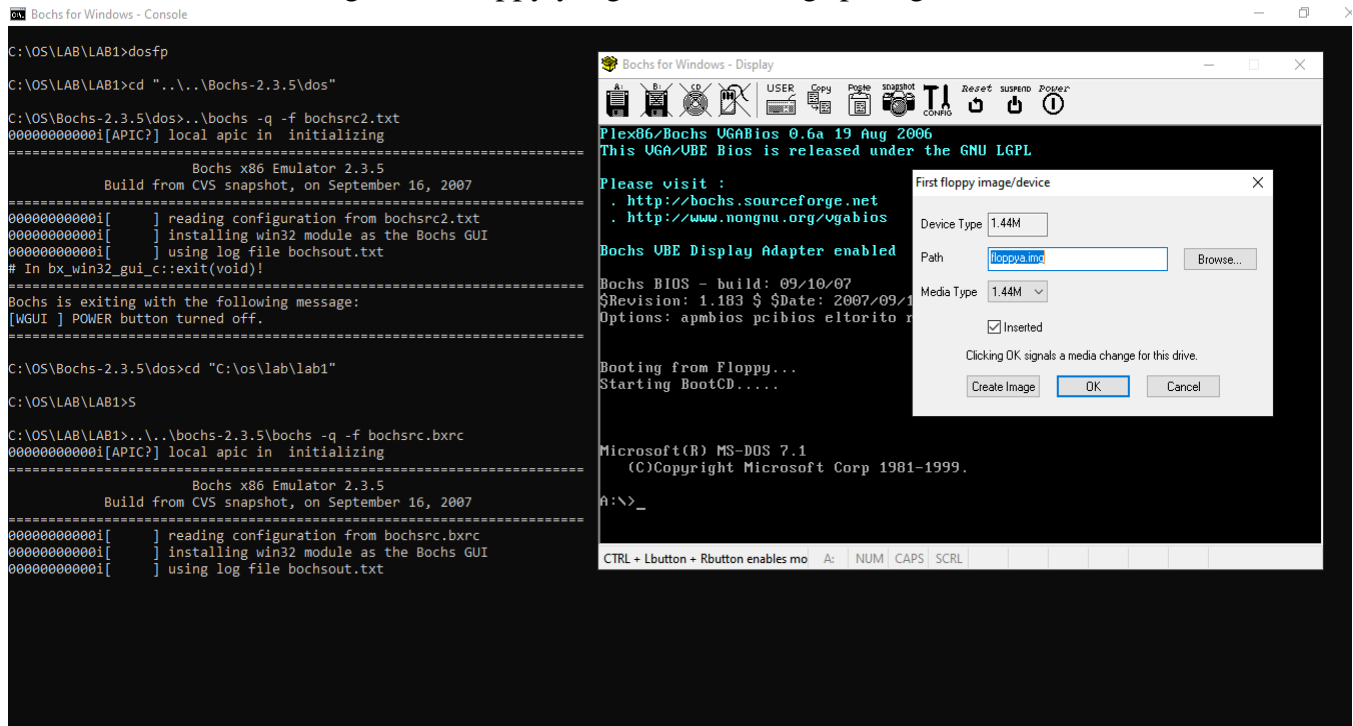
5. Ketik perintah 'A:>Format B:/S' selesaikan prosesnya.



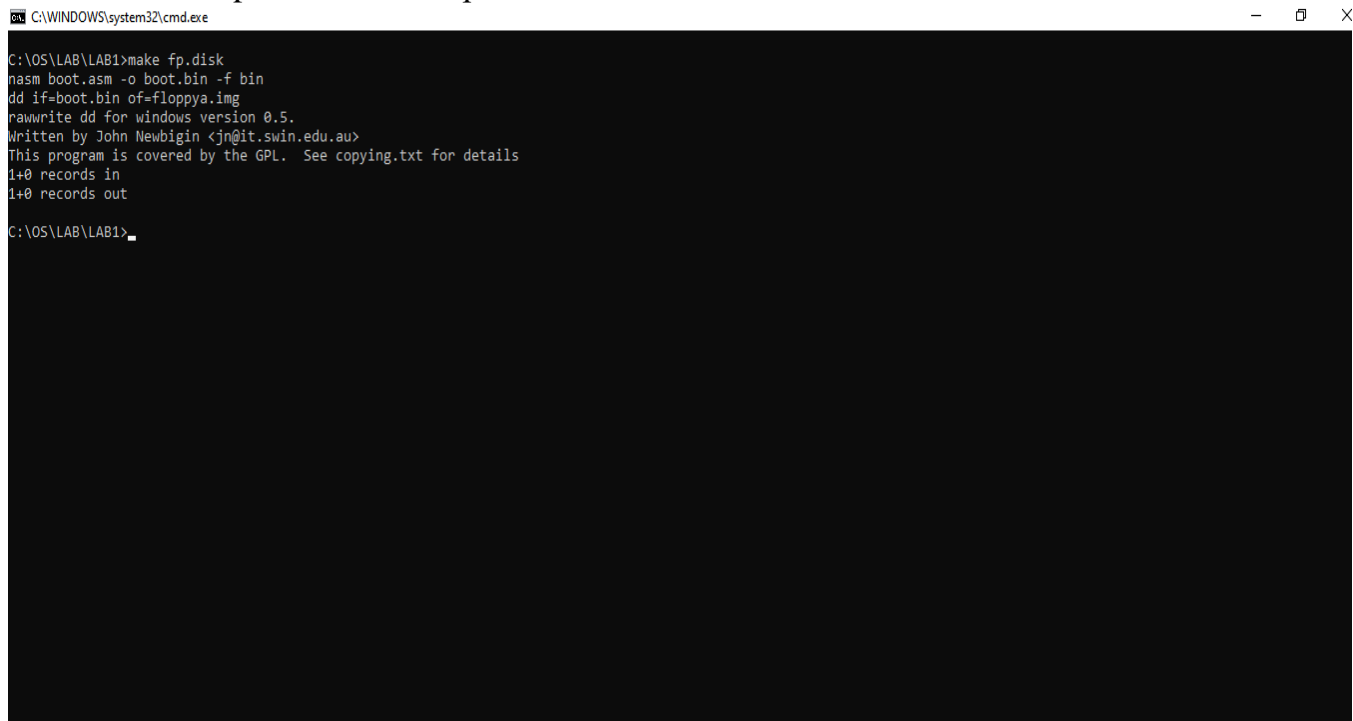
- ❖ Tampilan berkas aktifitas 'Bochs' setelah diklik menu power dan sudah dipastikan tidak ada kesalahan pada 'floppya.img'.



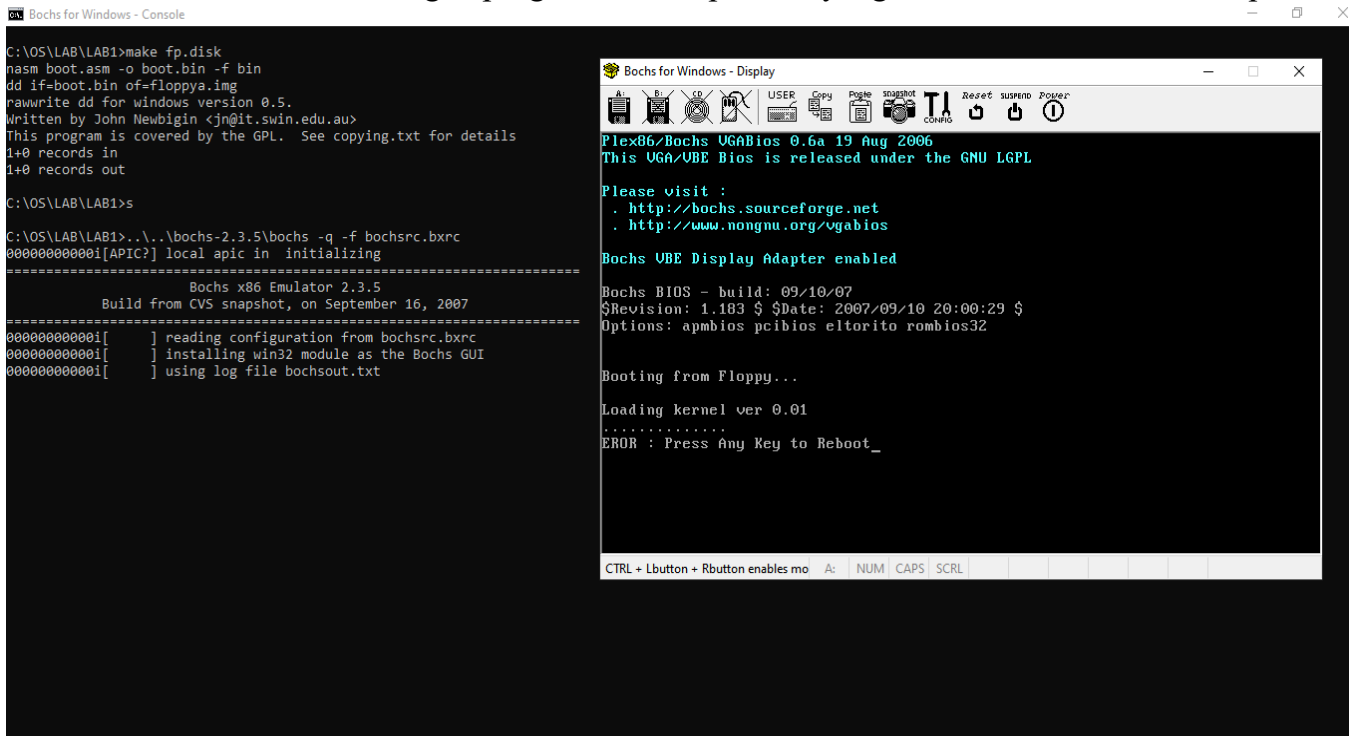
6. Jalankan perintah 's' maka akan menampilkan proses boot dengan disk boot yang berasal dari file 'floppya.img' yang diletakkan pada drive A. dan memastikannya dengan menekan tombol gambar floppy yang tidak disilang (paling kiri).



7. Jalankan perintah 'make fp.disk'.



8. Boot PC Simulator dengan program bootstaploader yang baru, ketik 's' & lihat tampilan.



The screenshot shows a PC simulator environment. On the left, a console window titled 'Bochs for Windows - Console' displays the following text:

```
C:\OS\LAB\LAB1>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\LAB1>s

C:\OS\LAB\LAB1>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
0000000000i[APIC?] local apic in initializing
-----
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
-----
0000000000i[ ] reading configuration from bochsrc.bxrc
0000000000i[ ] installing win32 module as the Bochs GUI
0000000000i[ ] using log file bochsout.txt

Bochs is exiting with the following message:
[VGUI ] POWER button turned off.

C:\OS\LAB\LAB1>notepad boot.asm
C:\OS\LAB\LAB1>
```

On the right, a window titled 'Bochs for Windows - Display' shows the BIOS screen. The text on the screen is:

```
Flex86/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/vgabios

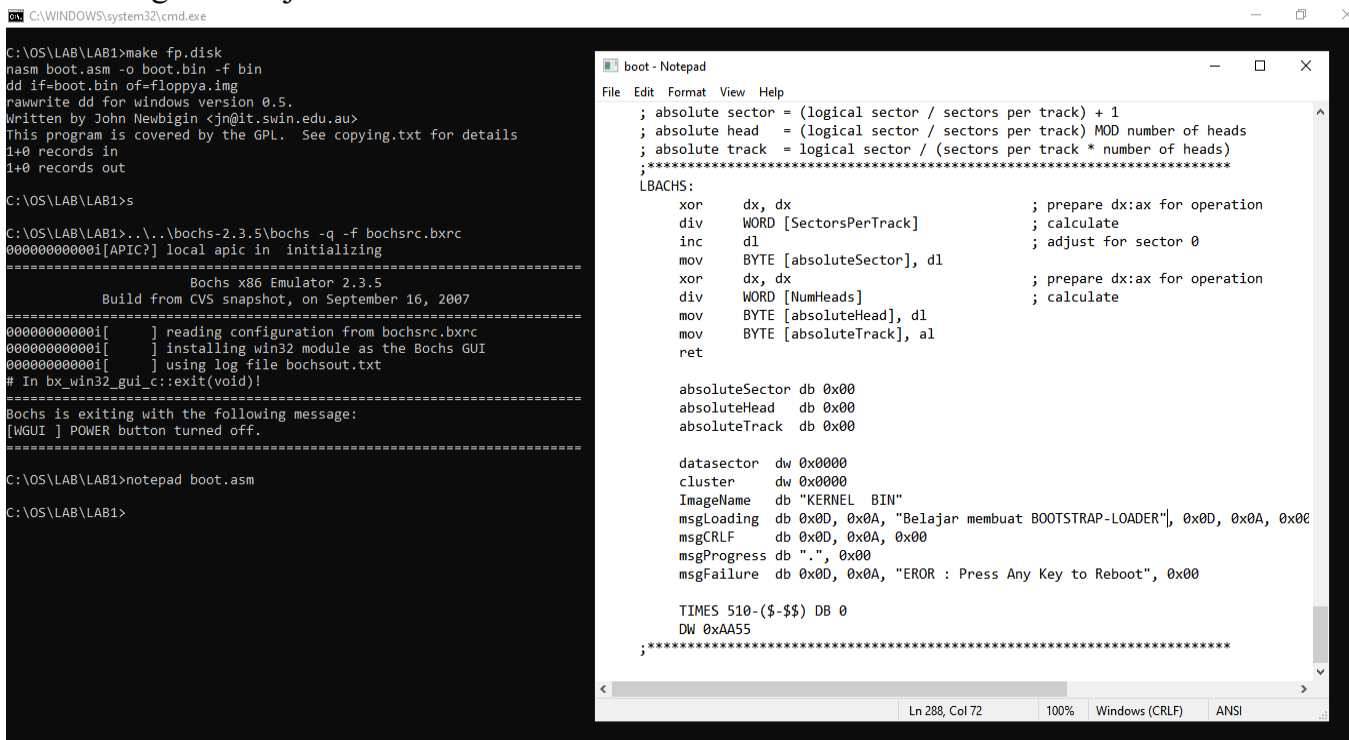
Bochs UBE Display Adapter enabled

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
.....
EROR : Press Any Key to Reboot_
```

9. Menyunting 'boot.asm', ketik 'notepad boot.asm' cari teks ' Loading kernel' dan ganti dengan 'Belajar membuat BOOTSTRAP-LOADER'.



The screenshot shows the same PC simulator environment. The console window on the left is identical to the previous one. The Notepad window on the right, titled 'boot - Notepad', shows the following assembly code:

```
File Edit Format View Help
; absolute sector = (logical sector / sectors per track) + 1
; absolute head = (logical sector / sectors per track) MOD number of heads
; absolute track = logical sector / (sectors per track * number of heads)
;*****
LBACHS:
xor dx, dx ; prepare dx:ax for operation
div WORD [SectorsPerTrack] ; calculate
inc dl ; adjust for sector 0
mov BYTE [absoluteSector], dl
xor dx, dx ; prepare dx:ax for operation
div WORD [NumHeads] ; calculate
mov BYTE [absoluteHead], dl
mov BYTE [absoluteTrack], al
ret

absoluteSector db 0x00
absoluteHead db 0x00
absoluteTrack db 0x00

datasetor dw 0x0000
cluster dw 0x0000
imageName db "KERNEL BIN"
msgLoading db 0x0D, 0x0A, "Belajar membuat BOOTSTRAP-LOADER", 0x0D, 0x0A, 0x0E
msgCRLF db 0x0D, 0x0A, 0x00
msgProgress db ".", 0x00
msgFailure db 0x0D, 0x0A, "EROR : Press Any Key to Reboot", 0x00

TIMES 510-($-$$) DB 0
DW 0xAA55
;*****
```

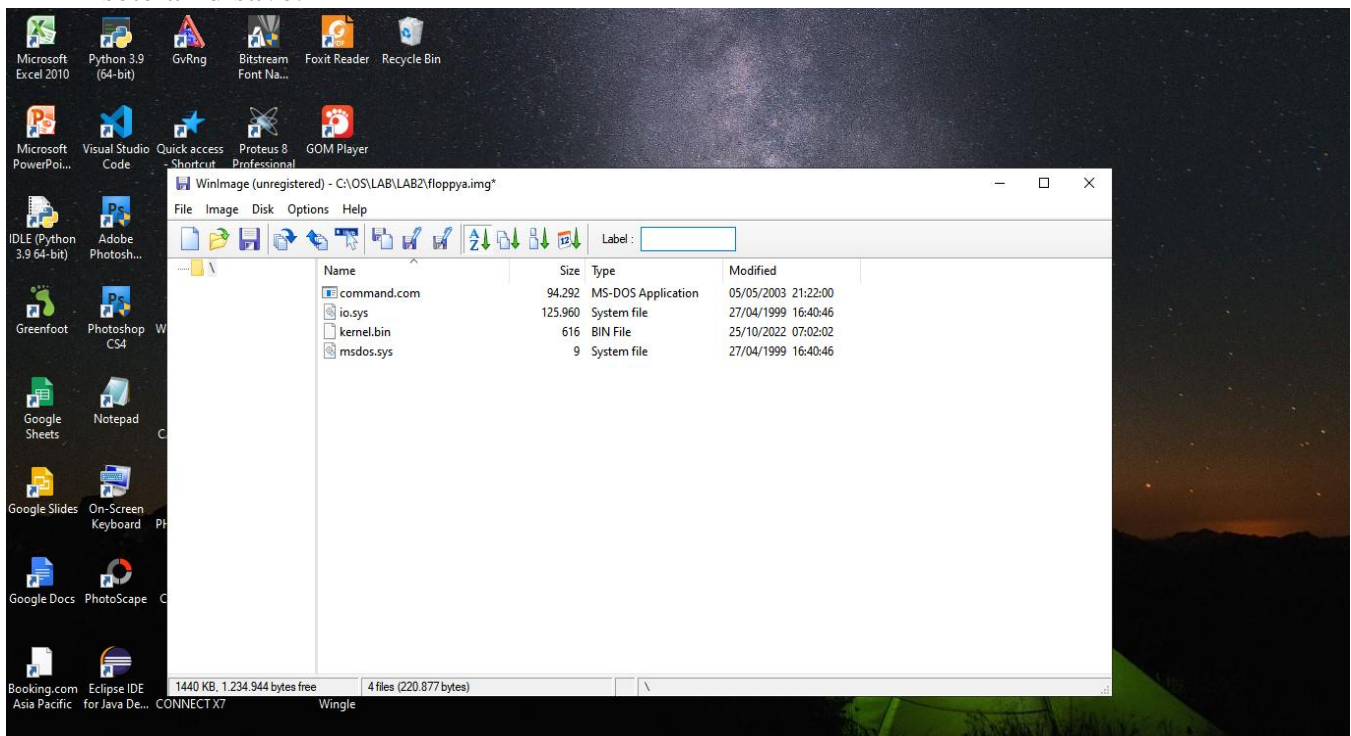
❖ Hasil setelah disave, cara menampilkannya seperti langkah sebelumnya.

```
Bochs for Windows - Console
C:\OS\LAB\LAB1>notepad boot.asm
C:\OS\LAB\LAB1>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\LAB1>s
C:\OS\LAB\LAB1>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
0000000000i[APIC?] local apic in initializing
-----
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
-----
0000000000i[ ] reading configuration from bochsrc.bxrc
0000000000i[ ] installing win32 module as the Bochs GUI
0000000000i[ ] using log file bochsout.txt
-----
Bochs for Windows - Display
Plex86/Bochs VGABios 0.6a 19 Aug 2006
This UGA/VE Bios is released under the GNU LGPL
Please visit :
. http://bochs.sourceforge.net
. http://www.nongnu.org/vgabios
Bochs VBE 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...
Belajar membuat BOOTSTRAP-LOADER
.....
ERROR : Press Any Key to Reboot_
CTRL + Lbutton + Rbutton enables mo A: NUM CAPS SCRL
```

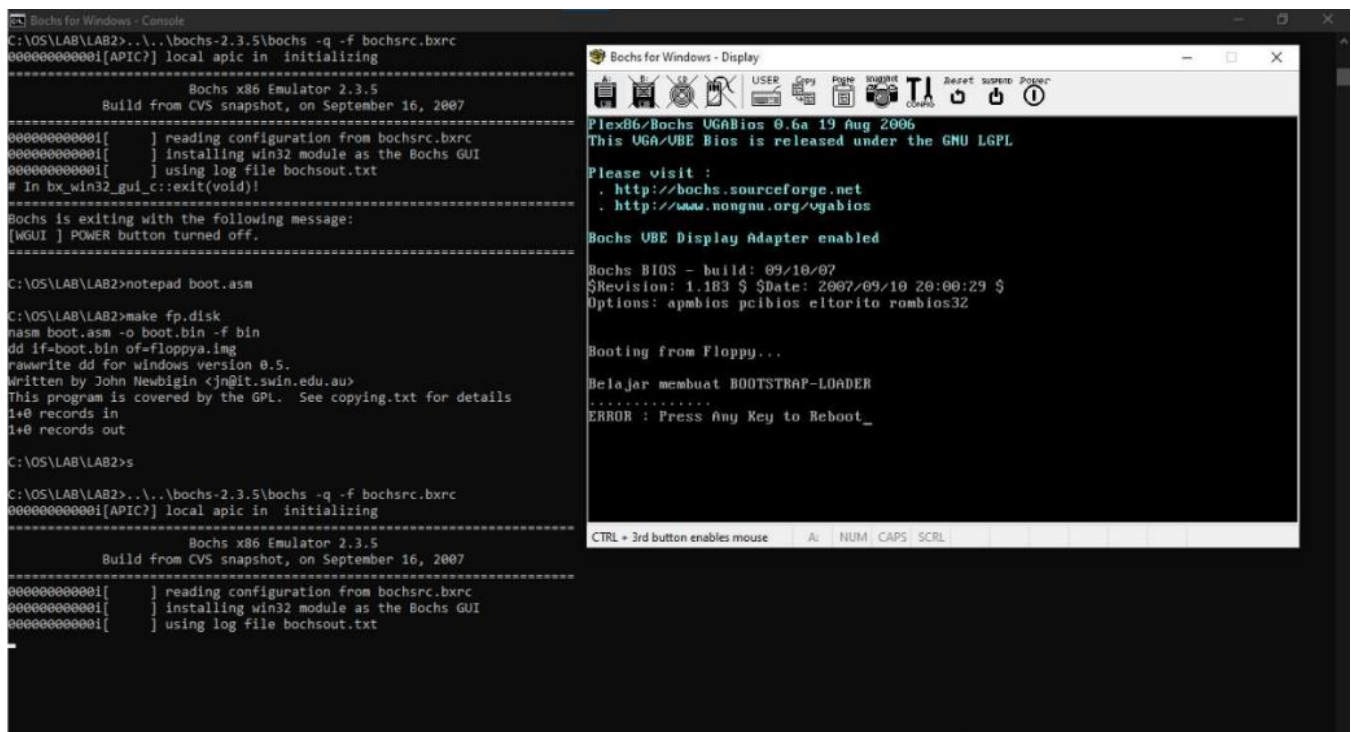
10. Menyiapkan file ‘kernel.bin’ dengan menjalankan perintah ‘make kernel’. Dan periksaah dengan perintah ‘dir’.

```
C:\WINDOWS\system32\cmd.exe
C:\OS\LAB\LAB1>make kernel
nasm kernel.asm -o kernel.bin -f bin
C:\OS\LAB\LAB1>dir
Volume in drive C is Windows
Volume Serial Number is 7633-D630
Directory of C:\OS\LAB\LAB1
25/10/2022 06:40 <DIR> .
25/10/2022 06:40 <DIR> ..
26/10/2022 07:15 10.203 bochsout.txt
15/12/2008 16:17 1.628 bochsrc.bxrc
26/10/2022 07:14 14.372 boot.asm
26/10/2022 07:15 512 boot.bin
16/09/2015 07:51 512 boots.bin
15/12/2008 00:47 78 dosfp.bat
24/10/2022 15:36 1.474.560 floppya.img
26/10/2022 07:15 1.474.560 floppya.img
25/10/2022 06:39 7.940 kernel.asm
26/10/2022 07:15 585 kernel.bin
15/12/2008 16:21 227 Makefile
15/12/2008 12:20 44 s.bat
12 File(s) 2.985.221 bytes
2 Dir(s) 28.506.865.664 bytes free
C:\OS\LAB\LAB1>
```

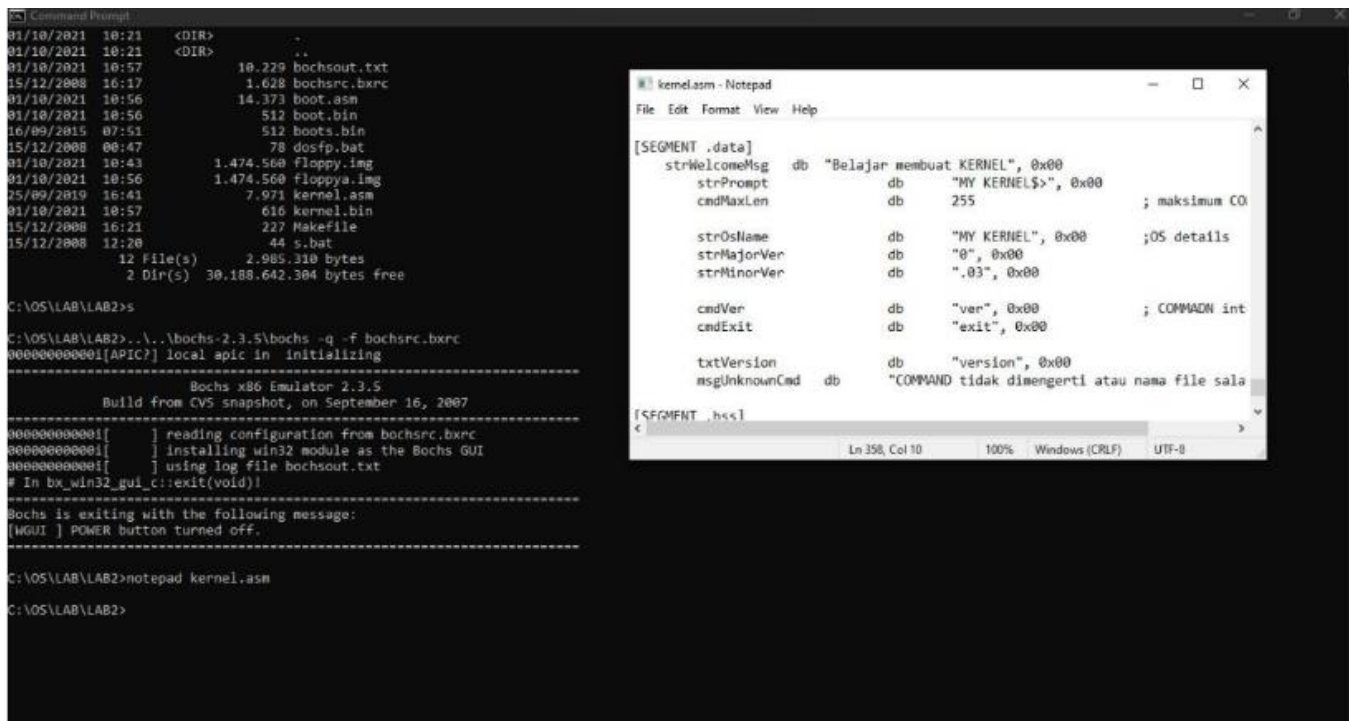

11. Hasil akhir setelah menjalankan WinImage, dengan menampilkan adanya kernel.bin setelah disave.



12. Jalankan perintah 's' untuk menampilkan cek proses booting floppy pada bochs display



13. Memodifikasi file 'kernel.asm' dengan mengganti isi pada variable 'strWelcomeMsg' yaitu 'Belajar membuat KERNEL'.



The screenshot shows a Windows desktop with two windows. On the left is a Command Prompt window titled 'Command Prompt' showing the execution of 'bochs -q -f bochsrc.bxrc' and the output of the BIOS boot process. On the right is a Notepad window titled 'kernel.asm - Notepad' showing the contents of the 'kernel.asm' file. The file contains assembly code for a BIOS boot sector. The variable 'strWelcomeMsg' is defined as a string of 255 bytes, and its value is being modified to 'Belajar membuat KERNEL'.

```
Command Prompt
C:\OS\LAB\LAB2>dir
.
..
10.229 bochsout.txt
1.628 bochsrc.bxrc
14.373 boot.asm
512 boot.bin
512 boots.bin
78 dosfp.bat
1.474.560 floppy.img
1.474.560 floppy.aimg
7.971 kernel.asm
616 kernel.bin
227 Makefile
44 s.bat
12 File(s) 2.985.310 bytes
2 Dir(s) 30.188.642.304 bytes free

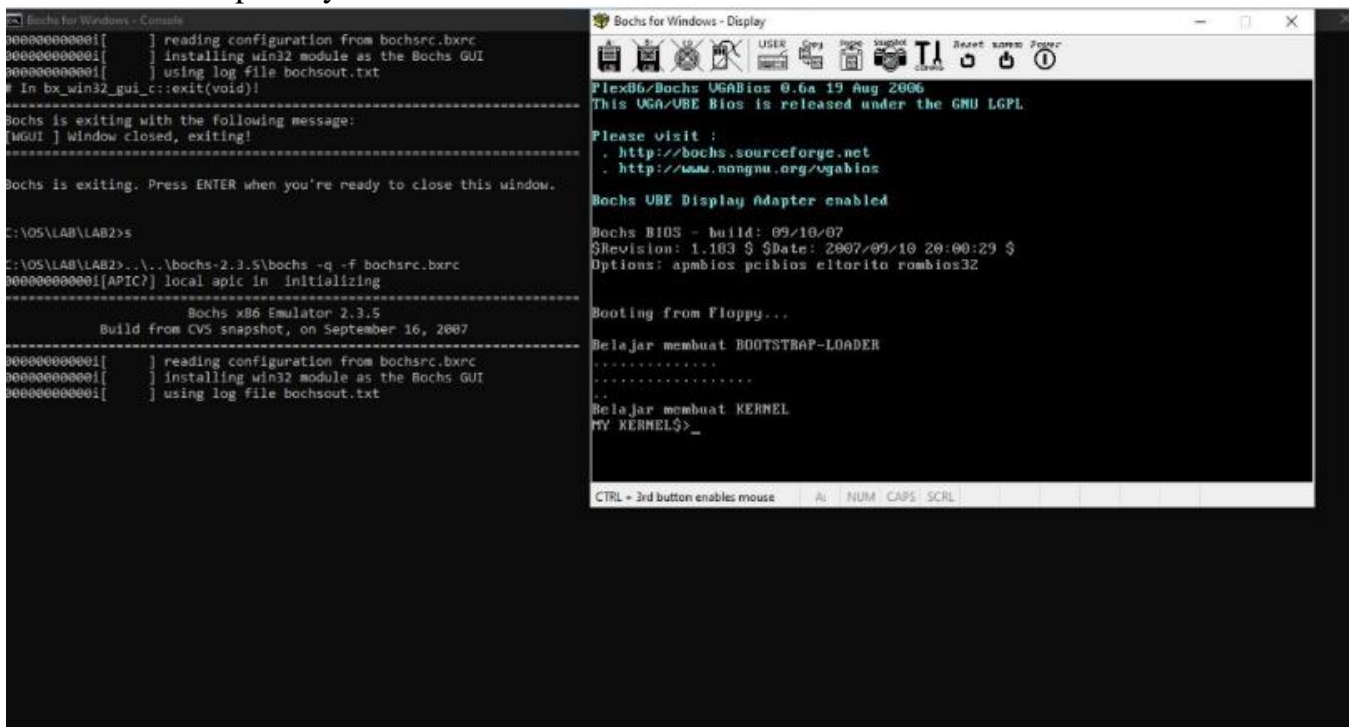
C:\OS\LAB\LAB2>
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc
000000000000[APIC?] local apic in initializing
-----
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
-----
000000000000[ ] reading configuration from bochsrc.bxrc
000000000000[ ] installing win32 module as the Bochs GUI
000000000000[ ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
Bochs is exiting with the following message:
[MGUI ] POWER button turned off.
-----
C:\OS\LAB\LAB2>notepad kernel.asm
C:\OS\LAB\LAB2>
```

```
kernel.asm - Notepad
File Edit Format View Help

[SEGMENT .data]
strWelcomeMsg db "Belajar membuat KERNEL", 0x00
strPrompt db "MY KERNEL$>", 0x00 ; maksimum CO
cmdMaxLen db 255 ; maksimum CO
strOsName db "MY KERNEL", 0x00 ; OS details
strMajorVer db "0", 0x00
strMinorVer db ".03", 0x00
cmdVer db "ver", 0x00 ; COMMAND int
cmdExit db "exit", 0x00
txtVersion db "version", 0x00
msgUnknownCmd db "COMMAND tidak dikenali atau nama file sala

[SEGMENT .bss]
Ln 358, Col 10 100% Windows (CRLF) UTF-8
```

❖ Hasil tampilannya.



The screenshot shows the Bochs BIOS boot screen. The BIOS version is 0.6a 19 Aug 2006. The screen displays the output of the BIOS boot process, including the message 'Bochs UBE Display Adapter enabled' and 'Bochs BIOS - build: 09/10/07'. The screen also shows the output of the modified kernel.asm, which displays 'Belajar membuat BOOTSTRAP-LOADER' and 'MY KERNEL\$>_'. The screen is titled 'Bochs for Windows - Display'.

```
Bochs for Windows - Display
Flex06/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: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

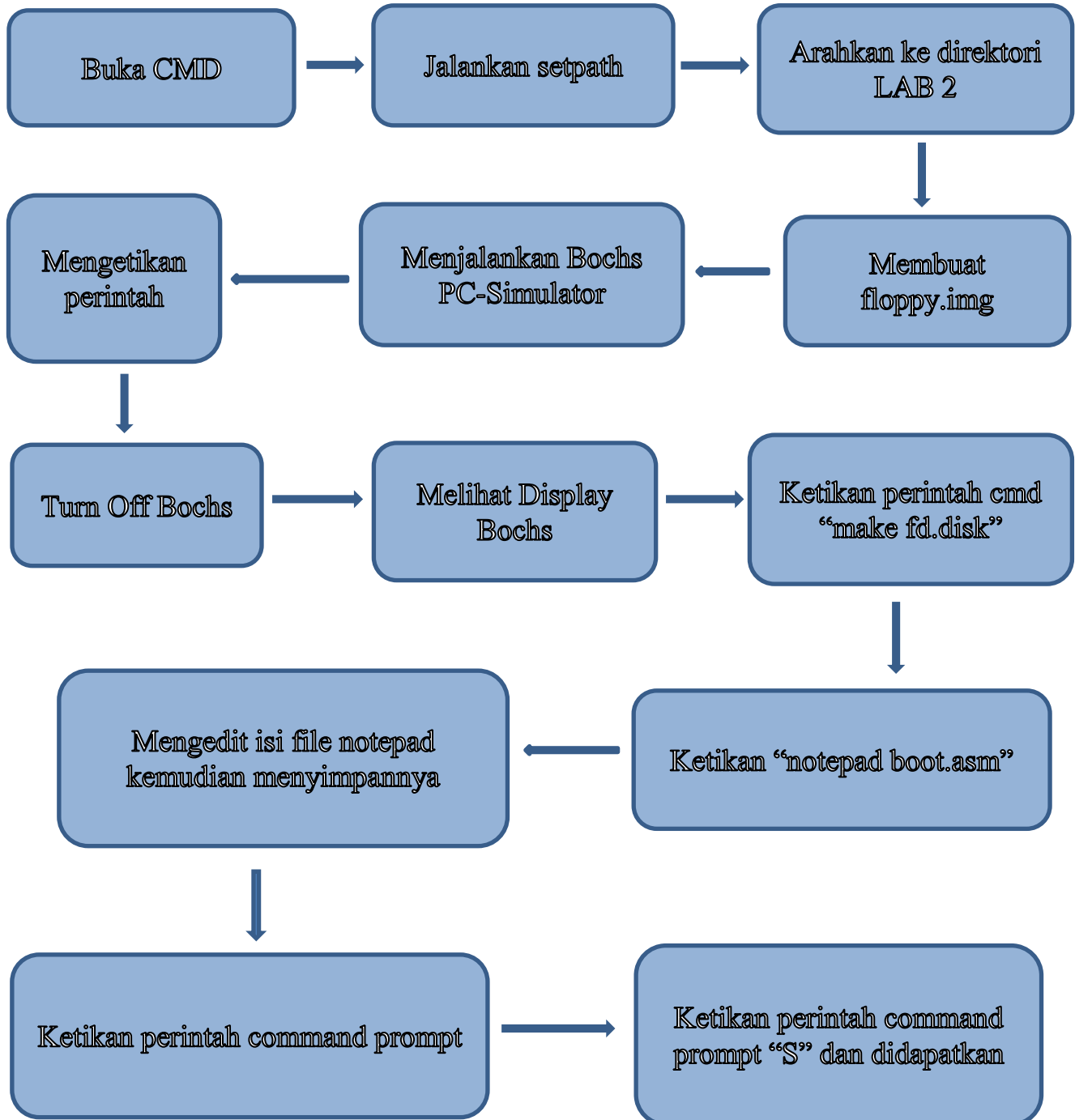
Booting from Floppy...

Belajar membuat BOOTSTRAP-LOADER
.....
Belajar membuat KERNEL
MY KERNEL$>_

CTRL + 3rd button enables mouse  Alt NUM CAPS SCRL
```

TUGAS!!

✓ Boot.asm detail



✓ Kernel.asm detail

