

**LAPORAN KEGIATAN PRAKTIKUM**  
**Pengenalan Sistem Pengembangan**  
**OS Dengan PC Simulator 'BOCHS'**



**Disusun oleh :**

**NAMA : Gita Juli Hartanti**

**NIM : L200190256**

**KELAS : G**

## Langkah Kerja

### Menuju ke direktori kerja.

1. Jalankan program command prompt atau cmd. Maka akan muncul tampilan sebagai berikut.

```
C:\> C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.18362.1016]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\>_
```

2. Selanjutnya ketik perintah 'cd os' lalu <ENTER>.

```
C:\> C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.18362.1016]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\>cd os

C:\OS>
```

3. Selanjutnya ketik perintah 'dir' maka akan muncul seperti di bawah ini.

```
C:\> C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.18362.1016]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\>cd os

C:\OS>dir
Volume in drive C has no label.
Volume Serial Number is 188B-5780

Directory of C:\OS

25/09/2020  10:25    <DIR>          .
25/09/2020  10:25    <DIR>          ..
25/09/2020  10:20    <DIR>          Bochs-2.3.5
25/09/2020  10:25             0 cd
25/09/2020  10:20    <DIR>          Dev-Cpp
17/12/2008  00:08    1.096.291 i386.pdf
26/09/2020  14:31    <DIR>          LAB
17/12/2008  00:07    846.920 pcasm-book.pdf
17/12/2008  01:44             86 Setpath.bat
13/12/2008  14:12    716.512 winima81.exe
               5 File(s)      2.659.809 bytes
               5 Dir(s)  151.454.896.128 bytes free

C:\OS>
```

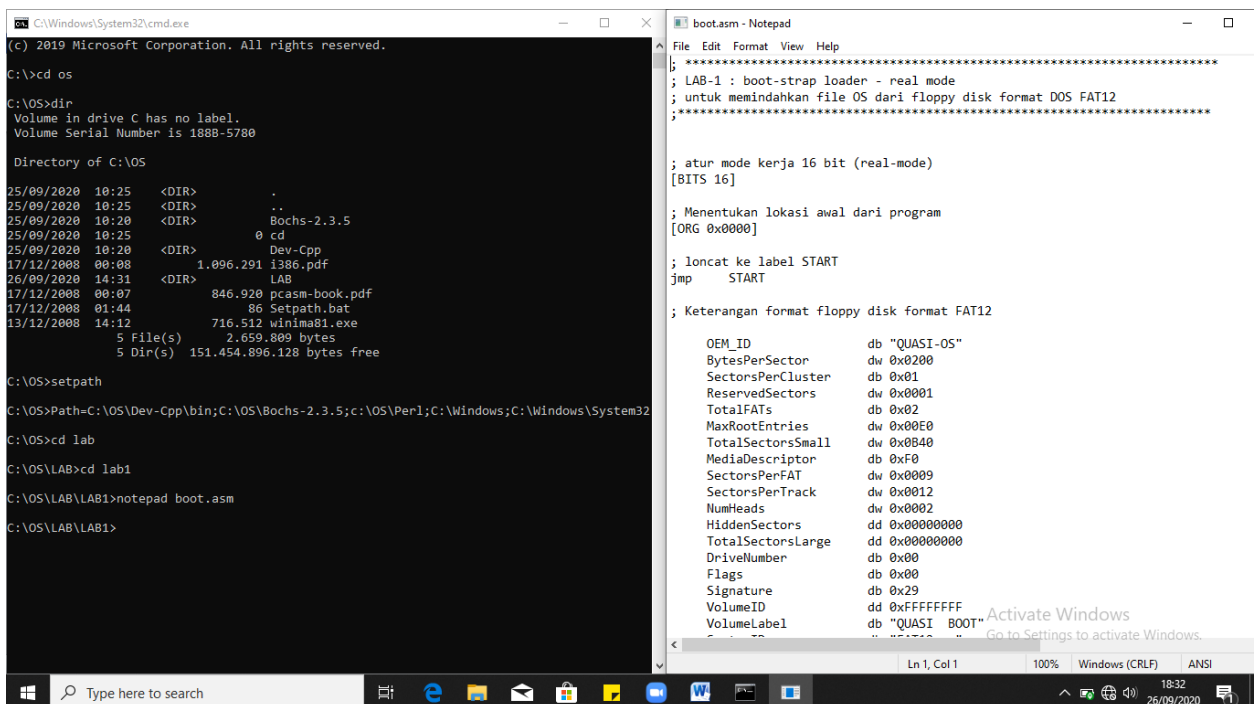
4. Untuk menjalankan file setpath klik 'setpath' tekan <ENTER>

```
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>
```

5. Lalu masuk ke direktori kerja pada C:\OS\LAB\LAB1

```
C:\OS>cd lab  
  
C:\OS\LAB>cd lab1  
  
C:\OS\LAB\LAB1>_
```

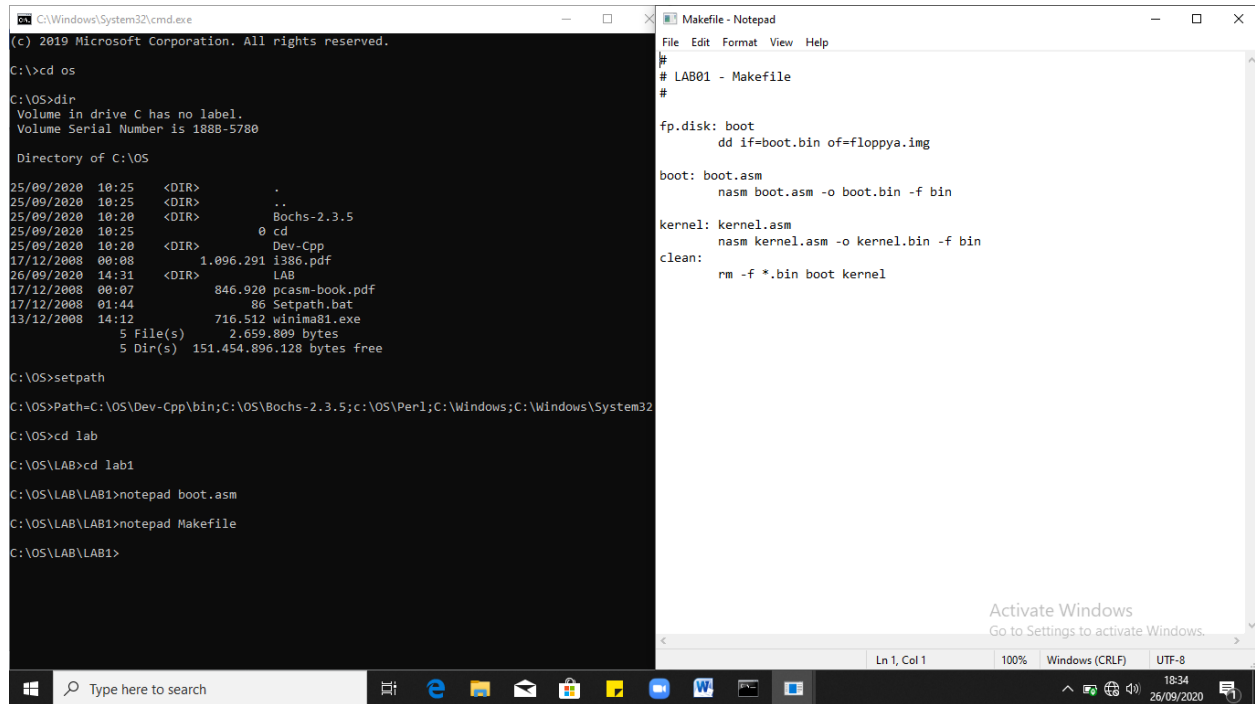
6. Untuk membuka file tersebut, masukkan perintah pada 'COMMAND PROMPT' dengan cara ketik 'notepad boot.asm' klik <ENTER>. Maka akan muncul tampilan seperti di bawah ini.



```
(c) 2019 Microsoft Corporation. All rights reserved.  
C:\>cd os  
  
C:\OS>dir  
Volume in drive C has no label.  
Volume Serial Number is 188B-5780  
  
Directory of C:\OS  
  
25/09/2020 10:25 <DIR> .  
25/09/2020 10:25 <DIR> ..  
25/09/2020 10:20 <DIR>   Bochs-2.3.5  
25/09/2020 10:25         0 cd  
25/09/2020 10:20 <DIR>   Dev-Cpp  
17/12/2008 00:08      1.096.291 1386.pdf  
26/09/2020 14:31 <DIR>   LAB  
17/12/2008 00:07      846.920 pcasm-book.pdf  
17/12/2008 01:44         86 Setpath.bat  
13/12/2008 14:12      716.512 winima01.exe  
               5 File(s)      2.659.809 bytes  
               5 Dir(s)    151.454.896.128 bytes free  
  
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  
  
C:\OS\LAB>cd lab1  
  
C:\OS\LAB\LAB1>notepad boot.asm  
  
C:\OS\LAB\LAB1>
```

```
File Edit Format View Help  
; *****  
; LAB-1 : boot-strap loader - real mode  
; untuk memindahkan file OS dari floppy disk format DOS FAT12  
; *****  
  
; atur mode kerja 16 bit (real-mode)  
[BITS 16]  
  
; Menentukan lokasi awal dari program  
[ORG 0x0000]  
  
; loncat ke label START  
jmp     START  
  
; Keterangan format floppy disk format FAT12  
  
OEM_ID          db "QUASI-OS"  
BytesPerSector  dw 0x0200  
SectorsPerCluster dw 0x01  
ReservedSectors dw 0x0001  
TotalFATS       dw 0x02  
MaxRootEntries  dw 0x00E0  
TotalSectorsSmall dw 0x0B40  
MediaDescriptor db 0xF0  
SectorsPerFAT   dw 0x0009  
SectorsPerTrack dw 0x0012  
NumHeads        dw 0x0002  
HiddenSectors   dd 0x00000000  
TotalSectorsLarge dd 0x00000000  
DriveNumber     db 0x00  
Flags           db 0x00  
Signature       db 0x29  
VolumeID        dd 0xFFFFFFFF  
VolumeLabel     db "QUASI BOOT"  
               ; *****
```

7. Selanjutnya tutup notepad, bukalah direktori kerja 'C:\OS\LAB\LAB1' lalu klik 'Notepad M' tekan tombol 'TAB' sehingga muncul 'Notepad Makefile' lalu klik <ENTER>.



```
(c) 2019 Microsoft Corporation. All rights reserved.

C:\>cd os

C:\OS>dir
Volume in drive C has no label.
Volume Serial Number is 1888-5780

Directory of C:\OS

25/09/2020  10:25    <DIR>        ..
25/09/2020  10:25    <DIR>        .
25/09/2020  10:20    <DIR>        Bochs-2.3.5
25/09/2020  10:25                0 cd
25/09/2020  10:20    <DIR>        Dev-Cpp
17/12/2008  00:08                1.096.291 1386.pdf
26/09/2020  14:31    <DIR>        LAB
17/12/2008  00:07                846.920 pcasm-book.pdf
17/12/2008  01:44                86 Setpath.bat
13/12/2008  14:12                716.512 winima81.exe
               5 File(s)          2.659.809 bytes
               5 Dir(s)        151.454.896.128 bytes free

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

C:\OS\LAB>cd lab1

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

C:\OS\LAB\LAB1>notepad Makefile

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

Makefile - Notepad

```
#
# LAB01 - Makefile
#

fp.disk: boot
dd if=boot.bin of=floppya.img

boot: boot.asm
nasm boot.asm -o boot.bin -f bin

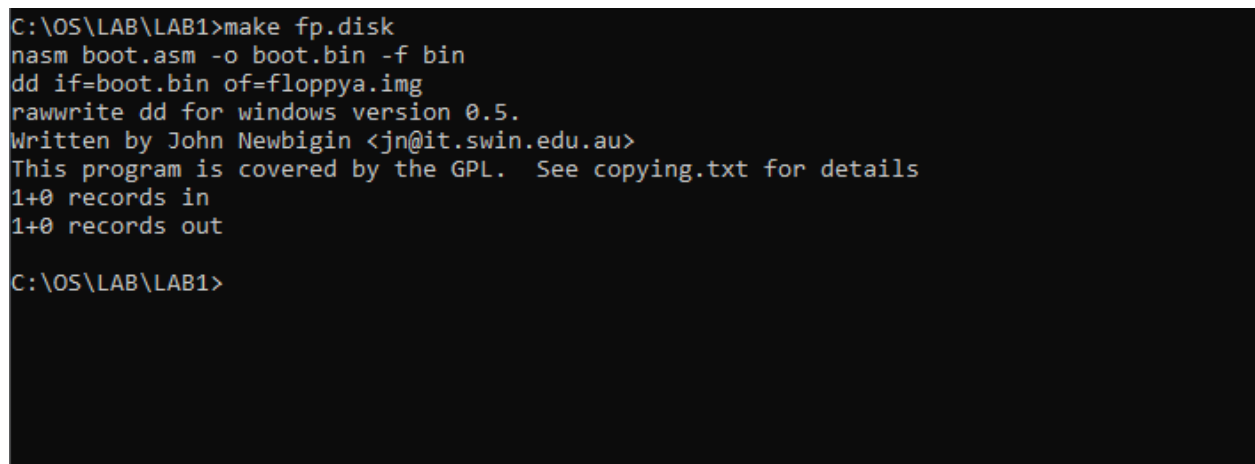
kernel: kernel.asm
nasm kernel.asm -o kernel.bin -f bin

clean:
rm -f *.bin boot kernel
```

Activate Windows  
Go to Settings to activate Windows.

Ln 1, Col 1 100% Windows (CRLF) UTF-8

8. Buka 'COMMAND PROMPT' ketik make fp. Disk, jika tidak ada kesalahan akan muncul seperti gambar dibawah ini.



```
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>
```

9. Ketik 'del floppy.img /P' lalu tekan 'Y' lalu <ENTER>



```
C:\OS\LAB\LAB1>del floppy.img /P
C:\OS\LAB\LAB1>floppya.img, Delete (Y/N)? Y
```

10. Masukkan perintah 'dir' maka akan muncul gambar seperti di bawah. Setelah itu klik 'bximage'

```
C:\OS\LAB\LAB1>dir
Volume in drive C has no label.
Volume Serial Number is 188B-5780

Directory of C:\OS\LAB\LAB1

26/09/2020  18:38    <DIR>          .
26/09/2020  18:38    <DIR>          ..
10/09/2019  16:19             10.235 bochsout.txt
15/12/2008  16:17             1.628 bochsrc.bxrc
14/12/2008  12:02            14.365 boot.asm
26/09/2020  18:35             512 boot.bin
15/12/2008  00:47             78 dosfp.bat
14/12/2008  11:45            7.966 kernel.asm
15/12/2008  16:21             227 Makefile
15/12/2008  12:20             44 s.bat
               8 File(s)            35.055 bytes
               2 Dir(s)  151.450.845.184 bytes free

C:\OS\LAB\LAB1>bximage
=====
                        bximage
                Disk Image Creation Tool for Bochs
          $Id: bximage.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] _
```

(Membuat file image floppy tahap-1)

11. Klik 'fd' lalu tekan <ENTER>

```
C:\OS\LAB\LAB1>bximage
=====
                        bximage
                Disk Image Creation Tool for Bochs
          $Id: bximage.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]
```

(Membuat file image floppy tahap-2)

```

C:\OS\LAB\LAB1>bximage
=====
                        bximage
                Disk Image Creation Tool for Bochs
                $Id: bximage.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] _

```

(Membuat file image floppy tahap-3)

12. Untuk memberikan nama file, ketiklah 'floppya.img' lalu <ENTER>

```

C:\OS\LAB\LAB1>bximage
=====
                        bximage
                Disk Image Creation Tool for Bochs
                $Id: bximage.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] 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

```

13. Pastikan bahwa nama file imagenya adalah 'floppy.img' dengan memasukkan perintah 'dir' lalu <ENTER>. Jika belum ada maka Anda harus mengulangi proses dari awal dengan memanggil program 'bximage'.

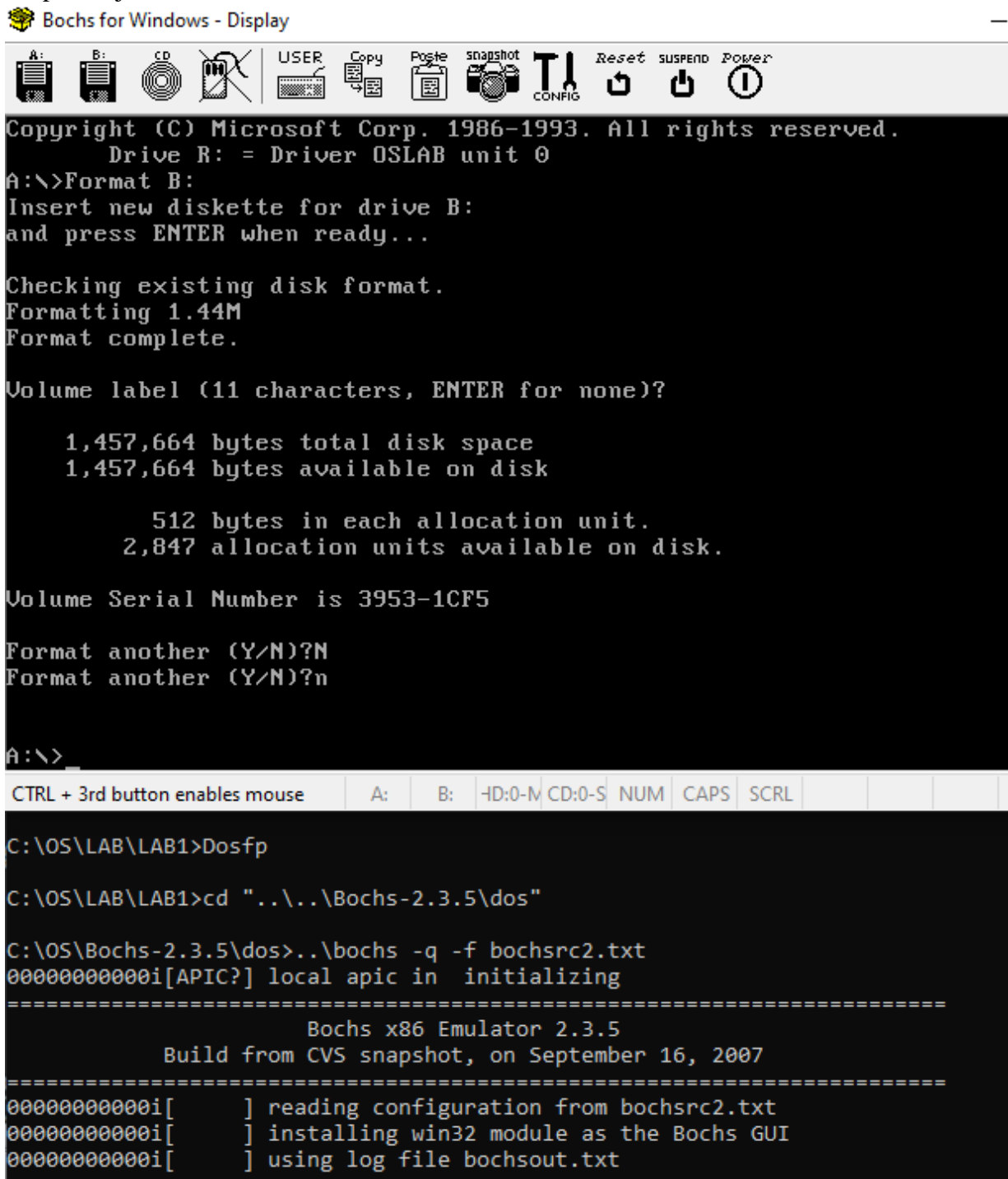
```
C:\OS\LAB\LAB1>dir
Volume in drive C has no label.
Volume Serial Number is 188B-5780

Directory of C:\OS\LAB\LAB1

26/09/2020  20:58    <DIR>          .
26/09/2020  20:58    <DIR>          ..
26/09/2020  19:00         1.474.560 a.img
10/09/2019  16:19           10.235 bochsout.txt
15/12/2008  16:17           1.628 bochsrc.bxrc
14/12/2008  12:02          14.365 boot.asm
26/09/2020  18:51           512 boot.bin
15/12/2008  00:47           78 dosfp.bat
26/09/2020  20:58         1.474.560 floppya.img
14/12/2008  11:45           7.966 kernel.asm
15/12/2008  16:21          227 Makefile
15/12/2008  12:20           44 s.bat
           10 File(s)        2.984.175 bytes
           2 Dir(s)  151.412.658.176 bytes free

C:\OS\LAB\LAB1>■
```

14. Jalankan PC-Simulator dari 'COMMAND PROMPT' klik perintah 'DosFp'. Maka akan muncul gambar seperti dibawah ini. Setelah A:\> klik 'Format B:' Lalu klik <ENTER> 2X tetapi beri jeda.



```
Bochs for Windows - Display
A: B: CD USER Copy Paste Snapshot CONFIG Reset SUSPEND Power
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
Drive R: = Driver OSLAB unit 0
A:\>Format B:
Insert new diskette for drive B:
and press ENTER when ready...

Checking existing disk format.
Formatting 1.44M
Format complete.

Volume label (11 characters, ENTER for none)?

1,457,664 bytes total disk space
1,457,664 bytes available on disk

512 bytes in each allocation unit.
2,847 allocation units available on disk.

Volume Serial Number is 3953-1CF5

Format another (Y/N)?N
Format another (Y/N)?n

A:\>

CTRL + 3rd button enables mouse  A:  B:  HD:0-H CD:0-S NUM CAPS SCRL
C:\OS\LAB\LAB1>Dosfp
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
00000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
00000000000i[ ] reading configuration from bochsrc2.txt
00000000000i[ ] installing win32 module as the Bochs GUI
00000000000i[ ] using log file bochsout.txt
```



15. Tutup PC-Simulator dengan klik tombol power. Copy 512 byte data bootsektor ke dalam file terpisah. Buka 'Command Prompt' ketik 'dd if=floppy.img of=boots.bin count=1' lalu <ENTER>

```
C:\OS\LAB\LAB1>Dosfp
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
00000000000i[APIC?] local apic in  initializing
=====
                        Bochs x86 Emulator 2.3.5
                Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc2.txt
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochsout.txt
# In bx_win32_gui_c::exit(void)!
=====
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====

C:\OS\Bochs-2.3.5\dos>cd "C:\os\lab\lab1"

C:\OS\LAB\LAB1>dd if=floppya.img of=boots.bin count=1
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>
```

16. Ketik 'tdump boots.bin' lalu <ENTER>

```
C:\OS\LAB\LAB1>tdump boots.bin
Turbo Dump Version 5.0.16.12 Copyright (c) 1988, 2000 Inprise Corporation
Display of File BOOTS.BIN

000000: EB 3C 90 4D 53 57 49 4E 34 2E 31 00 02 01 01 00 .<.MSWIN4.1....
000010: 02 E0 00 40 0B F0 09 00 12 00 02 00 00 00 00 00 ...@.....
000020: 00 00 00 00 00 00 29 F5 1C 53 39 4E 4F 20 4E 41 .....).S9NO NA
000030: 4D 45 20 20 20 20 46 41 54 31 32 20 20 20 33 C9 ME FAT12 3.
000040: 8E D1 BC FC 7B 16 07 BD 78 00 C5 76 00 1E 56 16 ....{...x..v..V.
000050: 55 BF 22 05 89 7E 00 89 4E 02 B1 0B FC F3 A4 06 U."..~..N.....
000060: 1F BD 00 7C C6 45 FE 0F 38 4E 24 7D 20 8B C1 99 ...|.E..8N$} ...
000070: E8 7E 01 83 EB 3A 66 A1 1C 7C 66 3B 07 8A 57 FC .~...:f..|f;..W.
000080: 75 06 80 CA 02 88 56 02 80 C3 10 73 ED 33 C9 FE u....V....s.3..
000090: 06 D8 7D 8A 46 10 98 F7 66 16 03 46 1C 13 56 1E ..}.F...f..F..V.
0000A0: 03 46 0E 13 D1 8B 76 11 60 89 46 FC 89 56 FE B8 .F....v..`F..V..
0000B0: 20 00 F7 E6 8B 5E 0B 03 C3 48 F7 F3 01 46 FC 11 ....^...H...F..
0000C0: 4E FE 61 BF 00 07 E8 28 01 72 3E 38 2D 74 17 60 N.a....(r>8-t.`
0000D0: B1 0B BE D8 7D F3 A6 61 74 3D 4E 74 09 83 C7 20 ....}.at=Nt...
0000E0: 3B FB 72 E7 EB DD FE 0E D8 7D 7B A7 BE 7F 7D AC ;.r.....}{...}.
0000F0: 98 03 F0 AC 98 40 74 0C 48 74 13 B4 0E BB 07 00 ....@t.Ht.....
000100: CD 10 EB EF BE 82 7D EB E6 BE 80 7D EB E1 CD 16 .....}......}.
000110: 5E 1F 66 8F 04 CD 19 BE 81 7D 8B 7D 1A 8D 45 FE ^.f.....}.}.E.
000120: 8A 4E 0D F7 E1 03 46 FC 13 56 FE B1 04 E8 C2 00 .N....F..V.....
000130: 72 D7 EA 00 02 70 00 52 50 06 53 6A 01 6A 10 91 r....p.RP.Sj.j..
000140: 8B 46 18 A2 26 05 96 92 33 D2 F7 F6 91 F7 F6 42 .F..&...3.....B
000150: 87 CA F7 76 1A 8A F2 8A E8 C0 CC 02 0A CC B8 01 ...v.....
000160: 02 80 7E 02 0E 75 04 B4 42 8B F4 8A 56 24 CD 13 ..~..u..B...V$.
000170: 61 61 72 0A 40 75 01 42 03 5E 0B 49 75 77 C3 03 aar.@u.B.^Iuw..
000180: 18 01 27 0D 0A 49 6E 76 61 6C 69 64 20 73 79 73 ..'..Invalid sys
000190: 74 65 6D 20 64 69 73 6B FF 0D 0A 44 69 73 6B 20 tem disk...Disk
0001A0: 49 2F 4F 20 65 72 72 6F 72 FF 0D 0A 52 65 70 6C I/O error...Repl
0001B0: 61 63 65 20 74 68 65 20 64 69 73 6B 2C 20 61 6E ace the disk, an
0001C0: 64 20 74 68 65 6E 20 70 72 65 73 73 20 61 6E 79 d then press any
0001D0: 20 6B 65 79 0D 0A 00 00 49 4F 20 20 20 20 20 20 key....IO
0001E0: 53 59 53 4D 53 44 4F 53 20 20 20 53 59 53 7F 01 SYSMSDOS SYS..
0001F0: 00 41 BB 00 07 60 66 6A 00 E9 3B FF 00 00 55 AA .A...`fj.;...U.

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

17. Untuk melihat isi file 's.bat' masukkan perintah 'type s.bat' lalu <ENTER>

```
C:\OS\LAB\LAB1>type s.bat
..\..\bochs-2.3.5\bochs -q -f bochsrc.bxrc

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

18. Masukkan perintah 's' lalu klik <ENTER>

```
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

Plex86/Bochs VGABios 0.6a 19 Aug 2006
This VGA/VBE 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...

Invalid system disk
Replace the disk, and then press any key
```

19. Ketik 'Dosfp' pada command prompt lalu pada windows bochs masukan perintah 'A:\>format B:/S' lalu <ENTER>

```
C:\OS\LAB\LAB1>Dosfp
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
0000000000i[APIC?] local apic in  initializing
=====
                Bochs x86 Emulator 2.3.5
                Build from CVS snapshot, on September 16, 2007
=====
0000000000i[      ] reading configuration from bochsrc2.txt
0000000000i[      ] installing win32 module as the Bochs GUI
0000000000i[      ] using log file bochsout.txt

Bochs for Windows - Display
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.
Verifying 1.44M
Format complete.
System transferred
Volume label (11 characters, ENTER for none)?

1,457,664 bytes total disk space
221,696 bytes used by system
1,235,968 bytes available on disk

512 bytes in each allocation unit.
2,414 allocation units available on disk.

Volume Serial Number is 3444-1E0D
Format another (Y/N)?n
A:\>
```

20. Matikan PC-Simulator dengan klik power. Ketik 'S' lalu <ENTER>

```
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 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: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

Booting from Floppy...
Starting BootCD.....

Microsoft(R) MS-DOS 7.1
(C)Copyright Microsoft Corp 1981-1999.
A:\>
```