

LAPORAN PRAKTIKUM SISTEM OPERASI
KEGIATAN MODUL 1
PENGENALAN SISTEM PENGEMBANGAN OS DENGAN PC
SIMULATOR ‘BOCHS’



DISUSUN OLEH:

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KELAS : F

INFORMATIKA

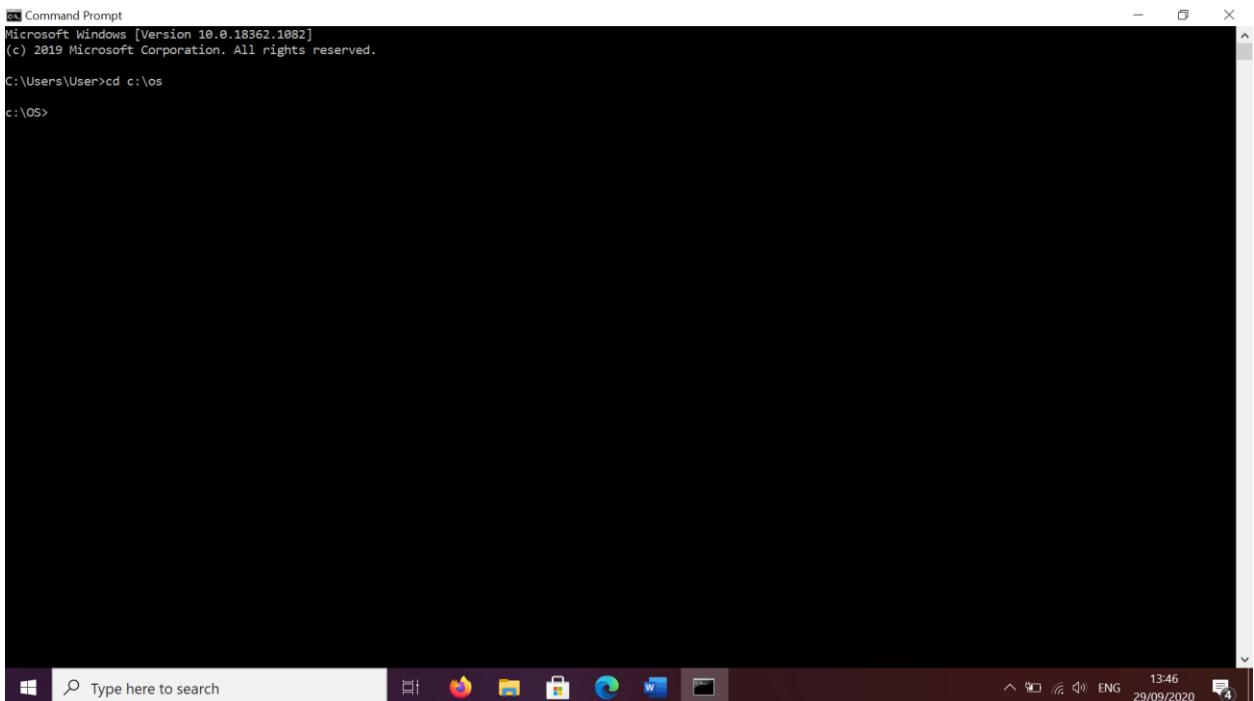
ILMU KOMUNIKASI DAN INFORMATIKA

UNIVERSITAS MUHAMMADIYAH SURAKARTA

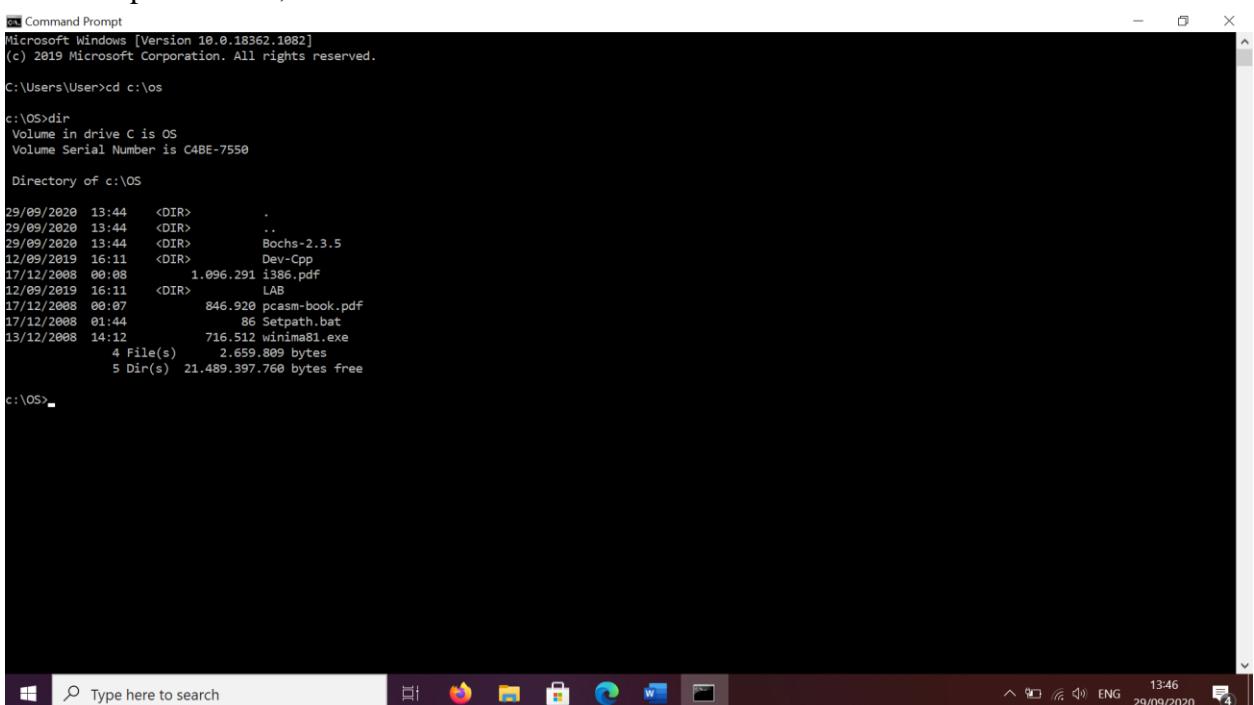
2020/2021

Menuju ke direktori kerja.

- Jalankan program command prompt atau cmd.
- Masuk ke direktori kerja 'C:\OS', dengan perintah 'cd os'



- Masukan perintah dir, untuk melihat isi direktori di dalam folder tersebut.



- Jalankan file setpath, untuk menjalankannya ketik 'setpath' tekan <ENTER>

```
cmd Command Prompt
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\User>cd c:\os

c:\OS>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\OS

29/09/2020 13:44 <DIR> .
29/09/2020 13:44 <DIR> ..
29/09/2020 13:44 <DIR> Bochs-2.3.5
12/09/2019 16:11 <DIR> Dev-Cpp
17/12/2008 00:08 1.096.291 i386.pdf
12/09/2019 16:11 <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
   4 File(s)    2.659.809 bytes
   5 Dir(s)  21.489.397.760 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>
```

Melihat isi direktori kerja.

- Jalankan command prompt.
- Masuk ke direktori kerja pada ‘C:\OS\LAB\LAB1’.

```
cmd Command Prompt
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\User>cd c:\os

c:\OS>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\OS

29/09/2020 13:44 <DIR> .
29/09/2020 13:44 <DIR> ..
29/09/2020 13:44 <DIR> Bochs-2.3.5
12/09/2019 16:11 <DIR> Dev-Cpp
17/12/2008 00:08 1.096.291 i386.pdf
12/09/2019 16:11 <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
   4 File(s)    2.659.809 bytes
   5 Dir(s)  21.489.397.760 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\LAB1

c:\OS\LAB\LAB1>
```

- c. Cobalah untuk membuka file tersebut dengan perintah berikut, dari ‘COMMAND PROMPT’, ketikkan ‘Notepad boot.asm’ dan tekan <ENTER>

```

C:\OS>Command Prompt
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\User>cd c:\os

c:\os>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\os

29/09/2020 13:44    <DIR>      .
29/09/2020 13:44    <DIR>      ..
29/09/2020 13:44    <DIR>      Bochs-2.3.5
12/09/2019 16:11    <DIR>      Dev-Cpp
17/12/2008 00:08        1.096.291 i386.pdf
12/09/2019 16:11    <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 w1nima81.exe
                           4 File(s)   2.659.809 bytes
                           5 Dir(s)  21.489.397.760 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/LAB1

c:\os\LAB\LAB1>Notepad boot.asm

c:\os\LAB\LAB1>

```

bootasm - Notepad

```

File Edit Format View Help
; *****
; LAB-1 : boot-strap loader - real mode
; untuk memindahkan file OS dari floppy disk format DOS FA
;

; 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	db 0x01
ReservedSectors	dw 0x0001
TotalFATs	db 0x02

Sekilas tentang Makefile

- a. Membuka file ‘Makefile’ lewat cmd dengan cara masuk ke direktori ‘C:\OS\LAB\LAB1’ selanjutnya ketik ‘Notepad M’ tekan tombol ‘TAB’ sehingga muncul ‘Notepad Makefile’ dan tekan <ENTER>.

```

c:\ Command Prompt
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\User>cd c:\os

c:\OS>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\os

29/09/2020 13:44 <DIR> .
29/09/2020 13:44 <DIR> ..
29/09/2020 13:44 <DIR> Bochs-2.3.5
12/09/2019 16:11 <DIR> Dev-Cpp
17/12/2008 00:08 1.096.291 i386.pdf
12/09/2019 16:11 <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 winhama81.exe
   4 File(s) 2.659.809 bytes
   5 Dir(s) 21.489.397.760 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\LAB1

c:\OS\LAB\LAB1>Notepad boot.asm

c:\OS\LAB\LAB1>Notepad Makefile

c:\OS\LAB\LAB1>

```

```

Makefile - Notepad
File Edit Format View Help
#
# 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 *.bin boot kernel

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

```

- b. Bukalah ‘Command Prompt’ dan buka direktori kerja ‘LAB1’ selanjutnya ketik ‘make fp.disk’. Periksa hasil kompilasi dengan memasukan perintah ‘dir’, sekarang pada direktori kerja terdapat tambahan file baru, yaitu ‘boot.bin’ dan isinya sudah disalin ke dalam bootsector ‘floppya.img’.

```

c:\ Command Prompt
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\LAB1

c:\OS\LAB\LAB1>Notepad boot.asm

c:\OS\LAB\LAB1>Notepad Makefile

c:\OS\LAB\LAB1>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawrite dd for windows version 0.5.
Written by John Newbigin <jnewb@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>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\OS\LAB\LAB1

29/09/2020 13:44 <DIR> .
29/09/2020 13:44 <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
29/09/2020 13:55 512 boot.bin
16/09/2015 07:51 512 boots.bin
15/12/2008 00:47 78 dosfp.bat
29/09/2020 13:55 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) 1.510.127 bytes
   2 Dir(s) 21.496.504.320 bytes free

c:\OS\LAB\LAB1>

```

Mengenal ‘BOOT DISK’

- Hapuslah file ‘floppya.img’ jika sudah ada pada direktori kerja anda, dari ‘Command Prompt’ (lakukan dari direktori kerja) ketik ‘del floppya.img /P’ lanjutkan dengan tekan ‘Y’ dan <ENTER>. Pastikan bahwa file udah benar- benar terhapus dengan perintah ‘dir’.

```
Command Prompt
2 Dir(s) 21.496.504.320 bytes free
c:\OS\LAB\LAB1>del floppya.img/P
Could Not Find c:\OS\LAB\LAB1\floppya.img

c:\OS\LAB\LAB1>del floppya.img/P
Could Not Find c:\OS\LAB\LAB1\floppya.img

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

c:\OS\LAB\LAB1>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

Directory of c:\OS\LAB\LAB1

29/09/2020 13:58 <DIR> .
29/09/2020 13:58 <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
29/09/2020 13:55 512 boot.bin
16/09/2015 07:51 512 boots.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
9 File(s) 35.567 bytes
2 Dir(s) 21.496.930.304 bytes free

c:\OS\LAB\LAB1>
```

Selanjutnya panggil ‘bximage’ sehingga ditampilkan window seperti pada gambar.

```
Command Prompt - bximage
c:\OS\LAB\LAB1>del floppya.img/P
c:\OS\LAB\LAB1\floppya.img, Delete (Y/N)? Y

c:\OS\LAB\LAB1>dir
Volume in drive C is OS
Volume Serial Number is C4BE-7550

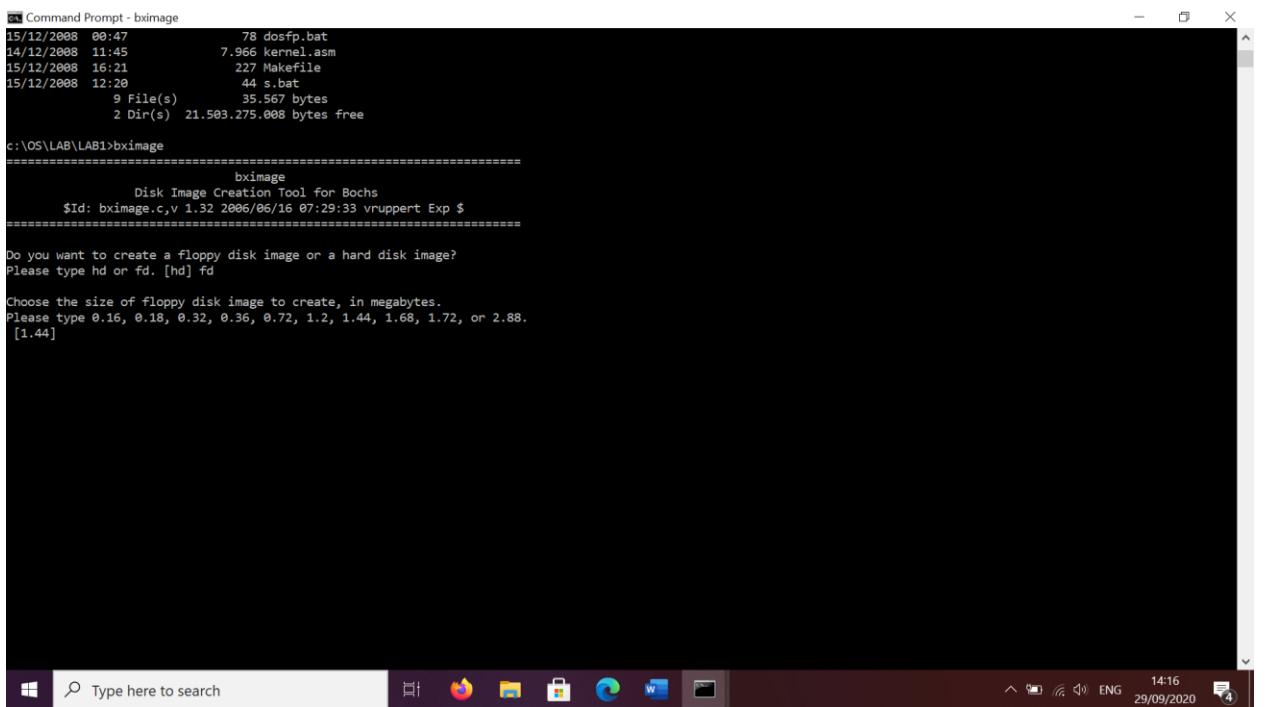
Directory of c:\OS\LAB\LAB1

29/09/2020 13:58 <DIR> .
29/09/2020 13:58 <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
29/09/2020 13:55 512 boot.bin
16/09/2015 07:51 512 boots.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
9 File(s) 35.567 bytes
2 Dir(s) 21.496.930.304 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]
```

- b. Kita akan membuat floppy image (karena ukuran filenya lebih kecil), selanjutnya ketikan ‘fd’ dan tekan <ENTER>.



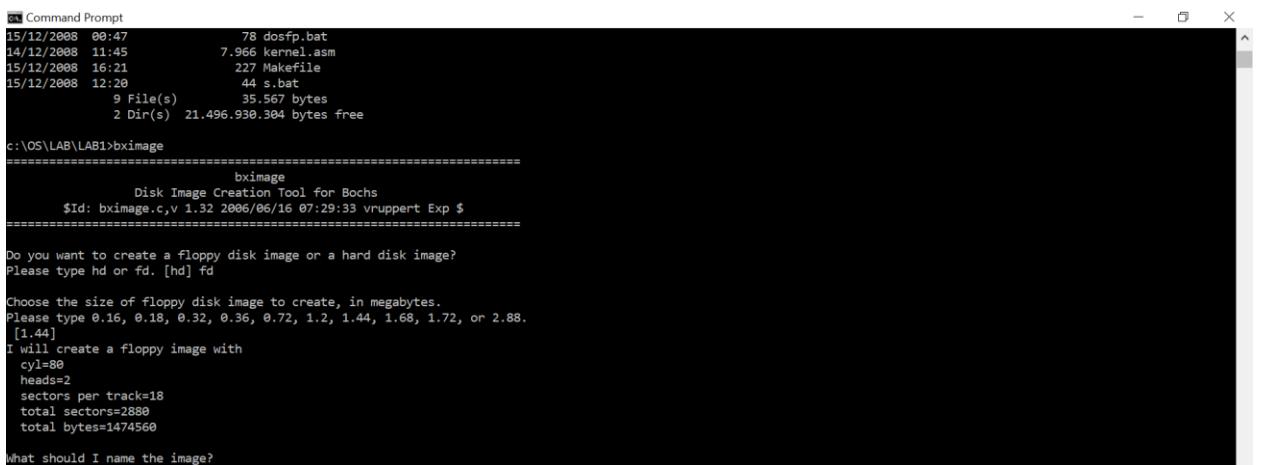
```
c:\ Command Prompt - bximage
15/12/2008 00:47      78 dosfp.bat
14/12/2008 11:45      7.966 kernel.asm
15/12/2008 16:21      227 Makefile
15/12/2008 12:20      44 s.bat
      9 File(s)      35.567 bytes
      2 Dir(s)  21.503.275.008 bytes free

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] 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]
```

- c. Pilih tipe floppy dengan kapasitas ‘1.44MB’, ditunjukan oleh angka [1.44], selanjutnya tekan <ENTER>.



```
c:\ Command Prompt
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
      9 File(s)      35.567 bytes
      2 Dir(s)  21.496.930.304 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] 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?
```

- d. Berikan nama file, ketikan ‘floppya.img’ dan <ENTER>.

```

c:\ Command Prompt
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 12:28          44 s.bat
      9 File(s)       35.567 bytes
     2 Dir(s)  21.496.930.304 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] 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:
  floppy: image="floppya.img", status=inserted
(The line is stored in your windows clipboard, use CTRL-V to paste)

Press any key to continue
c:\OS\LAB\LAB1>

```

File image floppy ‘floppya.img’ yang dibuat dengan langkah di atas belum dapat digunakan, karena belum di ‘FORMAT’, seperti pada floppy sebenarnya jika belum di format floppy tidak dapat dibaca. Langkah –langkah untuk memformat ‘floppya.img’ adalah:

- Jalankan PC-Simulator dari ‘Command Prompt’ dengan perintah ‘DosFp’.

```

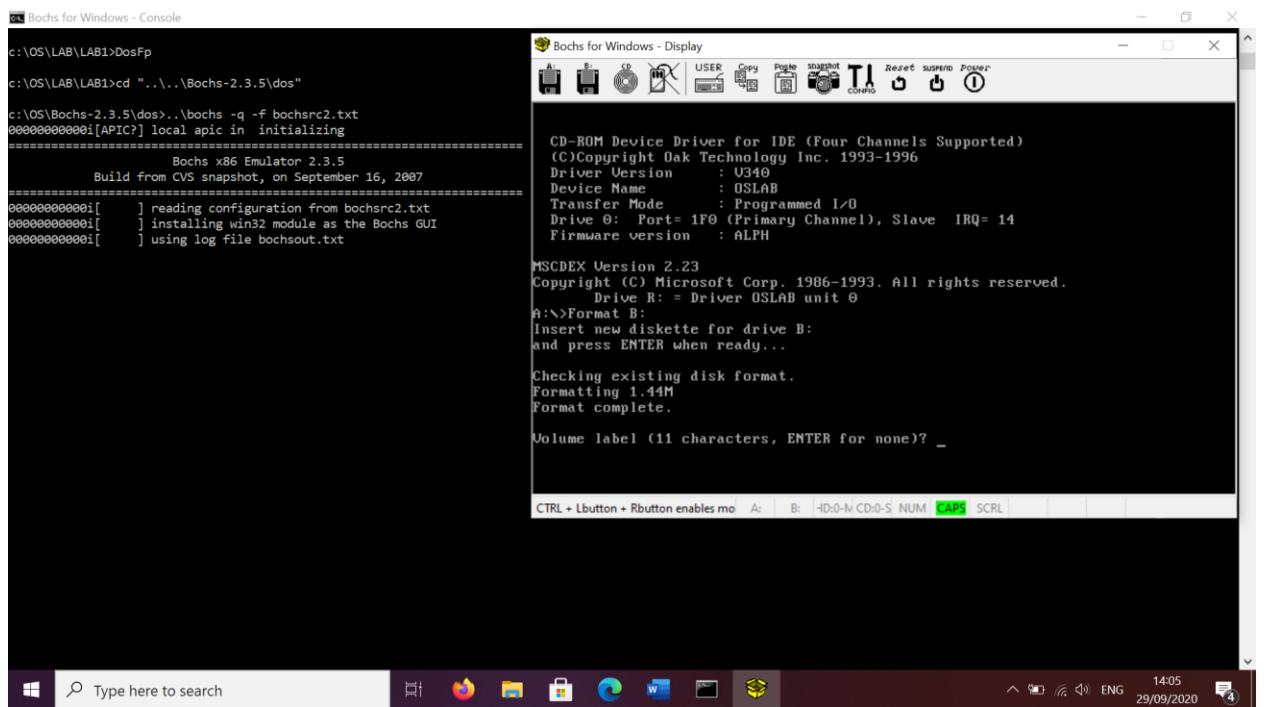
c:\ Bochs for Windows - Console
c:\OS\LAB\LAB1>DOSFp
c:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
c:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
00000000001[APIC?] local apic in initializing
=====
          Bochs x86 Emulator 2.3.5
          Build from CVS snapshot, on September 16, 2007
=====
00000000001[    ] reading configuration from bochsrc2.txt
00000000001[    ] installing win32 module as the Bochs GUI
00000000001[    ] using log file bochcout.txt

c:\ Bochs for Windows - Display
A: B: C: USER COPY Page snapshot TI Reset Suspend POWER
CD-ROM Device Driver for IDE (Four Channels Supported)
(C)Copyright Oak Technology Inc. 1993-1996
Driver Version   : U340
Device Name     : OSLAB
Transfer Mode   : Programmed I/O
Drive 0: Port= 1F0 (Primary Channel), Slave IRQ= 14
Firmware version : ALPH

MSCDEX Version 2.23
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
Drive A: = Driver OSLAB unit 0
A:>_

```

- b. Pada konfigurasi PC-Simulator file ‘floppya.img’ terpasang pada ‘drive B:’. Selanjutnya dari prompt ‘A:>’ ketikan ‘Format B:’ <ENTER> [2x]



- c. Tutup kembali PC-Simulator dengan klik pada tombol power, di bagian menu atas-kanan.

Melihat data dalam boot sector

- a. Copy 512 byte data bootsektor ke dalam sebuah file terpisah, caranya dari ‘Command Prompt’ ketik ‘dd if=floppya.img of=boots.bin count=1’ maksud dari perintah ini adalah menyalin byte data dari file ‘floppya.img’ ke dalam file ‘boots.bin’ sebanyak satu sektor mulai dari sektor 0.

```

os Command Prompt
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

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
# 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
rawrite 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>

```



Untuk melihat isinya jalankan ‘Command Prompt’ dan ketik ‘debug boots.bin’ dan <ENTER> (Perlu diketahui untuk mengakhiri debug ketikkan ‘quit’ kemudian enter).

- b. Dari ‘Command Prompt’ ketikan ‘tdump boots.bin’ <ENTER>.

```

os Command Prompt
1+0 records out

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

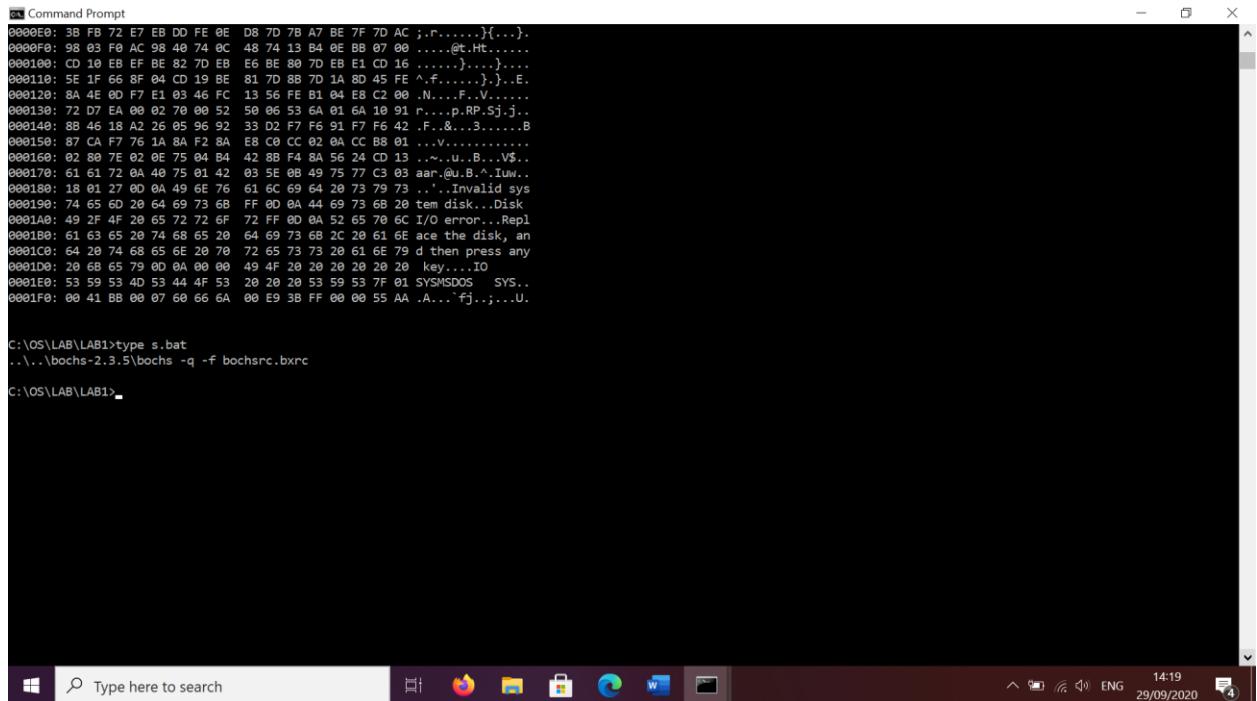
000000: EB 3C 90 4D 53 57 49 4E 34 2E 31 00 02 01 01 00 .<.MSWIN4.1.....
000010: 02 E8 00 48 0B F0 09 00 12 00 02 00 00 00 00 00 ...@......
000020: 00 00 00 00 00 29 F7 15 3F 0C 4E 4F 20 4E 41 .....)?NO NA
000030: 4D 45 20 20 20 20 46 41 54 31 32 20 20 33 C9 ME .FAT12 3.
000040: 8E D1 BC FC 7B 16 07 BD 78 00 C5 76 00 1E 56 16 ....,{...x..v..v.
000050: 55 BF 22 05 89 7E 00 89 4E 02 B1 08 FC F3 A4 06 U."~.N.....
000060: 1F BD 00 7C C6 45 FE 0F 38 4E 24 7D 20 88 C1 99 ...|E..8N$) ...
000070: E8 7E 01 83 EB 3A 66 A1 1C 7C 66 3B 07 8A 57 FC .~....f;..W.
000080: 75 06 80 CA 02 88 56 02 80 C3 10 73 ED 33 C9 FE U.....V....s.3..
000090: 00 D8 7D 8A 46 10 98 F7 66 16 03 46 1C 13 56 1E ..}..F...f..F..V.
0000A0: 03 46 0E 13 D1 88 76 11 60 89 46 FC 89 56 FE B8 .F..v..F..V..
0000B0: 20 00 F7 E6 8B 5E 0B 03 C3 48 F7 F3 01 46 FC 11 .....^..H..F..
0000C0: 00 E6 61 BF 00 07 E8 28 01 72 3E 38 2D 74 17 60 N.a....(r>x8-t`.
0000D0: B1 00 BF D8 7D F3 A6 61 74 3D 4E 74 00 83 C7 20 ....}.at=Nt...
0000E0: 3B FB 72 E7 EB DD FE 0E D8 7D 7B A7 BE 7F 7D AC ;.r.....){....}.
0000F0: 98 03 F0 AC 98 40 74 0C 48 74 13 B4 0E BB 07 00 ....@.Ht....
000100: CD 1B EB EF BE 82 7D EB E6 B8 80 7D EB E1 CD 16 .....}..}.
000110: 5E 1F 66 8F 04 CD 19 BE 81 7D 8B 70 1A 8D 45 FE ^..f.....}..E.
000120: 8A 4E 00 F7 E1 03 46 FC 13 56 FE F7 B1 04 E8 C2 00 N....F..V....
000130: 72 D7 EA 00 02 70 00 52 50 86 53 6A 01 6A 10 91 r....p.RP.Sj.j..
000140: 8B 46 18 A2 26 05 96 92 33 D2 F7 F6 91 F7 F6 42 .F..&...3.....B
000150: 87 CA F7 76 1A 8A F2 8A E8 C0 CC 02 0A CC B8 01 ....V.....
000160: 02 88 7E 02 0E 75 B4 84 42 8B F4 8A 56 24 CD 13 ..~..u..B...V$..
000170: 61 61 72 0A 40 75 01 42 03 5E 0B 49 75 77 C3 03 aar.@u.B.^Iw..
000180: 18 01 27 00 0A 49 6E 76 61 6C 69 64 20 73 79 73 ..'Invalid sys
000190: 74 65 6D 20 64 69 73 6B FF 00 0A 44 69 73 6B 20 tem disk...Disk
0001A0: 49 2F 4F 28 65 72 72 6F 72 FF 00 0A 52 65 70 6C I/O error...Repl
0001B0: 61 63 65 20 74 68 65 64 69 73 6B 2C 28 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 68 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 SYMSDOS  SYS..
0001F0: 00 41 BB 00 07 60 66 6A 00 E9 3B FF 00 00 55 AA .A...`fj...;..U.

```



‘Boot’ PC-Simulator dengan file image ‘floppya.img’

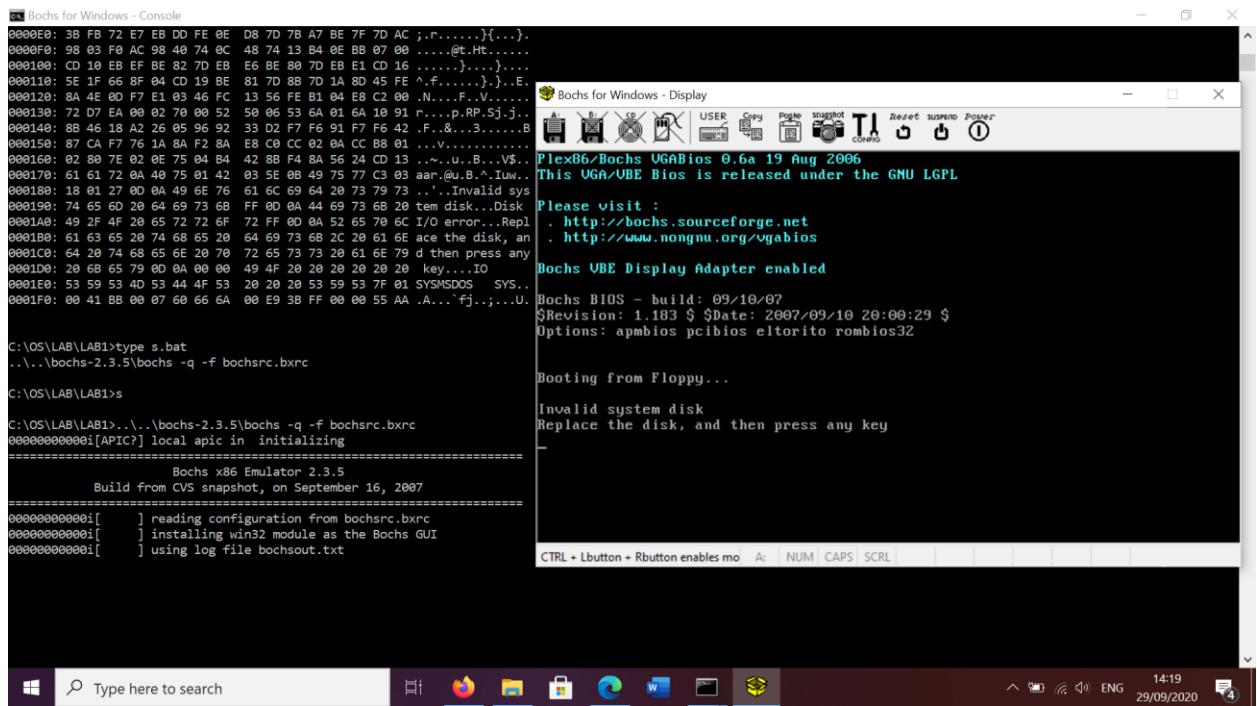
- Lihat isi file ‘s.bat’ dengan perintah ‘type s.bat’ <ENTER>



```
cmd Command Prompt
0000E0: 3B FB 72 E7 EB DD FE 0E D8 7D 7B A7 BE 7F 7D AC ;r.....}{..}.
0000F0: 98 03 F0 AC 98 48 74 0C 48 74 13 B4 0E BB 07 00 .....@.Ht.....
000100: CD 18 EB EF BE 82 7D EB E6 B8 80 7D EB E1 CD 16 .....}{..}.
000110: 5E 1F 68 8F 04 CD 19 BE 81 7D 8B 7D 1A 8D 45 FE ^f.....}{..}.E.
000120: 8A 4E 00 F7 E1 03 46 FC 13 56 FE B1 04 EB 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: 88 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 C8 CC 02 0A CC B8 01 .....v.....
000160: 02 88 7E 02 0E 79 04 B4 42 8B F4 8A 56 24 CD 13 ..~..u.B..VS..
000170: 61 61 72 0A 40 75 01 42 03 5E 0B 49 75 77 C3 03 aar:@.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 28 64 69 73 6B FF 0D 0A 44 69 73 6B 28 tem disk...Disk
0001A0: 49 2F 4F 28 65 72 72 6F 72 FF 0D 0A 52 65 70 6C I/O error...Repl
0001B0: 61 63 65 28 74 68 65 20 64 69 73 6B 2C 20 61 6E ace the disk, an
0001C0: 64 28 74 68 65 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 key...IO
0001E0: 53 59 53 4D 53 44 4F 53 20 20 20 53 59 53 7F 01 SYMSDOS 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>type s.bat
..\\bochs-2.3.5\bochs -q -f bochssrc.bxrc
C:\OS\LAB\LAB1>

- Selanjutnya masukan perintah ‘s’ <ENTER>, akan ditampilkan windows ‘Bochs for windows – display’ yang sedang melakukan proses ‘booting’ namun tidak berhasil karena tidak menemukan diskboot.



```
cmd Bochs for Windows - Console
0000E0: 3B FB 72 E7 EB DD FE 0E D8 7D 7B A7 BE 7F 7D AC ;r.....}{..}.
0000F0: 98 03 F0 AC 98 48 74 0C 48 74 13 B4 0E BB 07 00 .....@.Ht.....
000100: CD 18 EB EF BE 82 7D EB E6 B8 80 7D EB E1 CD 16 .....}{..}.
000110: 5E 1F 68 8F 04 CD 19 BE 81 7D 8B 7D 1A 8D 45 FE ^f.....}{..}.E.
000120: 8A 4E 00 F7 E1 03 46 FC 13 56 FE B1 04 EB 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: 88 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 C8 CC 02 0A CC B8 01 .....v.....
000160: 02 88 7E 02 0E 79 04 B4 42 8B F4 8A 56 24 CD 13 ..~..u.B..VS..
000170: 61 61 72 0A 40 75 01 42 03 5E 0B 49 75 77 C3 03 aar:@.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 28 64 69 73 6B FF 0D 0A 44 69 73 6B 28 tem disk...Disk
0001A0: 49 2F 4F 28 65 72 72 6F 72 FF 0D 0A 52 65 70 6C I/O error...Repl
0001B0: 61 63 65 28 74 68 65 20 64 69 73 6B 2C 20 61 6E ace the disk, an
0001C0: 64 28 74 68 65 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 key...IO
0001E0: 53 59 53 4D 53 44 4F 53 20 20 20 53 59 53 7F 01 SYMSDOS 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>type s.bat
..\\bochs-2.3.5\bochs -q -f bochssrc.bxrc
C:\OS\LAB\LAB1>..\\bochs-2.3.5\bochs -q -f bochssrc.bxrc
000000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[] reading configuration from bochssrc.bxrc
000000000001[] installing win32 module as the Bochs GUI
000000000001[] using log file bochsout.txt

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.hongnu.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...

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

CTRL + Lbutton + Rbutton enables mo A: NUM CAPS SCRL

‘Floppya.img’ belum terisi ‘system file’ atau ‘kernel’ sehingga proses boot gagal.

- c. Format ‘floppya.img’ dan tambahkan ‘system file’ ke dalamnya. Panggil ‘DosFp’ <ENTER>. Pada windows ‘Bochs’ masukan perintah ‘A:>format B:/S’ <ENTER>, selesaikan proses format dan berikan nama label disk.

```

Bochs for Windows - Console
0001E0: 53 59 53 4D 53 44 4F 53 20 20 20 53 59 53 7F 01 SYMSDOS  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>type s.bat
..\bochs-2.3.5\bochs -q -f bochsrc.bxrc

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 bochcout.txt
# In bx_win32_gui_c::exit(void)

Bochs is exiting with the following message:
[WGUI ] Window closed, exiting!
=====

Bochs is exiting. Press ENTER when you're ready to close this window.

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 bochcout.txt
=====

Bochs for Windows - Display
=====
MSCDEX Version 2.23
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
Drive B: = 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 2975-1602
Format another (Y/N)?n
CTRL + Lbutton + Rbutton enables mo A: B: CD:0-N NUM CAPS SCRL
=====

14:21 29/09/2020

```

Untuk memastikan bahwa floppy pada drive ‘B:’ terisi dengan ‘system file’, periksa dengan perintah berikut ‘A:>dir B:’ <ENTER>.

```

Bochs for Windows - Console
0001E0: 53 59 53 4D 53 44 4F 53 20 20 20 53 59 53 7F 01 SYMSDOS  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>type s.bat
..\bochs-2.3.5\bochs -q -f bochsrc.bxrc

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 bochcout.txt
# In bx_win32_gui_c::exit(void)

Bochs is exiting with the following message:
[WGUI ] Window closed, exiting!
=====

Bochs is exiting. Press ENTER when you're ready to close this window.

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 bochcout.txt
=====

Bochs for Windows - Display
=====
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 2975-1602
Format another (Y/N)?n
Format another (Y/N)?n

A:>dir B:
Volume in drive B has no label
Volume Serial Number is 2975-1602
Directory of B:\

COMMAND   COM      94,292  05-05-03 21:22
          1 file(s)      94,292 bytes
          0 dir(s)     1,235,968 bytes free
A:>
CTRL + Lbutton + Rbutton enables mo A: B: CD:0-N NUM CAPS SCRL
=====

14:22 29/09/2020

```

- d. Coba untuk menggunakan ‘floppya.img’ sebagai ‘boot disk’ lagi, ketik ‘S’ <ENTER>.

