

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

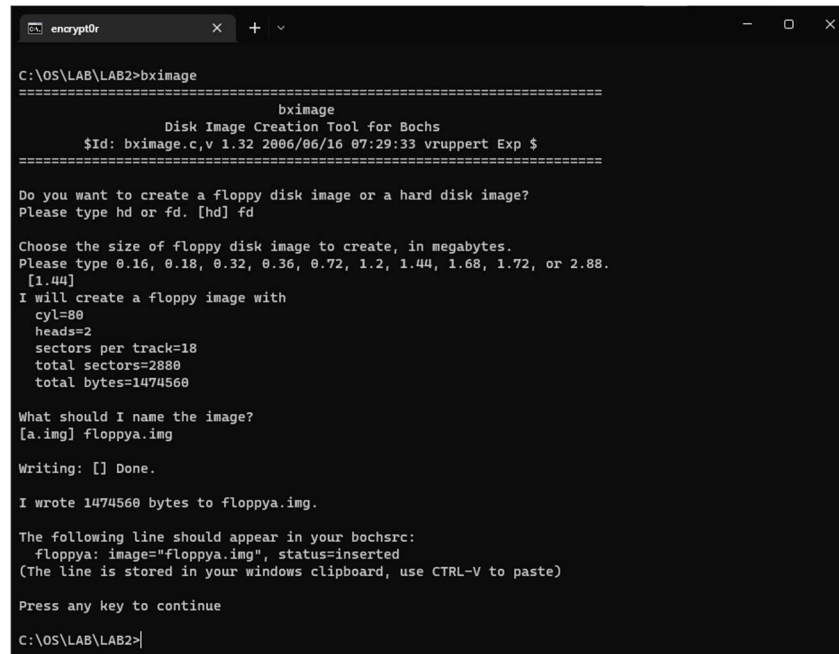


Disusun Oleh :
MUHAMMAD WAHYU SYAFI'UDDIN
L200210056

PROGRAM STUDI TEKNIK INFORMATIKA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
UNIVERSITAS MUHAMMADIYAH SURAKARTA
TAHUN 2021/2022

A. Langkah – langkah

1. Menyiapkan file **floppya.img** dengan bimage



```
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] floppya.img

Writing: [] Done.

I wrote 1474560 bytes to floppya.img.

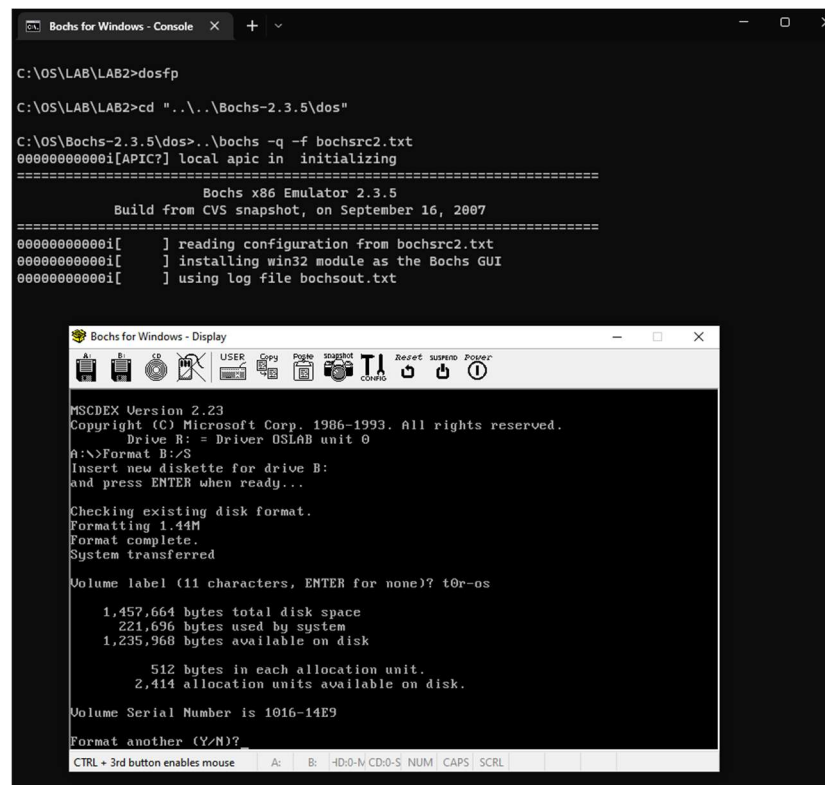
The following line should appear in your bochsrc:
floppya: image="floppya.img", status=inserted
(The line is stored in your windows clipboard, use CTRL-V to paste)

Press any key to continue

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

Gambar 2.1 – Menyiapkan floppya.img

2. Memformat **floppya.img** dan mengisinya dengan operasi DOS versi 7



```
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
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

Bochs for Windows - Display

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)? t0r-os

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

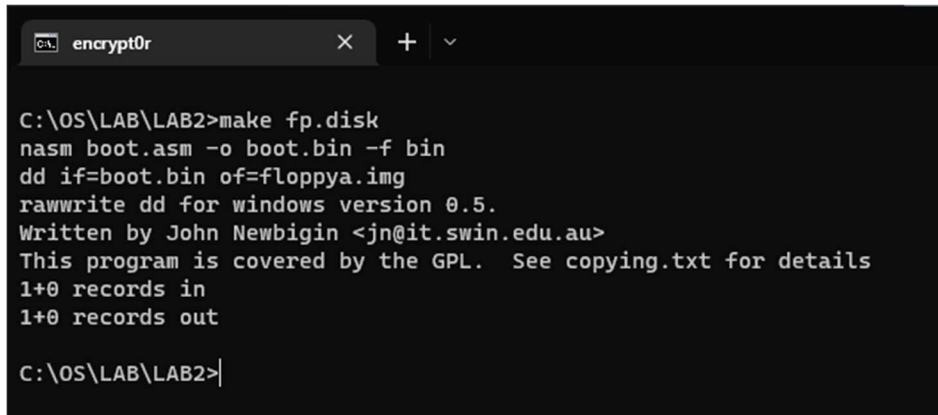
          512 bytes in each allocation unit.
          2,414 allocation units available on disk.

Volume Serial Number is 1016-14E9
Format another (Y/N)?

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

Gambar 2.2 – Memformat floppya.img

3. Kompilasi source code **boot.asm** dan memindah ke bootsector **floppya.img**

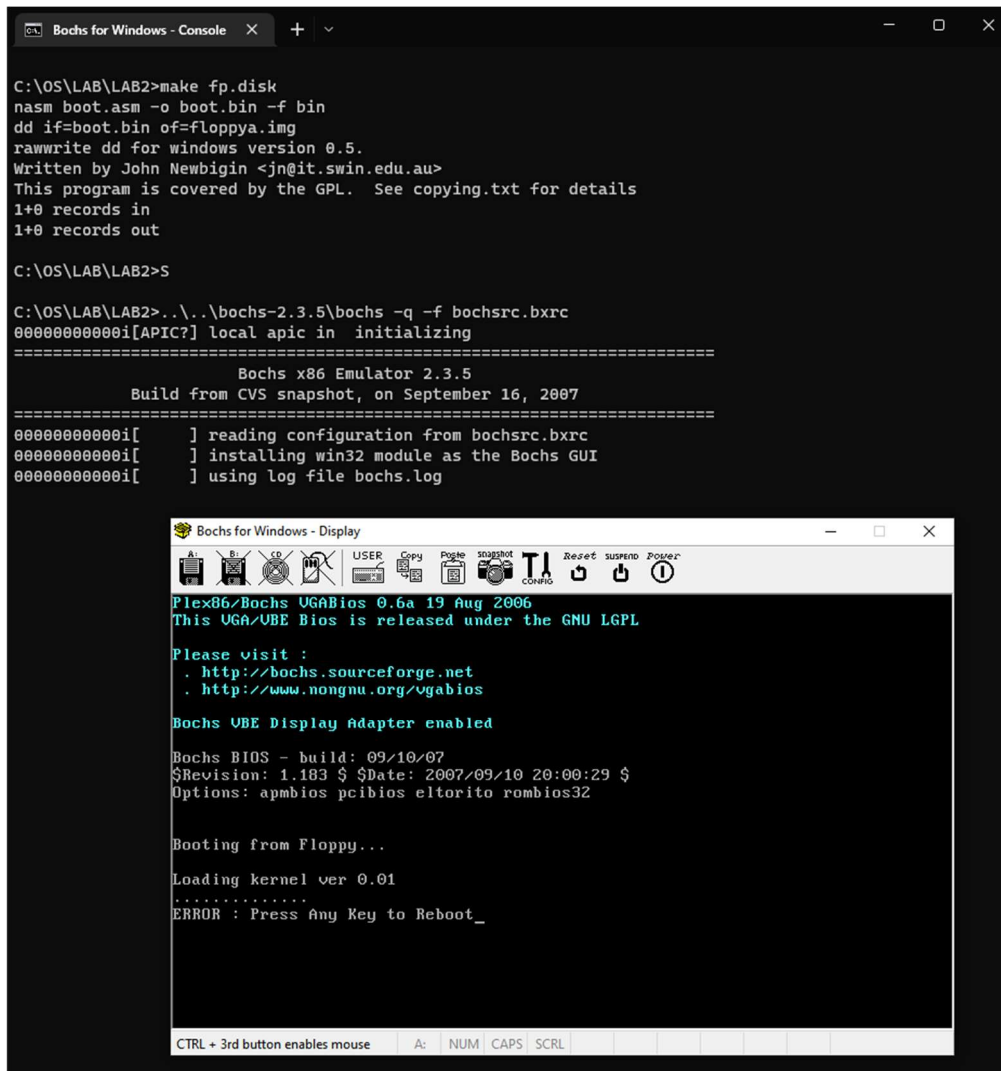


```
C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbigin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

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

Gambar 2.3 – Mengkompile boot.asm

4. Booting pertama dengan Bootloader yang baru



```
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
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 bochs.log

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

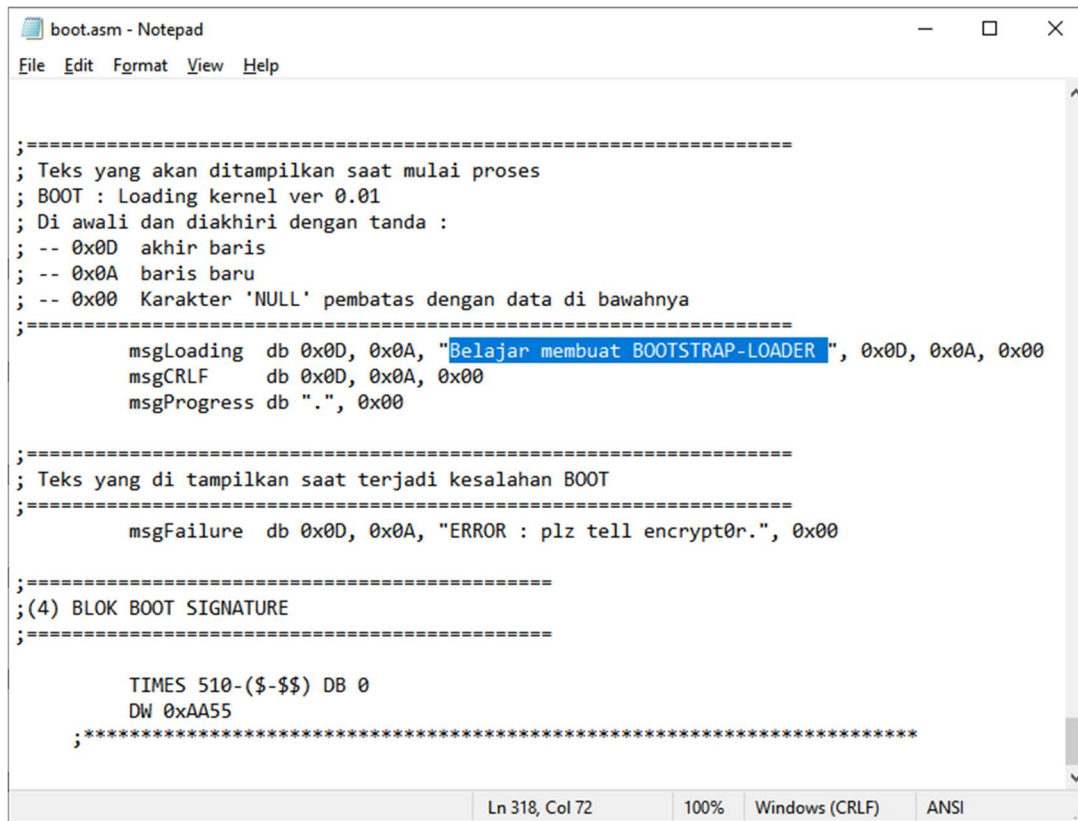
Bochs BIOS - build: 09/10/07
$Revision: 1.183 $ $Date: 2007/09/10 20:00:29 $
Options: apmbios pcibios eltorito rombios32

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

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

Gambar 2.4 – Booting pertama

5. Menyunting file **boot.asm**

A screenshot of a Notepad window titled 'boot.asm - Notepad'. The window shows assembly code for a boot sector. The code includes comments in Indonesian and several data definitions. The status bar at the bottom indicates 'Ln 318, Col 72', '100%', 'Windows (CRLF)', and 'ANSI'.

```
;=====
; 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, "Belajar membuat BOOTSTRAP-LOADER", 0x0D, 0x0A, 0x00
msgCRLF db 0x0D, 0x0A, 0x00
msgProgress db ".", 0x00

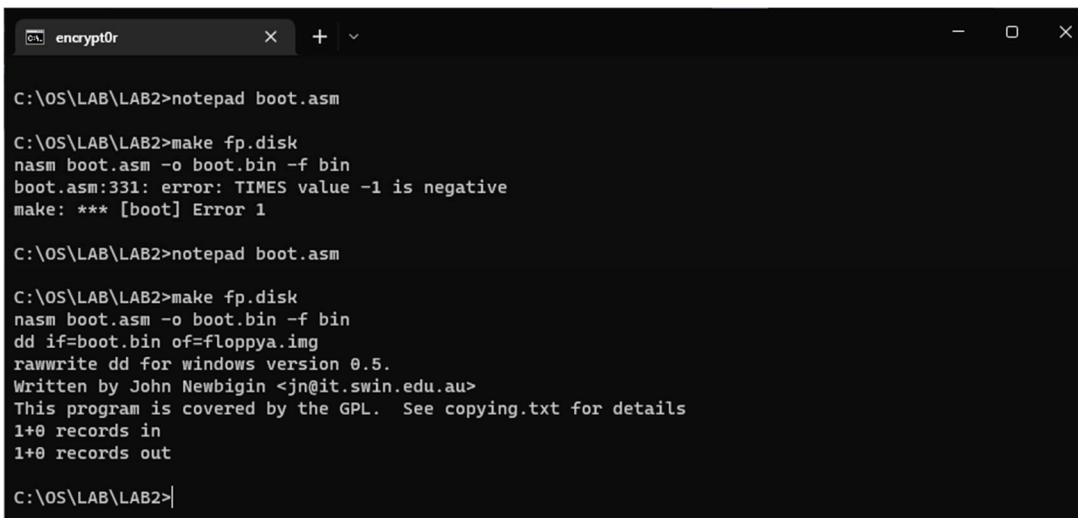
;=====
; Teks yang di tampilkan saat terjadi kesalahan BOOT
;=====
msgFailure db 0x0D, 0x0A, "ERROR : plz tell encrypt0r.", 0x00

;=====
;(4) BLOK BOOT SIGNATURE
;=====

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

Gambar 2.5 – Memodifikasi boot.asm

6. Mengkompilasi ulang file **boot.asm**

A screenshot of a terminal window titled 'encrypt0r'. It shows the process of compiling boot.asm using nasm and dd. The first attempt fails with an error: 'boot.asm:331: error: TIMES value -1 is negative'. The second attempt shows the successful creation of boot.bin and floppy.img files.

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

C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
boot.asm:331: error: TIMES value -1 is negative
make: *** [boot] Error 1

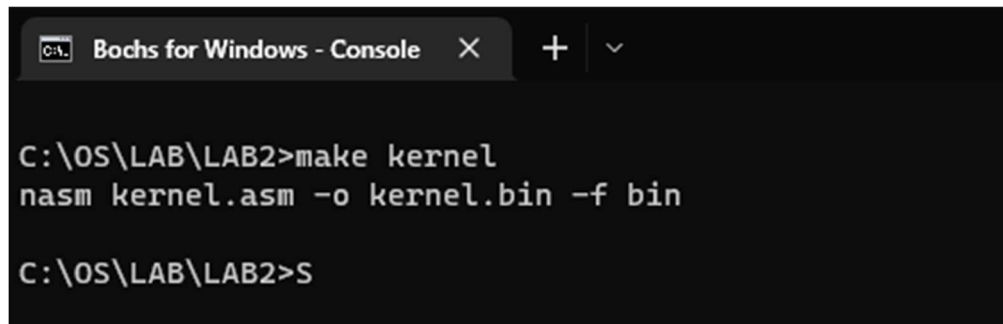
C:\OS\LAB\LAB2>notepad boot.asm

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>
```

Gambar 2.6 – Mengkompilasi ulang boot.asm

7. Menyiapkan **kernel.bin** dengan perintah **make kernel**

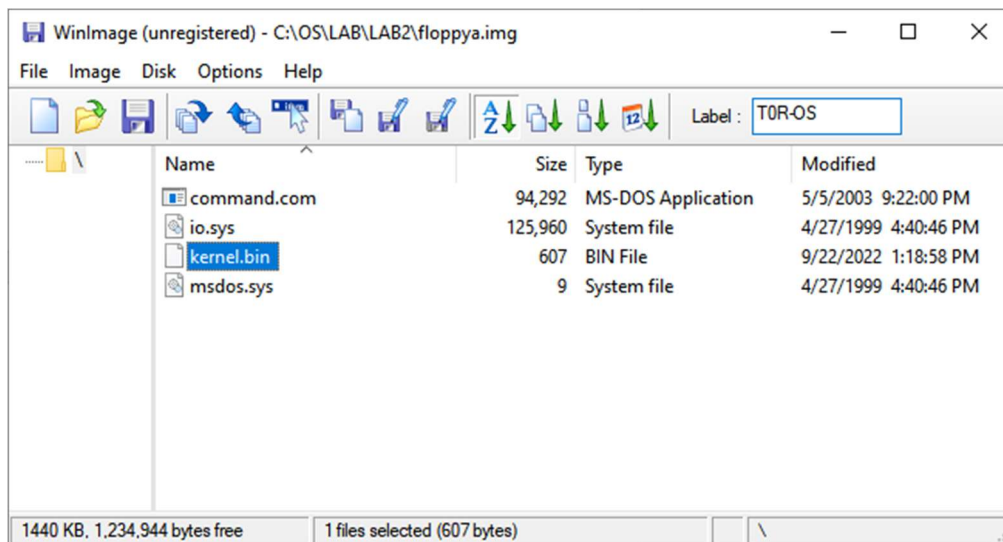


```
C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin

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

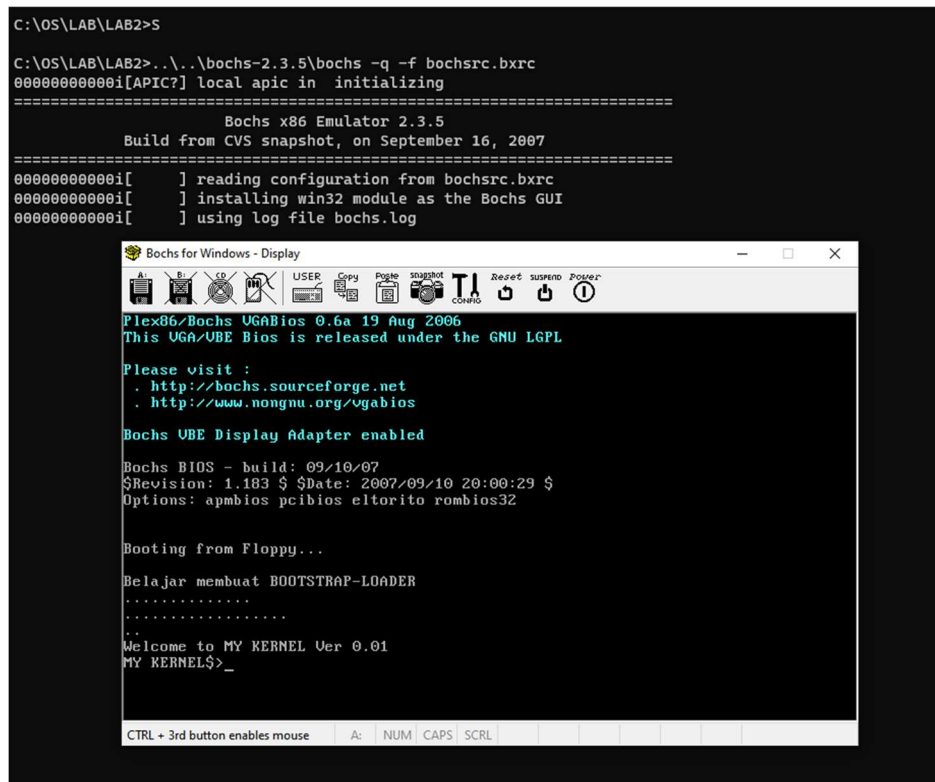
Gambar 2.7 – Mengkompile kernel.asm

8. Memindahkan file **kernel.bin** ke **floppya.img** dengan menggunakan WinImage



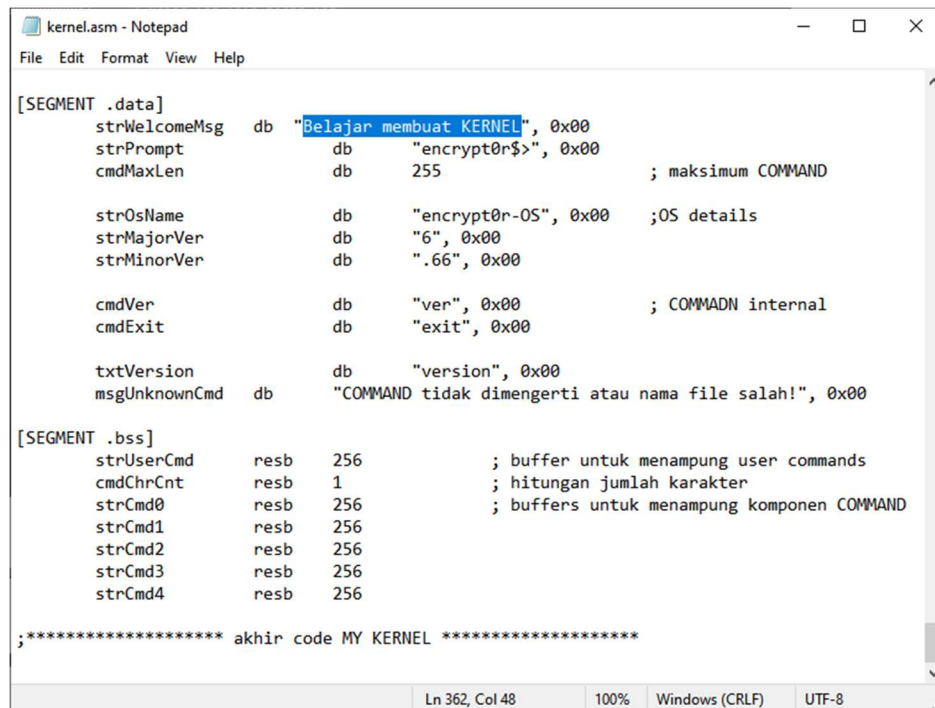
Gambar 2.8 – Memindahkan kernel.bin

9. Boot kedua dengan menambahkan kernel ke **floppya.img**



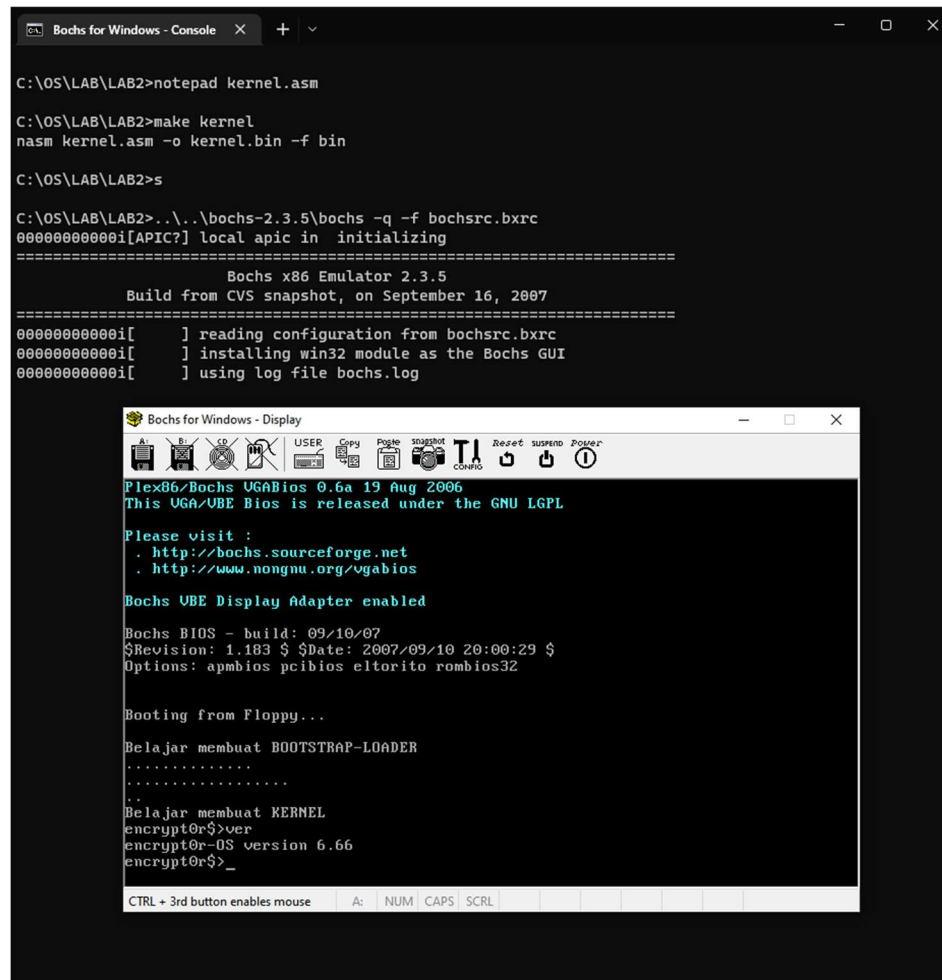
Gambar 2.9 – Boot kedua

10. Memodifikasi file **kernel.asm**, dan mengcompile serta memindahkan ke **floppya.img**



Gambar 2.10 – Memodifikasi kernel.asm

11. Boot terakhir dengan file kernel yang telah dimodifikasi



```
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>s

C:\OS\LAB\LAB2>..\..\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 bochs.log

Bochs for Windows - Display
Plex86/Bochs UGABios 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/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
encrypt0r$>ver
encrypt0r-OS version 6.66
encrypt0r$>_

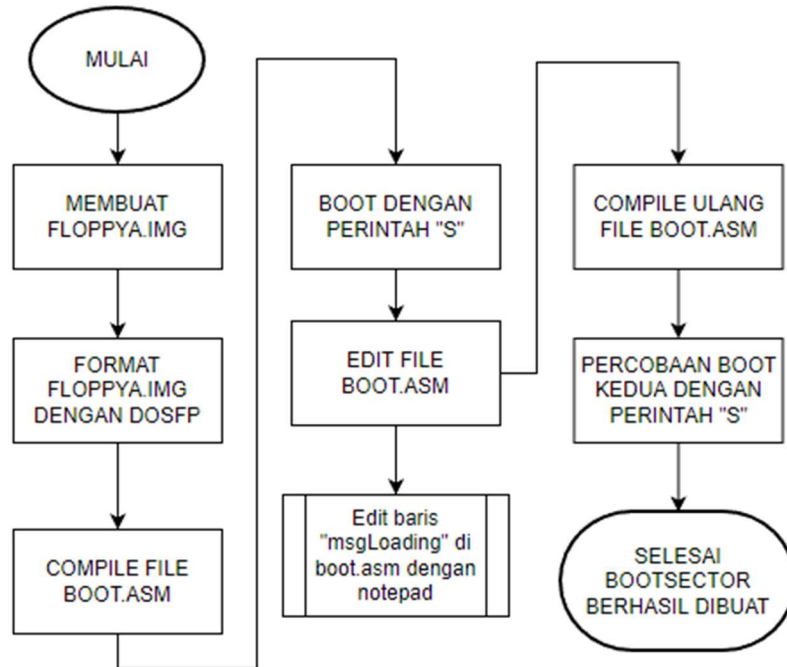
CTRL + 3rd button enables mouse | A: | NUM | CAPS | SCRL |
```

Gambar 2.11 – Boot Terakhir

12. Selesai

B. Tugas

1. Pelajari cara kerja **boot.asm** buatlah algoritma dari program tersebut dalam bentuk Flowchart. Untuk memudahkan dalam memahami proses boot buatlah dua jenis algoritma, pertama buat algoritma yang bersifat global dan kedua buat algoritma yang bersifat lebih detail.



2. Lakukan hal yang sama untuk program **kernel.asm**

