

LAPORAN PRAKTIKUM SISTEM OPERASI

MODUL 1-10

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KELAS : E

LAPORAN PRAKTIKUM MODUL 1

1. Memanggil direktori OS

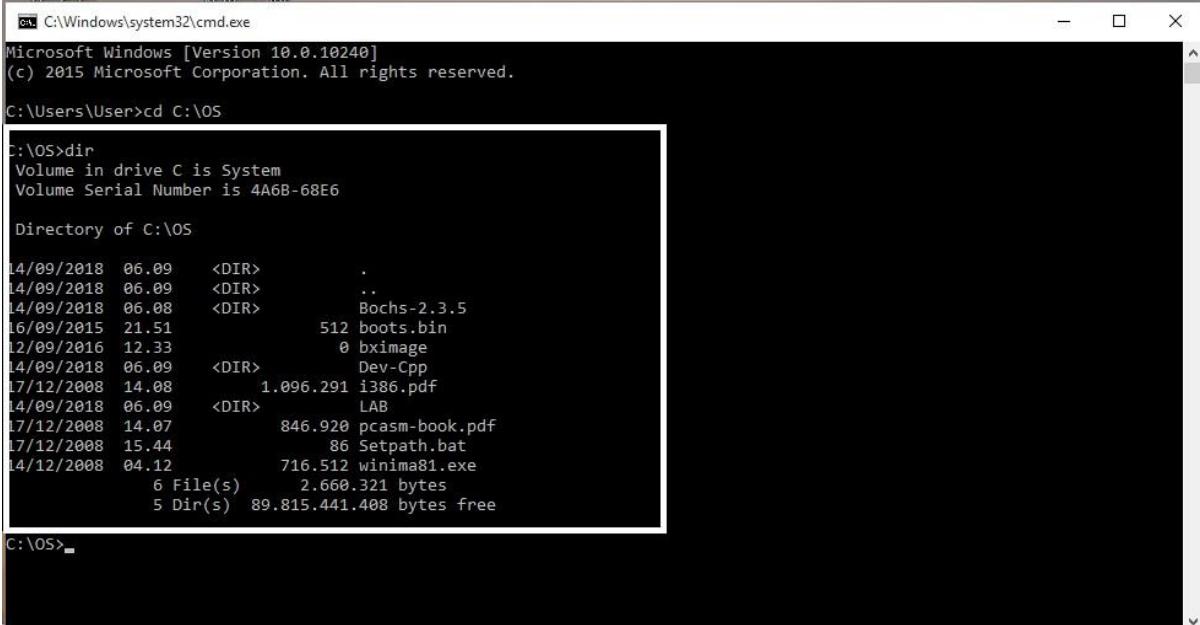


```
cmd Select C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:\OS

C:\OS>
```

2. Melihat isi direktori



```
cmd Select C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:\OS

C:\OS>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS

14/09/2018  06.09    <DIR>          .
14/09/2018  06.09    <DIR>          ..
14/09/2018  06.08    <DIR>          Bochs-2.3.5
16/09/2015  21.51            512 boots.bin
12/09/2016  12.33            0 bximage
14/09/2018  06.09    <DIR>          Dev-Cpp
17/12/2008  14.08            1.096.291 i386.pdf
14/09/2018  06.09    <DIR>          LAB
17/12/2008  14.07            846.920 pcasm-book.pdf
17/12/2008  15.44            86 Setpath.bat
14/12/2008  04.12            716.512 winima81.exe
                           6 File(s)   2.660.321 bytes
                           5 Dir(s)  89.815.441.408 bytes free

C:\OS>
```

3. Mengatur setpath

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:\OS

C:\OS>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS

14/09/2018  06.09      <DIR>      .
14/09/2018  06.09      <DIR>      ..
14/09/2018  06.08      <DIR>      Bochs-2.3.5
16/09/2015   21.51          512 boots.bin
12/09/2016  12.33          0 bximage
14/09/2018  06.09      <DIR>      Dev-Cpp
17/12/2008  14.08      1.096.291 i386.pdf
14/09/2018  06.09      <DIR>      LAB
17/12/2008  14.07      846.920 pcasm-book.pdf
17/12/2008  15.44          86 Setpath.bat
14/12/2008  04.12      716.512 winima81.exe
               6 File(s)   2.660.321 bytes
               5 Dir(s)  89.815.441.408 bytes free

C:\OS>type setpath.bat
Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Windows\System32
```

4. Masuk pada direktori Lab/Lab1

```
R C:\Windows\system32\cmd.exe
C:\Users\User>cd C:\OS

C:\OS>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS

14/09/2018  06.09      <DIR>      .
14/09/2018  06.09      <DIR>      ..
14/09/2018  06.08      <DIR>      Bochs-2.3.5
16/09/2015   21.51          512 boots.bin
12/09/2016  12.33          0 bximage
14/09/2018  06.09      <DIR>      Dev-Cpp
17/12/2008  14.08      1.096.291 i386.pdf
14/09/2018  06.09      <DIR>      LAB
17/12/2008  14.07      846.920 pcasm-book.pdf
17/12/2008  15.44          86 Setpath.bat
14/12/2008  04.12      716.512 winima81.exe
               6 File(s)   2.660.321 bytes
               5 Dir(s)  89.815.441.408 bytes free

C:\OS>type setpath.bat
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>
```

5. Melihat isi dari file boot.asm dengan menggunakan notepad

```

C:\Windows\system32\cmd.exe
Volume in drive C is System
Volume Serial Number is 4A6B-68E6
Directory of C:\OS
14/09/2018 06.09 <DIR> .
14/09/2018 06.09 <DIR> ..
14/09/2018 06.08 <DIR> Bochs-2.3.5
16/09/2015 21.51 512 boots.bin
12/09/2016 12.33 0 bximage
14/09/2018 06.09 <DIR> Dev-Cpp
17/12/2008 14.08 1.096.291 i386.pdf
14/09/2018 06.09 <DIR> LAB
17/12/2008 14.07 846.920 pcasm-book.pdf
17/12/2008 15.44 86 Setpath.bat
14/12/2008 04.12 716.512 winim81.exe
               6 File(s) 2.660.321 bytes
               5 Dir(s) 89.815.441.408 bytes free

C:\OS>type setpath.bat
Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Win

C:\OS>cd LAB\LAB1
C:\OS\LAB\LAB1>Notepad boot
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>

```

```

; ****
; 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]

; locat ke label START
jmp START

```

Activate Windows

Go to Settings to activate Windows.

6. Membuka file teks makefile dengan menggunakan makefile, yang di mana berisi kumpulan perintah CMD.

```

C:\Windows\system32\cmd.exe
Volume in drive C is System
Volume Serial Number is 4A6B-68E6
Directory of C:\OS
14/09/2018 06.09 <DIR> .
14/09/2018 06.09 <DIR> ..
14/09/2018 06.08 <DIR> Bochs-2.3.5
16/09/2015 21.51 512 boots.bin
12/09/2016 12.33 0 bximage
14/09/2018 06.09 <DIR> Dev-Cpp
17/12/2008 14.08 1.096.291 i386.pdf
14/09/2018 06.09 <DIR> LAB
17/12/2008 14.07 846.920 pcasm-book.pdf
17/12/2008 15.44 86 Setpath.bat
14/12/2008 04.12 716.512 winim81.exe
               6 File(s) 2.660.321 bytes
               5 Dir(s) 89.815.441.408 bytes free

C:\OS>type setpath.bat
Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Win

C:\OS>cd LAB\LAB1
C:\OS\LAB\LAB1>Notepad boot
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>Notepad Makefile
C:\OS\LAB\LAB1>

```

```

# 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.

```
on C:\Windows\system32\cmd.exe
17/12/2008 15.44          86 Setpath.bat
14/12/2008 04.12          716.512 winim81.exe
  6 File(s)   2.660.321 bytes
  5 Dir(s)  89.815.441.468 bytes free

C:\OS>type setpath.bat
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
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>Notepad Makefile
C:\OS\LAB\LAB1>del floppya.img

C:\OS\LAB\LAB1>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS\LAB\LAB1

18/09/2018 10.20    <DIR>      .
18/09/2018 10.20    <DIR>      ..
12/09/2017 00.48      8.358 bochsout.txt
16/12/2008 06.17      1.628 bochsrc.bxrc
18/10/2016 04.36      14.339 boot.asm
18/10/2016 04.50      512 boot.bin
12/09/2017 00.37      512 boots.bin
17/09/2007 06.22      18.432 bximage.exe
12/09/2017 00.21      10.321.920 c.img
27/02/2007 10.50      342.016 dd.exe
15/12/2008 14.47      78 dosfp.bat
15/12/2008 01.45      7.966 kernel.asm
16/12/2008 06.21      227 Makefile
16/12/2008 02.20      44 s.bat
31/01/2000 19.00      261.120 tdump.exe
  13 File(s)  10.977.152 bytes
  2 Dir(s)  89.815.986.176 bytes free

Activate Windows
Go to Settings to activate Windows.

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

7. Menghapus suatu bootdisk yang bernama floppya.img dan cek pada direktori

```
on C:\Windows\system32\cmd.exe
17/12/2008 15.44          86 Setpath.bat
14/12/2008 04.12          716.512 winim81.exe
  6 File(s)   2.660.321 bytes
  5 Dir(s)  89.815.441.468 bytes free

C:\OS>type setpath.bat
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
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>Notepad Makefile
C:\OS\LAB\LAB1>del floppya.img

C:\OS\LAB\LAB1>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS\LAB\LAB1

18/09/2018 10.20    <DIR>      .
18/09/2018 10.20    <DIR>      ..
12/09/2017 00.48      8.358 bochsout.txt
16/12/2008 06.17      1.628 bochsrc.bxrc
18/10/2016 04.36      14.339 boot.asm
18/10/2016 04.50      512 boot.bin
12/09/2017 00.37      512 boots.bin
17/09/2007 06.22      18.432 bximage.exe
12/09/2017 00.21      10.321.920 c.img
27/02/2007 10.50      342.016 dd.exe
15/12/2008 14.47      78 dosfp.bat
15/12/2008 01.45      7.966 kernel.asm
16/12/2008 06.21      227 Makefile
16/12/2008 02.20      44 s.bat
31/01/2000 19.00      261.120 tdump.exe
  13 File(s)  10.977.152 bytes
  2 Dir(s)  89.815.986.176 bytes free

Activate Windows
Go to Settings to activate Windows.

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

8. Membuat suatu bootdisk baru dengan menggunakan aplikasi bximage.exe Yang pertama pilih fd

```

C:\Windows\system32\cmd.exe - bximage
C:\OS>cd LAB\LAB1
C:\OS\LAB\LAB1>Notepad boot
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>Notepad Makefile
C:\OS\LAB\LAB1>del floppya.img
C:\OS\LAB\LAB1>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6
Directory of C:\OS\LAB\LAB1

18/09/2018 10.20 <DIR> .
18/09/2018 10.20 <DIR> ..
12/09/2017 00.48 8.358 bochsout.txt
16/12/2008 06.17 1.628 bochsrc.bxrc
18/10/2016 04.36 14.339 boot.asm
18/10/2016 04.50 512 boot.bin
12/09/2017 00.37 512 boots.bin
17/09/2007 06.22 18.432 bximage.exe
12/09/2017 00.21 10.321.920 c.img
27/02/2007 10.50 342.016 dd.exe
15/12/2008 14.47 78 dosfp.bat
15/12/2008 01.45 7.966 kernel.asm
16/12/2008 06.21 227 Makefile
16/12/2008 02.20 44 s.bat
31/01/2000 19.00 261.120 tdump.exe
13 File(s) 10.977.152 bytes
2 Dir(s) 89.815.986.176 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] -

```

Activate Windows
Go to Settings to activate Windows.

Kemudian untuk ukuran tekan enter untuk memilih default

```

C:\Windows\system32\cmd.exe - bximage
C:\OS\LAB\LAB1>Notepad boot.asm
C:\OS\LAB\LAB1>Notepad Makefile
C:\OS\LAB\LAB1>del floppya.img
C:\OS\LAB\LAB1>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6
Directory of C:\OS\LAB\LAB1

18/09/2018 10.20 <DIR> .
18/09/2018 10.20 <DIR> ..
12/09/2017 00.48 8.358 bochsout.txt
16/12/2008 06.17 1.628 bochsrc.bxrc
18/10/2016 04.36 14.339 boot.asm
18/10/2016 04.50 512 boot.bin
12/09/2017 00.37 512 boots.bin
17/09/2007 06.22 18.432 bximage.exe
12/09/2017 00.21 10.321.920 c.img
27/02/2007 10.50 342.016 dd.exe
15/12/2008 14.47 78 dosfp.bat
15/12/2008 01.45 7.966 kernel.asm
16/12/2008 06.21 227 Makefile
16/12/2008 02.20 44 s.bat
31/01/2000 19.00 261.120 tdump.exe
13 File(s) 10.977.152 bytes
2 Dir(s) 89.815.986.176 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] -

```

Activate Windows
Go to Settings to activate Windows.

Lalu beri nama. Di mana di sini diberi nama floppya.img

```
ca C:\Windows\system32\cmd.exe - bximage
Volume Serial Number is 4A6B-68E6
Directory of C:\OS\LAB\LAB1

18/09/2018  10.20    <DIR>      .
18/09/2018  10.20    <DIR>      ..
12/09/2017  08.48      8.358 bochsrc.out.txt
16/12/2008  06.17      1.628 bochsrc.bxrc
18/10/2016  04.36     14.339 boot.asm
18/10/2016  04.50      512 boot.bin
12/09/2017  00.37      512 boots.bin
17/09/2007  06.22     18.432 bximage.exe
12/09/2017  00.21     10.321.920 c.img
27/02/2007  10.50     342.016 dd.exe
15/12/2008  14.47      78 dosfp.bat
15/12/2008  01.45      7.966 kernel.asm
16/12/2008  06.21     227 Makefile
16/12/2008  02.20      44 s.bat
31/01/2000  19.00     261.120 tdump.exe
               13 File(s)   10.977.152 bytes
               2 Dir(s)   89.815.986.176 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
```

Activate Windows
Go to Settings to activate Windows.

```
ca C:\Windows\system32\cmd.exe
12/09/2017  00.21     10.321.920 c.img
27/02/2007  10.50     342.016 dd.exe
15/12/2008  14.47      78 dosfp.bat
15/12/2008  01.45      7.966 kernel.asm
16/12/2008  06.21     227 Makefile
16/12/2008  02.20      44 s.bat
31/01/2000  19.00     261.120 tdump.exe
               13 File(s)   10.977.152 bytes
               2 Dir(s)   89.815.986.176 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:
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>
```

Activate Windows
Go to Settings to activate Windows.

9. Cek isi direktori kembali apakah floppya.img telah dibuat.

```

C:\Windows\system32\cmd.exe
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\LAB1>dir
Volume in drive C is System
Volume Serial Number is 4A6B-68E6

Directory of C:\OS\LAB\LAB1

18/09/2018 10.24 <DIR> .
18/09/2018 10.24 <DIR> ..
12/09/2017 00.48 8.358 bochsout.txt
16/12/2008 06.17 1.628 bochsrc.bxrc
18/10/2016 04.36 14.339 boot.asm
18/10/2016 04.50 512 boot.bin
12/09/2017 00.37 512 boots.bin
17/09/2007 06.22 18.432 bimage.exe
12/09/2017 00.21 10.321.920 c.img
27/02/2007 10.50 342.016 dd.exe
15/12/2008 14.47 78 dosfp.bat
18/09/2018 10.24 1.474.560 floppya.img
15/12/2008 01.45 7.966 kernel.asm
16/12/2008 06.21 227 Makefile
16/12/2008 02.20 44 s.bat
31/01/2000 19.00 261.120 tdump.exe
14 File(s) 12,451,712 bytes
2 Dir(s) 89,813,987,328 bytes free

C:\OS\LAB\LAB1>

```

Activate Windows
Go to Settings to activate Windows.

10. Kemudian format floppya.img agar menjadi bootdisk.

```

Bochs for Windows - Console
15/12/2008 14.47 78 dosfp.bat
18/09/2018 10.24 1.474.560 floppya.img
15/12/2008 01.45 7.966 kernel.asm
16/12/2008 06.21 227 Makefile
16/12/2008 02.20 44 s.bat
31/01/2000 19.00 261.120 tdump.exe
14 File(s) 12,451,712 bytes
2 Dir(s) 89,813,987,328 bytes free

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
000000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc2.txt
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochsout.txt
* in bx_w32_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>DosFp
c:\os\lab\lab1>cd ..\..\Bochs-2.3.5\dos"

c:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
000000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====

Bochs for Windows - Display
=====
MSDEX Version 2.23
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
=====
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 422F-120A
Format another (Y/N)?n

C:\OS\LAB\LAB1>

```

Activate Windows
Go to Settings to activate Windows.

11. Kemudian salin byte dari floppya.img ke boots.bin yang digunakan untuk bootloader

```

C:\Windows\system32\cmd.exe
=====
Bochs X86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[      ] reading configuration from bochsrc2.txt
000000000001[      ] installing win32 module as the Bochs GUI
000000000001[      ] using log file bochcout.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>DOSFp
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"

C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
000000000001[APIC?] local apic in initializing
=====
Bochs X86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[      ] reading configuration from bochsrc2.txt
000000000001[      ] installing win32 module as the Bochs GUI
000000000001[      ] using log file bochcout.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>

```

Activate Windows
Go to Settings to activate Windows.

12. Melihat isi memori dari boots.bin

```

C:\Windows\system32\cmd.exe
=====
C:\OS\LAB\LAB1>debug boots.bin
'debug' is not recognized as an internal or external command,
operable program or batch file.
=====
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 00 00 12 00 02 00 00 00 00 00 ...@......
000020: 00 00 00 00 00 00 20 0A 13 2F 43 4E 4F 20 4E 41 .....)/BNO NA
000030: 4D 45 20 20 20 20 46 41 54 31 32 20 20 32 C9 ME ..{...x..v..V.
000040: 8E D1 BC FC 7B 16 07 BD 78 00 C5 76 00 1E 50 16 ...,{...x..v..V.
000050: 55 BF 22 05 89 7E 00 89 04 02 B1 0B 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$| ...
000070: E8 7E 01 83 EB 3A 66 A1 1C 7C 66 38 07 8A 57 FC ..{|,F..[F]..W.
000080: 75 00 88 CA 02 88 56 02 B0 C3 10 73 ED 33 C9 FE u.....V.....S3..
000090: 06 D8 7D 8A 46 18 98 F7 66 16 03 46 1C 13 56 1E ..},F..f..F..V.
0000A0: 03 40 0E 13 D1 88 76 11 60 89 46 Fc 89 50 Fe BB .F....v..F..V..
0000B0: 20 00 F7 E6 8E 5E 0B 03 C3 48 F7 F3 01 46 FC 11 ....H..F..
0000C0: 4E F6 61 BF 00 07 E8 28 01 72 3E 38 2D 74 17 60 N.a....(,>8-t.
0000D0: B1 00 BE D8 D0 F3 A6 61 74 3D 4E 74 09 83 C7 20 ....}.,at-Nt..
0000E0: 3B FB 72 E7 EE DD FE 0E D8 7D 78 A7 BE 77 7D A ;,r....{|,...}.
0000F0: 98 03 F0 A9 98 48 74 8C 48 74 13 B4 0E BB 07 00 .....@t.Ht....
000100: CD 10 EB EF BE 82 7D EB E6 B8 7D EB E1 CD 16 .....}.....
000110: 5E 10 66 8F 04 CD 19 BE 81 70 8B 7D 1A 80 45 FE ^,f.....}.....
000120: 8A 4E 00 F7 E1 03 46 FC 13 56 FE B4 04 E8 C2 00 .N....F..V....
000130: 72 D7 EA 00 02 70 00 52 50 06 53 6A 01 6A 10 91 r....p.Rp.Sj.j..
000140: 88 40 18 A2 26 05 96 92 33 D2 F7 F6 91 F7 F6 42 .F..&..3.....B
000150: 87 CA F7 76 1A 8A F2 8A E8 C0 CC 02 0A C0 88 01 ...V.....
000160: 02 80 7E 02 0E 75 04 84 42 88 F4 8A 56 24 CD 13 ...~..u.B..V$..
000170: 61 61 72 0A 46 01 42 03 5E 0B 49 75 77 C3 03 aar:@U.B.^,IwU..
000180: 18 01 27 00 04 49 6E 76 61 69 64 28 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 20 65 72 72 6F 72 F0 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 68 65 79 00 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.
=====

C:\OS\LAB\LAB1>

```

Activate Windows
Go to Settings to activate Windows.

13. Memanggil Bosch.

```

C:\Windows\system32\cmd.exe
operable program or batch file.
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 00 F0 09 00 12 00 02 00 00 00 00 00 ...@.....
000020: 00 00 00 00 00 00 29 0A 12 2F 42 4E 4F 20 4E 41 .....).BNO NA
000030: 4D 45 20 20 20 46 41 54 31 32 29 20 20 33 C9 ME .FAT12 3.
000040: 8E D0 BC FC 78 16 07 BD 78 00 C5 76 00 E1 56 16 ....,{...x...V.
000050: 55 BF 22 05 89 7E 00 89 4E 02 B1 00 FC F3 A4 00 U."...N.....
000060: 1F B0 00 7C C6 45 FE 0F 38 4E 24 7D 20 88 C1 99 ...|..E..8NS} ...
000070: E8 7E 01 83 EB 3A 66 A1 1C 7C 66 3D 07 8A 57 FC .~...|f...|W.
000080: 75 00 88 CA 02 88 56 02 B0 C3 10 73 ED 33 C9 FE u.....V.....S.|.
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 B8 76 11 00 89 46 FC 89 56 FE BB .F....V...F..V..
0000B0: 20 00 F7 E6 88 5E 00 93 C3 48 F7 F3 01 46 FC 11 ....^...H...F..
0000C0: 4E FE 61 BF 00 07 EB 28 01 72 3E 3B 2D 17 60 N.a....(>8-t..
0000D0: B1 00 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 78 A7 BE 7F 7D AC :r.....{N}...
0000F0: 98 03 F0 AC 98 48 74 9C 48 74 13 B4 0E B0 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 78 00 52 50 00 53 6A 01 6A 10 9 r....p.RP.Sj.j..
000140: 88 46 18 A2 26 05 96 92 33 D2 F7 F0 91 F7 F6 42 .F..&...3.....B
000150: 87 CA F7 76 1A 8A F2 8A EB C0 CC 02 0A C0 88 01 ...V.....V$..
000160: 02 89 7E 02 0E 75 04 84 42 89 F4 8A 56 24 CD 13 ..~..U..B..V$..
000170: 61 61 72 0A 40 75 01 42 93 5E 0B 44 75 77 C3 03 aar.@U.B.^IuW..
000180: 18 01 27 0D 80 49 6E 76 61 6C 69 64 28 73 79 73 .'.Invalid sys
000190: 74 65 60 20 64 69 73 68 FF 00 8A 44 69 73 68 20 tem disk..Disk
0001A0: 49 2F 4F 20 65 72 72 72 72 FE 00 0A 52 65 70 6 I/O error..Repl
0001B0: 61 63 65 20 74 68 65 28 64 69 73 68 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 80 0A 00 00 49 4F 20 20 20 20 20 20 29 key...IO
0001E0: 53 59 53 4D 53 44 4F 53 20 20 53 59 53 7F 01 SYSMSDOS ..SYS..
0001F0: 00 41 BB 00 00 00 66 0A 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

```

Activate Windows
Go to Settings to activate Windows.

14. Format floppya.img, dan menambahkan sistem file ke dalamnya, dengan bantuan bosch.

```

C:\Bochs for Windows - Console
=====
000000000001[ ] reading configuration from bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochsout.txt
# In bx_win32_gui.c:exit(void)

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

=====
C:\OS\LAB\LAB1>
C:\OS\LAB\LAB1>..\..\bochs-2.3.5\bochs -q -f bochsrc.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 bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochsout.txt
# In bx_win32_gui.c:exit(void)

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

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

C:\OS\LAB\LAB1>DOSP
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
000000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc2.txt
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochsout.txt

```

Activate Windows
Go to Settings to activate Windows.

15. Selesaikan proses format

```

[...] Bochs for Windows - Console
# In bx_w32_gui.c::exit(void)
=====
Bochs is exiting with the following message:
[!GUI ] POWER button turned off.

C:\OS\Bochs-2.3.5\dos>cd "C:\os\lab\lab1"
C:\OS\LAB\LAB1>DOSP
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
0000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
0000000001[ reading configuration from bochsrc2.txt
0000000001[ installing win32 module as the Bochs GUI
0000000001[ using log file bochcout.txt
# In bx_w32_gui.c::exit(void)
=====
Bochs is exiting with the following message:
[!GUI ] POWER button turned off.

C:\OS\Bochs-2.3.5\dos>cd "C:\os\lab\lab1"
C:\OS\LAB\LAB1>DOSP
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
0000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
0000000001[ reading configuration from bochsrc2.txt
0000000001[ installing win32 module as the Bochs GUI
0000000001[ using log file bochcout.txt

```

Activate Windows
Go to Settings to activate Windows.

16. Lihat isi direktori

```

[...] Bochs for Windows - Console
# In bx_w32_gui.c::exit(void)
=====
Bochs is exiting with the following message:
[!GUI ] POWER button turned off.

C:\OS\Bochs-2.3.5\dos>cd "C:\os\lab\lab1"
C:\OS\LAB\LAB1>DOSP
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
0000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
0000000001[ reading configuration from bochsrc2.txt
0000000001[ installing win32 module as the Bochs GUI
0000000001[ using log file bochcout.txt
# In bx_w32_gui.c::exit(void)
=====
Bochs is exiting with the following message:
[!GUI ] POWER button turned off.

C:\OS\Bochs-2.3.5\dos>cd "C:\os\lab\lab1"
C:\OS\LAB\LAB1>DOSP
C:\OS\LAB\LAB1>cd "..\..\Bochs-2.3.5\dos"
C:\OS\Bochs-2.3.5\dos>..\bochs -q -f bochsrc2.txt
0000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
0000000001[ reading configuration from bochsrc2.txt
0000000001[ installing win32 module as the Bochs GUI
0000000001[ using log file bochcout.txt

```

Activate Windows
Go to Settings to activate Windows.

1. Kode ASCII adalah merupakan kode standar yang digunakan dalam pertukaran informasi pada Komputer. Kode ASCII ini seperti Hex dan Unicode tetapi ASCII lebih bersifat universal.

ASCII Table

Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char
0	0	0		32	20	40	[space]	64	40	100	@	96	60	140	`
1	1	1	"	33	21	41	!	65	41	101	A	97	61	141	a
2	2	2	"	34	22	42	"	66	42	102	B	98	62	142	b
3	3	3	#	35	23	43	#	67	43	103	C	99	63	143	c
4	4	4	\$	36	24	44	\$	68	44	104	D	100	64	144	d
5	5	5	%	37	25	45	%	69	45	105	E	101	65	145	e
6	6	6	&	38	26	46	&	70	46	106	F	102	66	146	f
7	7	7	'	39	27	47	'	71	47	107	G	103	67	147	g
8	8	10	(40	28	50	(72	48	110	H	104	68	150	h
9	9	11)	41	29	51)	73	49	111	I	105	69	151	i
10	A	12	*	42	2A	52	*	74	4A	112	J	106	6A	152	j
11	B	13	+	43	2B	53	+	75	4B	113	K	107	6B	153	k
12	C	14	,	44	2C	54	,	76	4C	114	L	108	6C	154	l
13	D	15	-	45	2D	55	-	77	4D	115	M	109	6D	155	m
14	E	16	.	46	2E	56	.	78	4E	116	N	110	6E	156	n
15	F	17	/	47	2F	57	/	79	4F	117	O	111	6F	157	o
16	10	20	0	48	30	60	0	80	50	120	P	112	70	160	p
17	11	21	1	49	31	61	1	81	51	121	Q	113	71	161	q
18	12	22	2	50	32	62	2	82	52	122	R	114	72	162	r
19	13	23	3	51	33	63	3	83	53	123	S	115	73	163	s
20	14	24	4	52	34	64	4	84	54	124	T	116	74	164	t
21	15	25	5	53	35	65	5	85	55	125	U	117	75	165	u
22	16	26	6	54	36	66	6	86	56	126	V	118	76	166	v
23	17	27	7	55	37	67	7	87	57	127	W	119	77	167	w
24	18	30	8	56	38	70	8	88	58	130	X	120	78	170	x
25	19	31	9	57	39	71	9	89	59	131	Y	121	79	171	y
26	1A	32	:	58	3A	72	:	90	5A	132	Z	122	7A	172	z
27	1B	33	;	59	3B	73	;	91	5B	133	{	123	7B	173	{
28	1C	34	<	60	3C	74	<	92	5C	134	\	124	7C	174	\
29	1D	35	=	61	3D	75	=	93	5D	135	}	125	7D	175	}
30	1E	36	>	62	3E	76	>	94	5E	136	^	126	7E	176	~
31	1F	37	?	63	3F	77	?	95	5F	137	-	127	7F	177	

2. Perintah Bahasa assembly untuk keluarga intel x86

- Komentar: Komentar diawali dengan tanda titik koma (;); ini adalah komentar
- Label : Label diakhiri dengan tanda titik dua (:).Contoh: main: ,loop: ,proses: ,keluar:
- Definisi data: **DB** : define bytes. **DW** : define words. **DD** : define double words. **EQU** : equals. Membentuk konstanta.
- Perpindahan data**MOV** : move. **LEA** : load effective address. Mengisi suatu register dengan alamat offset sebuah data. **CHG** : exchange. Menukar dua buah register langsung.
- Operasi logika: **AND** : melakukan bitwise and. sintaks: **OR** : melakukan bitwise or. **NOT** : melakukan bitwise not (*one's complement*).**XOR** : melakukan bitwise eksklusif or. **SHL** : shift left. Menggeser bit ke kiri. Bit paling kanan diisi nol. **HR** : shift right. Menggeser bit ke kanan. Bit paling kiri diisi nol. **ROL** : rotate left. Memutar bit ke kiri. Bit paling kiri jadi paling kanan kali ini. **ROR** : rotate right. Memutar bit ke kanan. Bit paling kanan jadi paling kiri.
- Operasi matematika: **ADD** : add. Menjumlahkan dua buah register. **ADC** : add with carry. Menjumlahkan dua register dan carry flag (CF). **INC** : increment. Menjumlah isi sebuah register dengan 1. **BB** : subtract with borrow. Mengurangkan dua register dan carry flag (CF). **DEC** : decrement. Mengurang isi sebuah register dengan 1. **MUL** : multiply. Mengalikan register dengan AX atau AH. **UL** : signed multiply. **DIV** : divide. Membagi AX atau DX:AX dengan sebuah register. **IDIV** : signed divide. Sama dengan DIV, hanya saja IDIV menganggap bit-bit yang ada di register sumber sudah dalam bentuk *two's complement*. **NEG** : negate. Membuat isi register menjadi negatif (*two's complement*).
- Pengulangan: **LOOP** : loop. Mengulang sebuah proses. Pertama register CX dikurangi satu. Bila CX sama dengan nol, maka looping berhenti. Bila tidak nol, maka lompat ke label tujuan. **LOOPE** : loop while equal. Melakukan

pengulangan selama CX ≠ 0 dan ZF = 1. CX tetap dikurangi 1 sebelum diperiksa. sintaks: **LOOPZ** : loop while zero. Identik dengan LOOPE.

LOOPNE : loop while not equal. Melakukan pengulangan selama CX ≠ 0 dan ZF = 0. CX tetap dikurangi 1 sebelum diperiksa. **LOOPNZ** : loop while not zero. Identik dengan LOOPNE. **REP** : repeat. Mengulang perintah sebanyak CX kali.

MODUL 2

1. ketik perintah ‘cd os’ untuk masuk ke OS nya.

```
Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\LENOVO A9>cd c:/
c:\>cd os
```

2. jalankan ‘setpath’, setelah itu pindah ke LAB 2 dengan mengetikan ‘cd lab/lab2’.

```
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
```

3. lalu ketikan ‘dir’ untuk melihat isi direktori kerja, dan akan tampak seperti gambar berikut.

```
c:\os\lab\lab2>dir
Volume in drive C is rio
Volume Serial Number is C8BC-A4E1

Directory of c:\os\lab\lab2

20/09/2018  19:01    <DIR>      .
20/09/2018  19:01    <DIR>      ..
20/09/2018  19:01            1.474.560 a.img
19/09/2018  12:00            10.130 bochs.log
16/12/2008  00:18            1.625 bochssrc.bxrc
19/09/2018  12:08            15.922 boot.asm
16/09/2007  23:22            18.432 bximage.exe
27/02/2007  04:50            342.016 dd.exe
15/12/2008  21:52            78 dosfp.bat
19/09/2018  11:45            1.474.560 floppya.img
19/09/2018  12:09            7.966 kernel.asm
16/12/2008  00:21            228 Makefile
15/12/2008  20:20            44 s.bat
                           11 File(s)   3.345.561 bytes
                           2 Dir(s)   133.107.732.480 bytes free
```

4. selanjutnya jalankan ‘bximage’, dan diteruskan dengan menjawab pertanyaan-pertanyaan yang akan muncul setelah menjalankan 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 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

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

Writing: [] Done.

I wrote 1474560 bytes to floppya.img.
```

5. pastikan hasil file ‘floppya.img’ dengan memasukan perintah ‘dir’, hasilnya seperti gambar dibawah.

```
c:\OS\LAB\LAB2>dir
Volume in drive C is rio
Volume Serial Number is C8BC-A4E1

Directory of c:\OS\LAB\LAB2

20/09/2018  19:01    <DIR>      .
20/09/2018  19:01    <DIR>      ..
20/09/2018  19:01            1.474.560 a.img
19/09/2018  12:00            10.130 bochs.log
16/12/2008  00:18            1.625 bochssrc.bxrc
19/09/2018  12:08            15.922 boot.asm
16/09/2007  23:22            18.432 bximage.exe
27/02/2007  04:50            342.016 dd.exe
15/12/2008  21:52            78 dosfp.bat
20/09/2018  19:02            1.474.560 floppya.img
19/09/2018  12:09            7.966 kernel.asm
16/12/2008  00:21            228 Makefile
15/12/2008  20:20            44 s.bat
                           11 File(s)     3.345.561 bytes
                           2 Dir(s)   133.107.744.768 bytes free
```

6. jalankan perintah ‘dosfp’, lalu pindah ke windows ‘Bochs’ untuk mengatur lokasi file image, tampak seperti gambar dibawah. Dari prompt A:> ketikan perintah ‘format b: /s’ dan selesaikan prosesnya lalu tutup ‘Bochs’ dengan menu power.

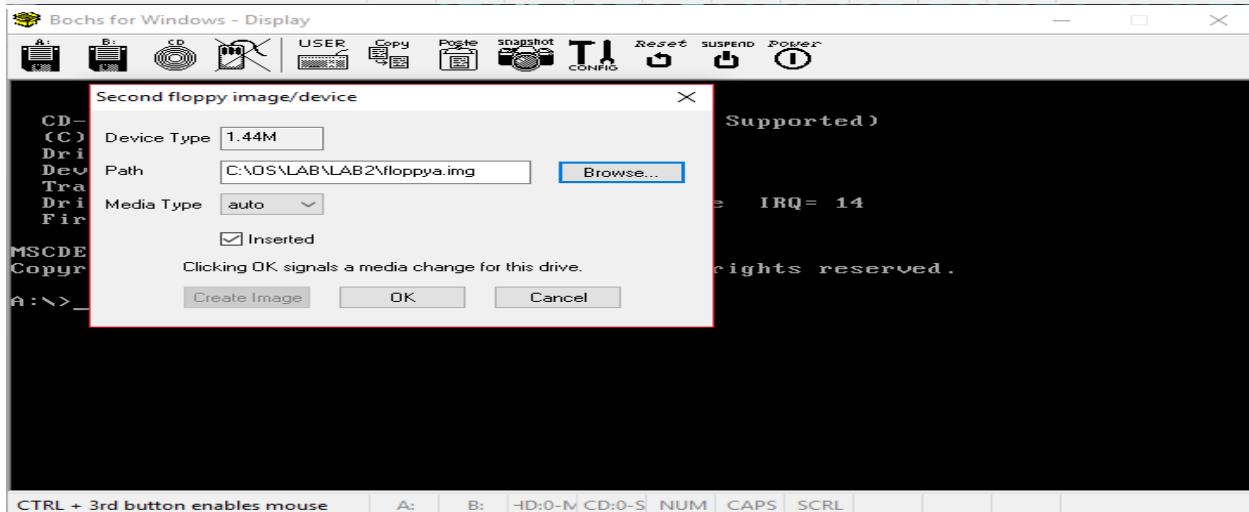
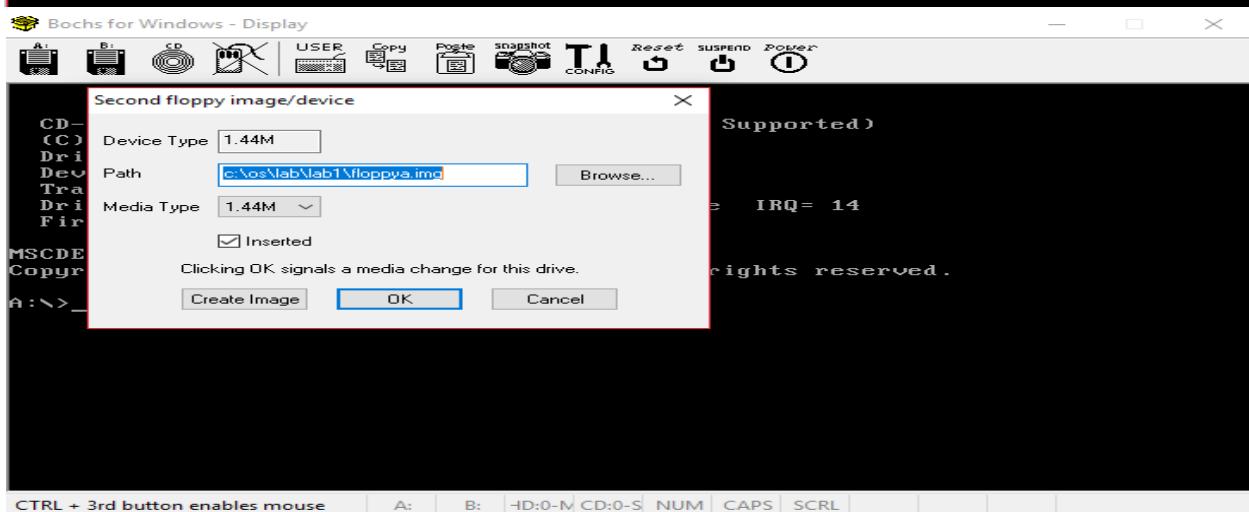
```

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 bochfout.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\\lab2"

```

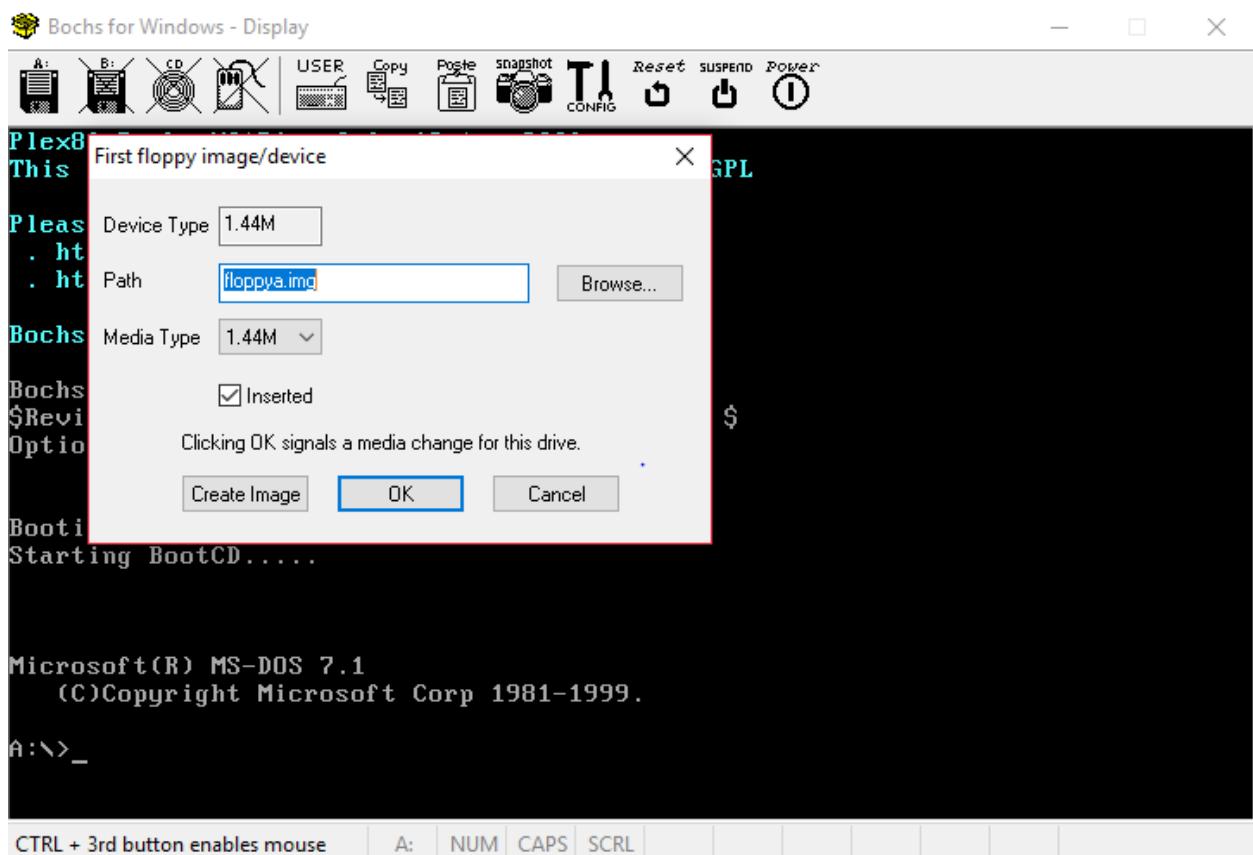


7. jalankan perintah 's' dan akan menuju ke PC simulator dan pastikan posisi 'floppya.img'.

```
C:\OS\LAB\LAB2>s
C:\OS\LAB\LAB2>...\\bochs-2.3.5\bochs -q -f bochsrc.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 bochsrc.bxrc
000000000001[      ] installing win32 module as the Bochs GUI
000000000001[      ] using log file bochs.log
# In bx_win32_gui_c::exit(void)!

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

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



8. ketikan perintah 'cls' untuk membersihkan layar, dan selanjutnya jalankan perintah 'make fp.disk' dan Jika berhasil akan muncul seperti gambar dibawah.

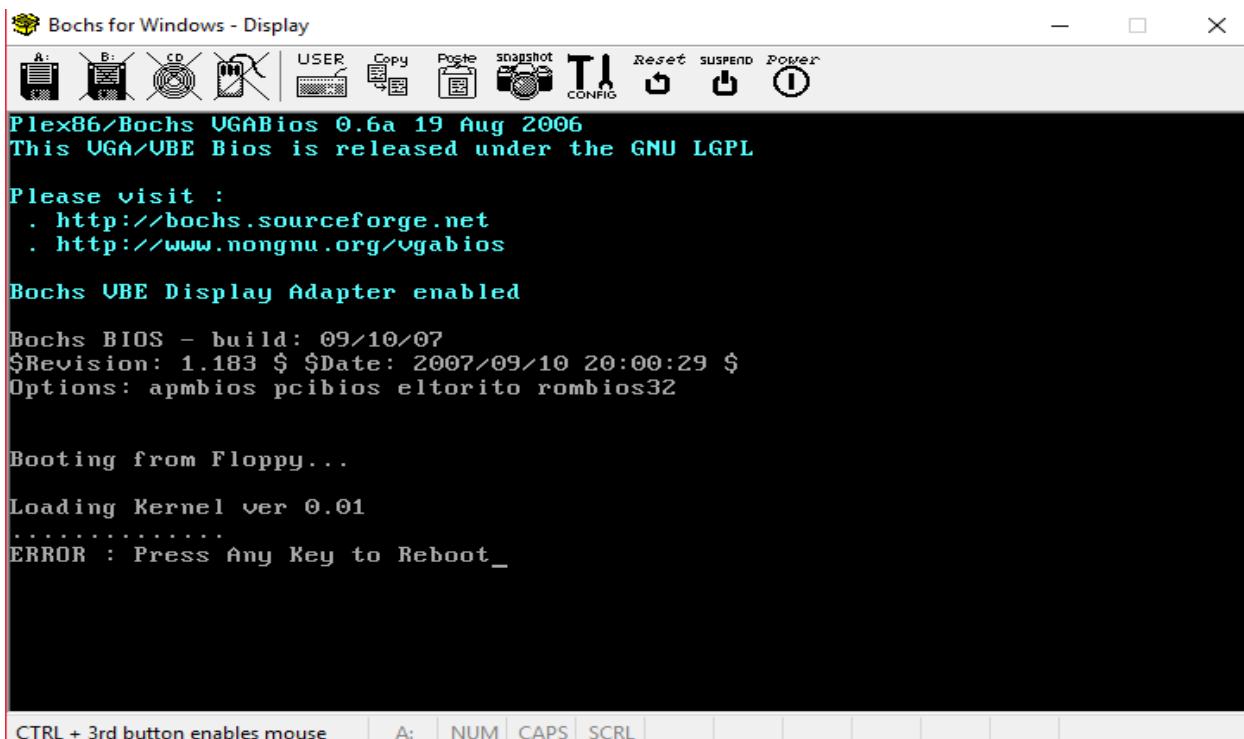
```
C:\OS\LAB\LAB2>make fp.disk
nasm boot.asm -o boot.bin -f bin
dd if=boot.bin of=floppya.img
rawwrite dd for windows version 0.5.
Written by John Newbiggin <jn@it.swin.edu.au>
This program is covered by the GPL. See copying.txt for details
1+0 records in
1+0 records out

C:\OS\LAB\LAB2>s

C:\OS\LAB\LAB2>..\.bochs-2.3.5\bochs -q -f bochsrc.bxrc
00000000000i[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
00000000000i[      ] reading configuration from bochsrc.bxrc
00000000000i[      ] installing win32 module as the Bochs GUI
00000000000i[      ] using log file bochs.log
# In bx_win32_gui_c::exit(void)!

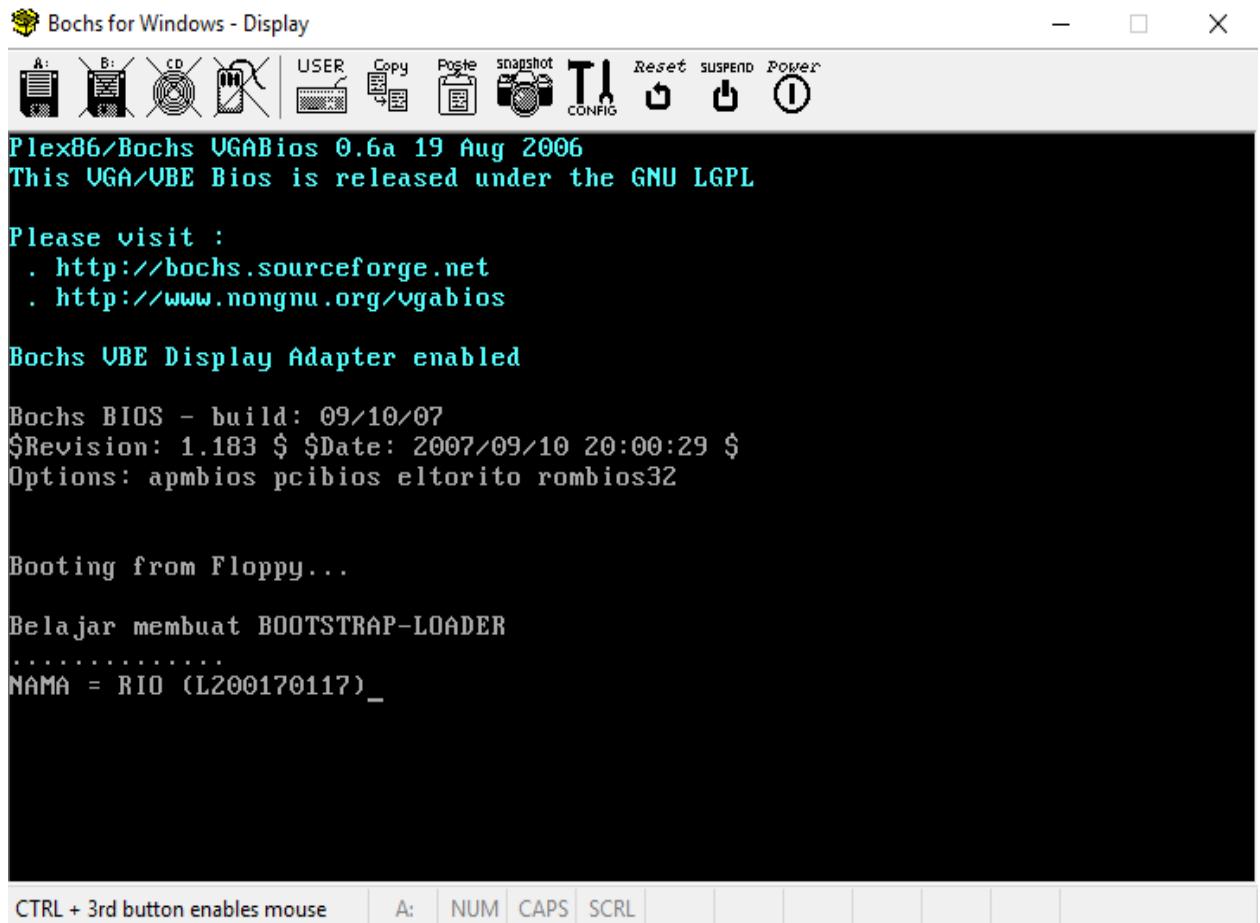
Bochs is exiting with the following message:
[WGUI ] POWER button turned off.
=====
```

9. ketikan perintah ‘s’ untuk menjalankan PC simulator dan akan muncul seperti gambar dibawah.



10. ketikan ‘notepad boot.asm’ dan menyunting file boot.asm, cari teks ‘loading kernel’ pada notepad lalu sunting teks tersebut. Selanjutnya save dan lanjutkan ke cmd dengan menjalankan perintah ‘make fp.disk’, setelah itu ketikan ‘s’ dan teks pada boot.asm akan berubah seperti gambar dibawah ini.

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



11. ketikan ‘make kernel untuk membuat kernel’.

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

12. selanjutnya ketikan ‘dir’ untuk melihat bahwa kernel telah ditambahkan.

```
C:\OS\LAB\LAB2>dir
Volume in drive C is rio
Volume Serial Number is C8BC-A4E1

Directory of C:\OS\LAB\LAB2

20/09/2018  19:58    <DIR>          .
20/09/2018  19:58    <DIR>          ..
20/09/2018  19:01        1.474.560 a.img
20/09/2018  19:57            10.130 bochs.log
16/12/2008  00:18            1.625 bochssrc.bxrc
20/09/2018  19:55            15.923 boot.asm
20/09/2018  19:55            512 boot.bin
16/09/2007  23:22            18.432 bximage.exe
27/02/2007  04:50            342.016 dd.exe
15/12/2008  21:52            78 dosfp.bat
20/09/2018  19:55        1.474.560 floppya.img
19/09/2018  12:09            7.966 kernel.asm
20/09/2018  19:58            611 kernel.bin
16/12/2008  00:21            228 Makefile
15/12/2008  20:20            44 s.bat
                           13 File(s)   3.346.685 bytes
                           2 Dir(s)  133.103.751.168 bytes free
```

13. jalankan perintah ‘s’ dan akan muncul booting from floppy

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

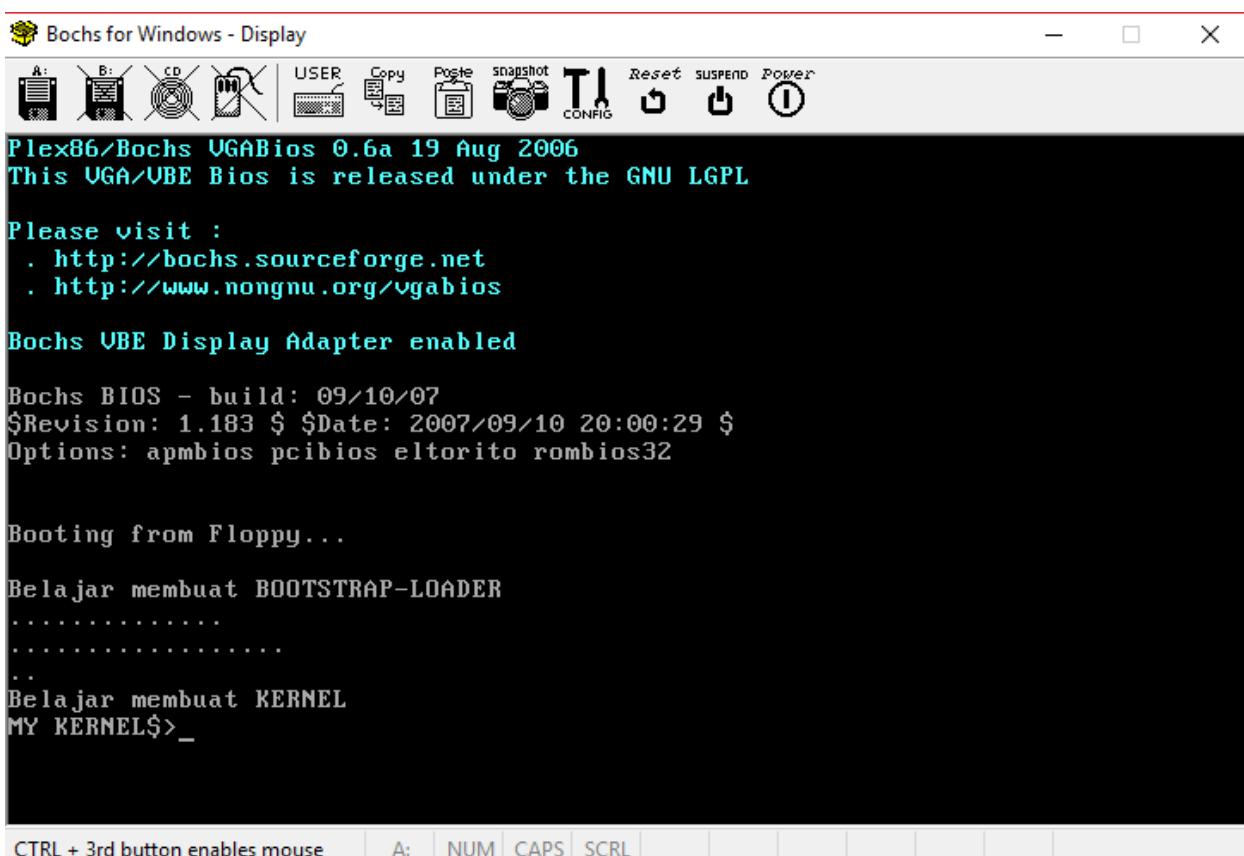
C:\OS\LAB\LAB2>..\..\bochs-2.3.5\bochs -q -f bochssrc.bxrc
000000000001[APIC?] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[      ] reading configuration from bochssrc.bxrc
000000000001[      ] installing win32 module as the Bochs GUI
000000000001[      ] using log file bochs.log
# In bx_win32_gui_c::exit(void)!

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

14. jalankan perintah ‘notepad kernel.asm’ lalu cari teks ‘welcome to my kernel’ pada notepad dan edit teks tersebut menjadi ‘belajar membuat kernel’ dan save.

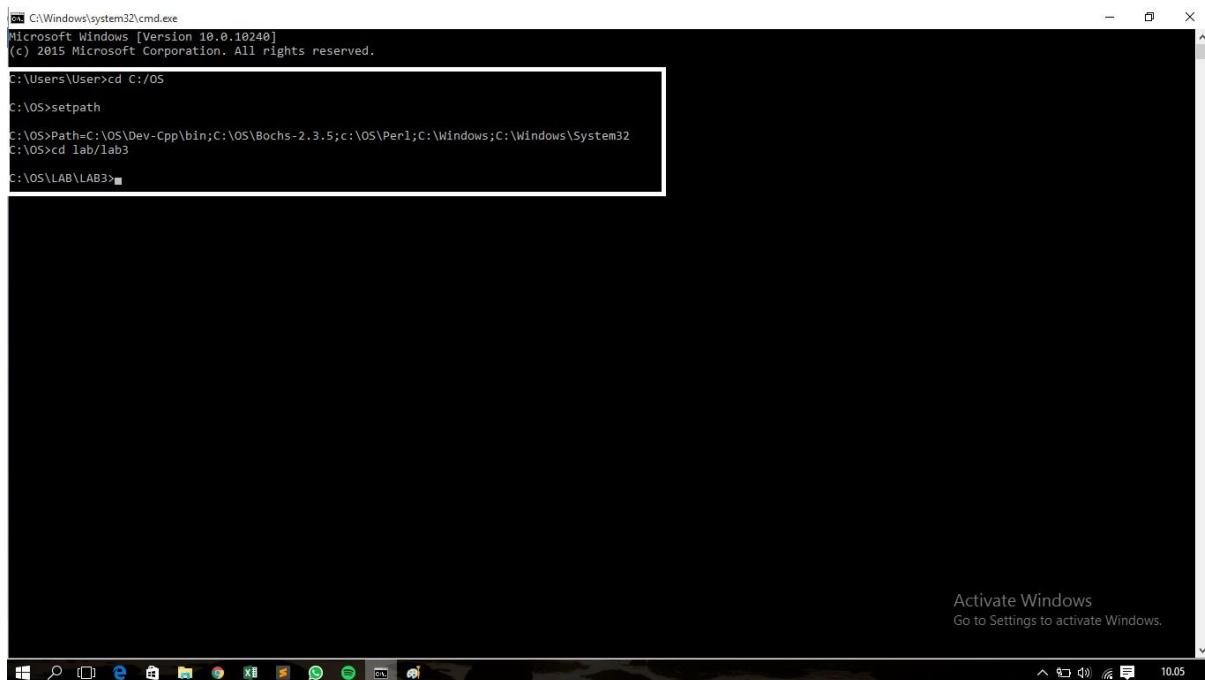
```
C:\OS\LAB\LAB2>notepad kernel.asm
C:\OS\LAB\LAB2>make kernel
nasm kernel.asm -o kernel.bin -f bin
```

```
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  
# In bx_win32_gui_c::exit(void)!  
=====  
Bochs is exiting with the following message:  
[WGUI ] POWER button turned off.  
=====
```



MODUL 3

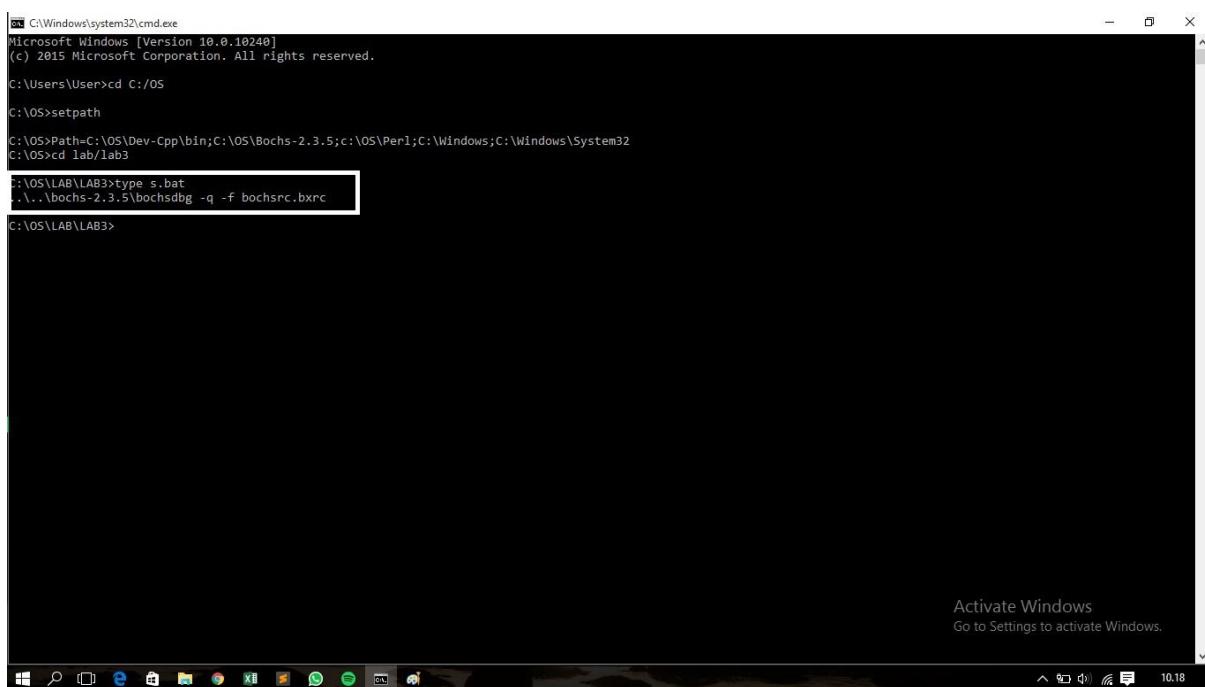
1. Masuk ke direktori C:/OS, lakukan setpath dan masuk ke direktori lab/lab3



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\lab3
C:\OS\LAB\LAB3>
```

2. ketikkan type s.bat



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\lab3
C:\OS\LAB\LAB3>type s.bat
..\\..\\bochs-2.3.5\\bochsrc -q -f bochssrc.bxrc
C:\OS\LAB\LAB3>
```

4. Lakukan debugging dengan cara ketik ‘S’

```

C:\Bochs for Windows - Console
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\Sys
C:\OS>cd lab/lab3
C:\OS\LAB\LAB3>type s.bat
...\\bochs-2.3.5\bochsdbg -q -f bochsrc.bxrc
C:\OS\LAB\LAB3>
C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsdbg -q -f bochsrc.bxrc
000000000001[ ] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1>

```

5. Ketikkan ‘r’ untuk melihat isi register CS dan IP.

```

C:\Bochs for Windows - Console
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\Sys
C:\OS>cd lab/lab3
C:\OS\LAB\LAB3>type s.bat
...\\bochs-2.3.5\bochsdbg -q -f bochsrc.bxrc
C:\OS\LAB\LAB3>
C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsdbg -q -f bochsrc.bxrc
000000000001[ ] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000720 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL-0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2>

```

6. Ketikkan ‘s’

Bochs for Windows - Console

```
C:\OS\LAB\LAB3>type s.bat
...\.bochs-2.3.5\bochsrcdbg -q -f bochsrc.bxrc
C:\OS\LAB\LAB3>
C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsrcdbg -q -f bochsrc.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 bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000000 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> s
Next at t=1
(0) [0xb00fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
<bochs:3> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000000 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:4>
```

Activate Windows
Go to Settings to activate Windows.

7. Kemudian masukkan perintah ‘vb 0:0x7C00’ untuk membuat pemberhentian di alamat tersebut.

Bochs for Windows - Console

```
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000000 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> s
Next at t=1
(0) [0xb00fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
<bochs:3> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000000 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:4> vb 0:0x7C00
<bochs:5> c
(4098424) Breakpoint 2748984, in 0000:7C00 (0x00007c00)
Next at t=208218
(0) [0xb0007c00] 0000:7C00 (unk. ctxt): jmp .+0x003b (0x00007c3e) ; e93b00
<bochs:6>
```

Bochs for Windows - Display

Plex86/Bochs VGA/Bios 0.6a 19 Aug 2006
This VGA/UEB Bios is released under the GNU GPL

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

Bochs UEB Display Adapter enabled

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

Booting from Floppy...

Activate Windows
Go to Settings to activate Windows.

8. Ketikkan ‘c’ untuk continue / melanjutkan. Lalu ketikkan ‘s’ berulang sebanyak 10 kali, dan lakukan pengecekan dengan file boot.asm

Bochs for Windows - Console

```

r$1: 0x00000000:00000000 r$1: 0x00000000:00000000
r$8 : 0x00000000:00000000 r$9 : 0x00000000:00000000
r$10: 0x00000000:00000000 r$11: 0x00000000:00000000
r$12: 0x00000000:00000000 r$13: 0x00000000:00000000
r$14: 0x00000000:00000000 r$15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs>:4> vb 0:0x7C0
<bochs>:5> c
(4098424) Breakpoint 2748984, in 0000:7c00 (0x00007c00)
Next at t=2082128
(0) [0xb0007c00] 0000:7c00 (unk. ctxt): jmp .+0x003b (0x00007c3e) ; e93b00
<bochs>:6> s
Next at t=2082129
(0) [0xb0007c3e] 0000:7c3e (unk. ctxt): cli ; fa
<bochs>:7> s
Next at t=2082130
(0) [0xb0007c3f] 0000:7c3f (unk. ctxt): mov ax, 0x07c0 ; b8c007
<bochs>:8> s
Next at t=2082131
(0) [0xb0007c42] 0000:7c42 (unk. ctxt): mov ds, ax ; 8ed8
<bochs>:9> s
Next at t=2082132
(0) [0xb0007c44] 0000:7c44 (unk. ctxt): mov es, ax ; 8ec0
<bochs>:10> s
Next at t=2082133
(0) [0xb0007c46] 0000:7c46 (unk. ctxt): mov fs, ax ; 8ee0
<bochs>:11> s
Next at t=2082134
(0) [0xb0007c48] 0000:7c48 (unk. ctxt): mov gs, ax ; 8ee8
<bochs>:12> s
Next at t=2082135
(0) [0xb0007c4a] 0000:7c4a (unk. ctxt): mov ax, 0x0000 ; b80000
<bochs>:13> s
Next at t=2082136
(0) [0xb0007c4d] 0000:7c4d (unk. ctxt): mov ss, ax ; 8ed0
<bochs>:14> s
Next at t=2082137
(0) [0xb0007c4f] 0000:7c4f (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs>:15> s
Next at t=2082138
(0) [0xb0007c52] 0000:7c52 (unk. ctxt): sti ; fb
<bochs>:16>

```

boot - Notepad

File	Edit	Format	View	Help
BytesPerSector	dw 0x0200			
SectorsPerCluster	db 0x01			
ReservedSectors	dw 0x0001			
TotalFATs	db 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 0xFFFFFFF			
VolumeLabel	db "QUASI BOOT"			
SystemID	db "FAT12 "			

=====

;(3) Blok BOOT CODE

=====

START:

; Mengatur lokasi kode program pada alamat 7C00:0000, dan mengatur REGISTER SEGMENT

```

        cli                                ; matikan aktifitas interupsi
        mov     ax, 0x07C0
        mov     ds, ax
        mov     es, ax
        mov     fs, ax
        mov     gs, ax

```

; Mengatur lokasi stack

```

        mov     ax, 0x0000
        mov     ss, ax
        mov     sp, 0xFFFF ; sp bergerak dari alamat atas ke bawah
        sti                                ; aktifkan aktifitas interupsi windows

```

9. Ketikkan ‘q’ untuk menghentikan debugging. Kemudian lakukan debugging lagi dengan cara ketikkan ‘s’, kemudian ketikkan ‘vb 0x0100:0x0000’ untuk menghentikan langkah saat

PC mulai mengeksekusi instruksi dari program ‘kernel.bin’, lalu ketikkan ‘c’

Bochs for Windows - Console

```

<bochs>:11> s
Next at t=2082134
(0) [0xb0007c48] 0000:7c48 (unk. ctxt): mov gs, ax ; 8ee8
<bochs>:12> s
Next at t=2082135
(0) [0xb0007c4a] 0000:7c4a (unk. ctxt): mov ax, 0x0000 ; b80000
<bochs>:13> s
Next at t=2082136
(0) [0xb0007c4d] 0000:7c4d (unk. ctxt): mov ss, ax ; 8ed0
<bochs>:14> s
Next at t=2082137
(0) [0xb0007c4f] 0000:7c4f (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs>:15> s
Next at t=2082138
(0) [0xb0007c52] 0000:7c52 (unk. ctxt): sti ; fb
<bochs>:16> q
# In bx_w32_gui.c::exit(void)

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

C:\OS\LAB\LAB3>h
'h' is not recognized as an internal or external command,
operable program or batch file.

C:\OS\LAB\LAB3>s

C:\OS\LAB\LAB3>...\\bochs-2.3.5\\bochsrc -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 bochs.log
Next at t=0
(0) [0xffffffff] f000:fff8 (unk. ctxt): jmp far f000:e05b ; ea5be00f0
<bochs>:1> vb 0x0100:0x0000
<bochs>:2> c
(9537920) Breakpoint 2748984, in 0100:0000 (0x00001000)
Next at t=2945013
(0) [0x00001000] 0100:0000 (unk. ctxt): mov ax, 0x0100 ; b80001
<bochs>:3>

```

Bochs for Windows - Display

Plex86/Bochs VGA/Bios 0.6a 19 Aug 2006
This VGA/UEB 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 peibios eltorito rombios32

Booting from Floppy...

Loading kernel ver 0.01

Activate Windows
Go to Settings to activate Windows.

10. Kemudian ketikkan ‘s’ minimal 10x. Lalu bandingkan hasilnya dengan isi file kernel.asm.

The screenshot shows two windows side-by-side. On the left is the 'Bochs x86 Emulator 2.3.5' console window, which displays assembly code and memory dump output. On the right is a 'kernel - Notepad' window containing the assembly code for the kernel.

```

Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
[0] [0xfffffff0] f000:ffff0 (unk. ctxt): jmp far f000:e05b ; ea5be00f0
<bochs:> c
(9537920) Breakpoint 2748984, in 0100:0000 (0x00001000)
...
(0) [0x00001000] 0100:0000 (unk. ctxt): mov ax, 0x0100 ; b80001
<bochs:> s
Next at t=0
(0) [0x00001003] 0100:0003 (unk. ctxt): mov ds, ax ; 8ed8
<bochs:> s
Next at t=2945014
(0) [0xb0001005] 0100:0005 (unk. ctxt): mov es, ax ; 8ec0
<bochs:> s
Next at t=2945016
(0) [0xb0001007] 0100:0007 (unk. ctxt): cli ; fa
<bochs:> s
Next at t=2945017
(0) [0xb0001008] 0100:0008 (unk. ctxt): mov ss, ax ; 8ed0
<bochs:> s
Next at t=2945018
(0) [0xb000100a] 0100:000a (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs:> s
Next at t=2945019
(0) [0xb000100d] 0100:000d (unk. ctxt): sti ; fb
<bochs:> s
Next at t=2945020
(0) [0xb000100e] 0100:000e (unk. ctxt): push dx ; 52
<bochs:> s
Next at t=2945021
(0) [0xb000100f] 0100:000f (unk. ctxt): push es ; 06
<bochs:> s
Next at t=2945022
(0) [0xb0001010] 0100:0010 (unk. ctxt): xor ax, ax ; 31c0
<bochs:> s
Next at t=2945023
(0) [0xb0001012] 0100:0012 (unk. ctxt): mov es, ax ; 8ec0
<bochs:>

```

```

; Prototype SIMPLE KERNEL ver 0.01
; LAB-INFORMATIKA
; =====
[org 0x0000]
[bits 16]

[SEGMENT .text]

;START ##### ;Lokasi memori untuk menempatkan kernel
    mov ax, 0x0100
    mov ds, ax
    mov es, ax

    cli
    mov ss, ax
    mov sp, 0xFFFF
    sti

    push dx
    push es
    xor ax, ax
    mov es, ax

    cli
    mov word [es:0x21*4], _int0x21 ; setup interrupt service
    mov [es:0x21*4+2], cs ; untuk menampilkan karakter di layar
    sti
    pop es
    pop dx

    mov si, strWelcomeMsg ; Tampilkan informasi proses
    mov al, 0x01 ; request service 0x01
    int 0x21 ; int 0x21

    call _shell ; call the shell

;call the shell
; Go to Settings to activate Windows

```

TUGAS!

1. Tabel pemetaan memori pada PC

No.	Blok Memori	Alokasi Pemakaian
1	F 0 0 0 0	ROM BIOS, Diagnostic, BASIC
2	E 0 0 0 0	ROM program
3	D 0 0 0 0	ROM program
4	C 0 0 0 0	Perluasan BIOS untuk hardisk XT
5	B 0 0 0 0	Monokrom Monitor
6	A 0 0 0 0	Monitor EGA, VGS, dll
7	9 0 0 0 0	Daerah kerja pemakai s/d 640 KB
8	8 0 0 0 0	Daerah kerja pemakai s/d 576 KB
9	7 0 0 0 0	Daerah kerja pemakai s/d 512 KB
10	6 0 0 0 0	Daerah kerja pemakai s/d 448 KB
11	5 0 0 0 0	Daerah kerja pemakai s/d 384 KB
12	4 0 0 0 0	Daerah kerja pemakai s/d 320 KB
13	3 0 0 0 0	Daerah kerja pemakai s/d 256 KB
14	2 0 0 0 0	Daerah kerja pemakai s/d 192 KB
15	1 0 0 0 0	Daerah kerja pemakai s/d 128 KB
16	0 0 0 0 0	Daerah kerja pemakai s/d 64 KB

2. Perbedaan mode kerja “Real Mode” dan “Protected Mode”

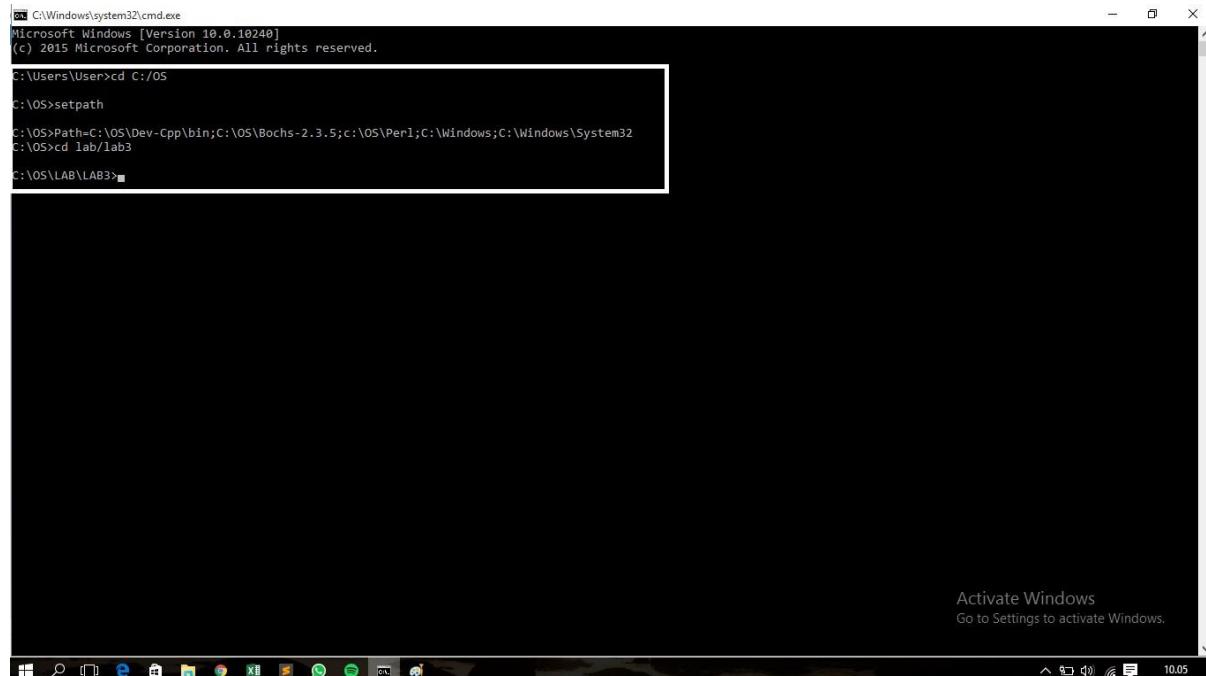
- a) **Real Mode:** Real-Mode adalah sebuah modus di mana prosesor Intel x86

berjalan seolah-olah dirinya adalah sebuah prosesor Intel 8085 atau Intel 8088, meski ia merupakan prosesor Intel 80286 atau lebih tinggi. Karenanya, modus ini juga disebut sebagai modus 8086 (8086 Mode). Dalam modus ini, prosesor hanya dapat mengeksekusi instruksi 16-bit saja dengan menggunakan register internal yang berukuran 16-bit, serta hanya dapat mengakses hanya 1024 KB dari memori karena hanya menggunakan 20-bit jalur bus alamat. Semua program DOS berjalan pada modus ini.

- b) **Protected Mode:** Modus terproteksi (protected mode) adalah sebuah modus di mana terdapat proteksi ruang alamat memori yang ditawarkan oleh mikroprosesor untuk digunakan oleh sistem operasi. Modus ini datang dengan mikroprosesor Intel 80286 atau yang lebih tinggi. Karena memiliki proteksi ruang alamat memori, maka dalam modus ini sistem operasi dapat melakukan multitasking.

MODUL 4

3. Masuk ke direktori C:/OS, lakukan setpath dan masuk ke direktori lab/lab3

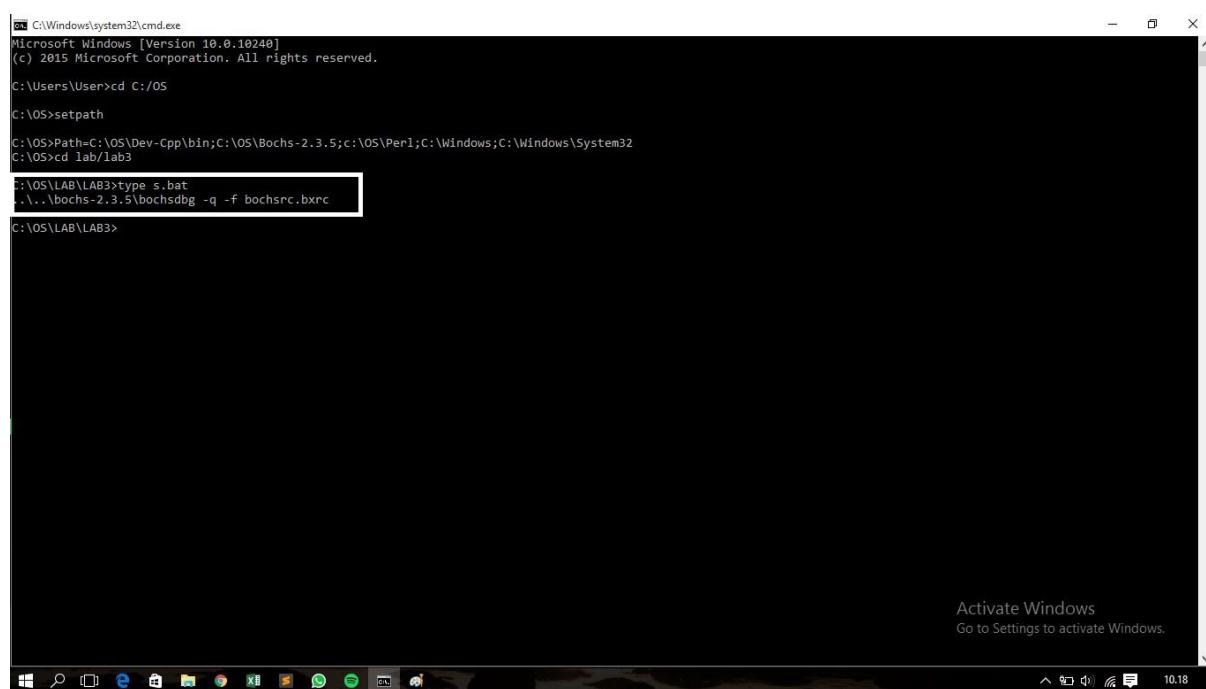


```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\lab3
C:\OS\LAB\LAB3>
```

The screenshot shows a Windows Command Prompt window. The title bar says "C:\Windows\system32\cmd.exe". The command history shows the user navigating to the "C:/OS" directory, setting the PATH environment variable, and then changing to the "lab\lab3" subdirectory. A red box highlights the command "C:\OS>Path=C:\OS\Dev-Cpp\bin;C:\OS\Bochs-2.3.5;c:\OS\Perl;C:\Windows;C:\Windows\System32". In the bottom right corner of the window, there is a watermark that says "Activate Windows Go to Settings to activate Windows." The taskbar at the bottom has icons for File Explorer, Task View, Start, Taskbar settings, and a clock showing 10:05.

4. ketikkan type s.bat

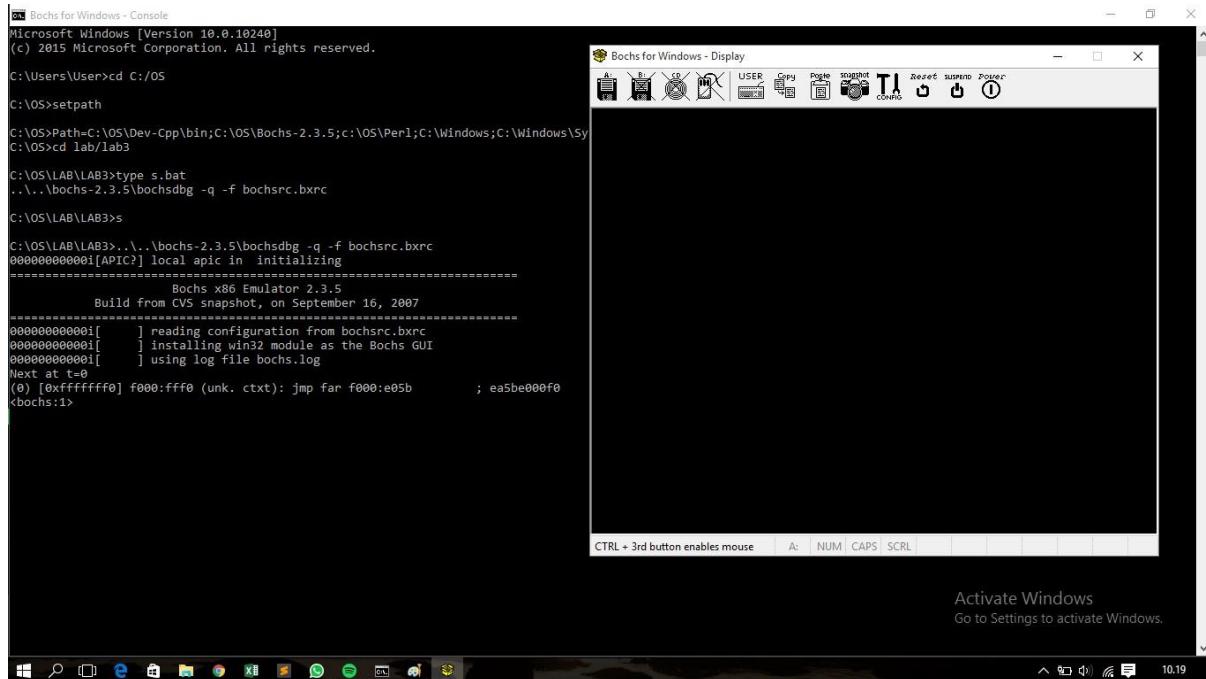


```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\lab3
C:\OS\LAB\LAB3>type s.bat
....\bochs-2.3.5\bochsrc.bxrc
```

The screenshot shows a Windows Command Prompt window. The title bar says "C:\Windows\system32\cmd.exe". The command history shows the user navigating to the "C:/OS" directory, setting the PATH environment variable, and then changing to the "lab\lab3" subdirectory. A red box highlights the command "C:\OS>type s.bat". In the bottom right corner of the window, there is a watermark that says "Activate Windows Go to Settings to activate Windows." The taskbar at the bottom has icons for File Explorer, Task View, Start, Taskbar settings, and a clock showing 10:18.

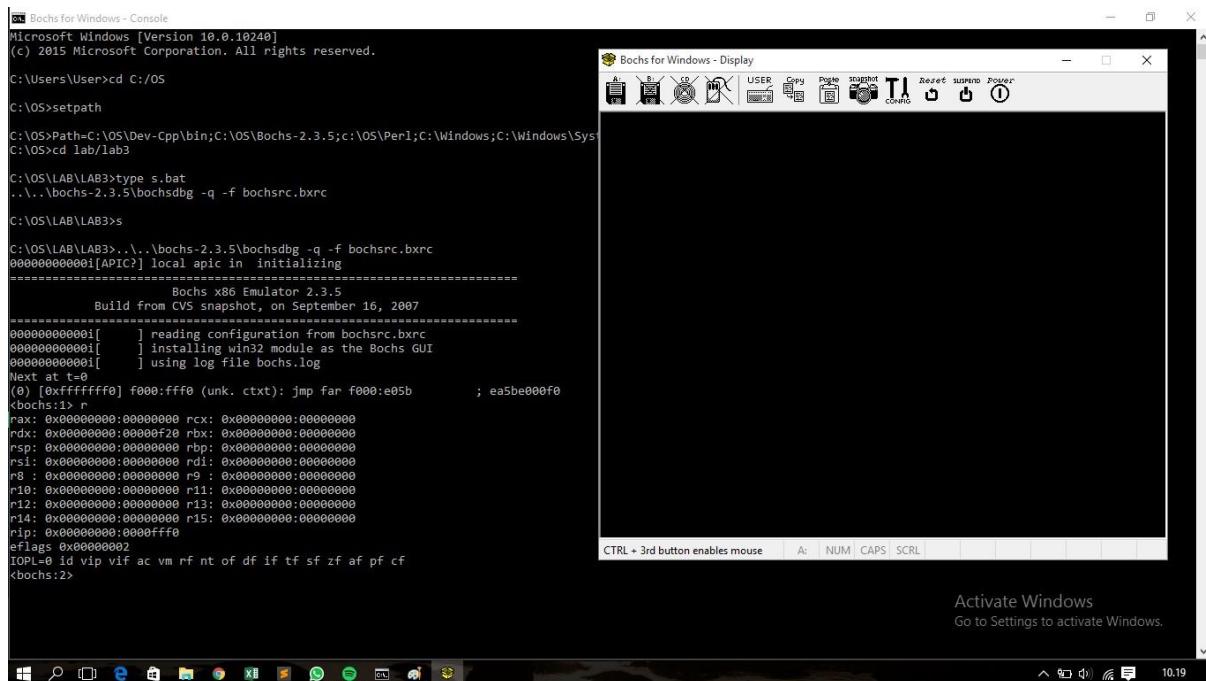
11. Lakukan debugging dengan cara ketik ‘S’



```
Bochs for Windows - Console
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\System
C:\OS>cd lab/lab3
C:\OS\LAB\LAB3>type s.bat
....\bochs-2.3.5\bochsrcdbg -q -f bochsrc.bxrc
C:\OS\LAB\LAB3>s
C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsrcdbg -q -f bochsrc.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 bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b      ; ea5be000f0
<bochs:1>
```

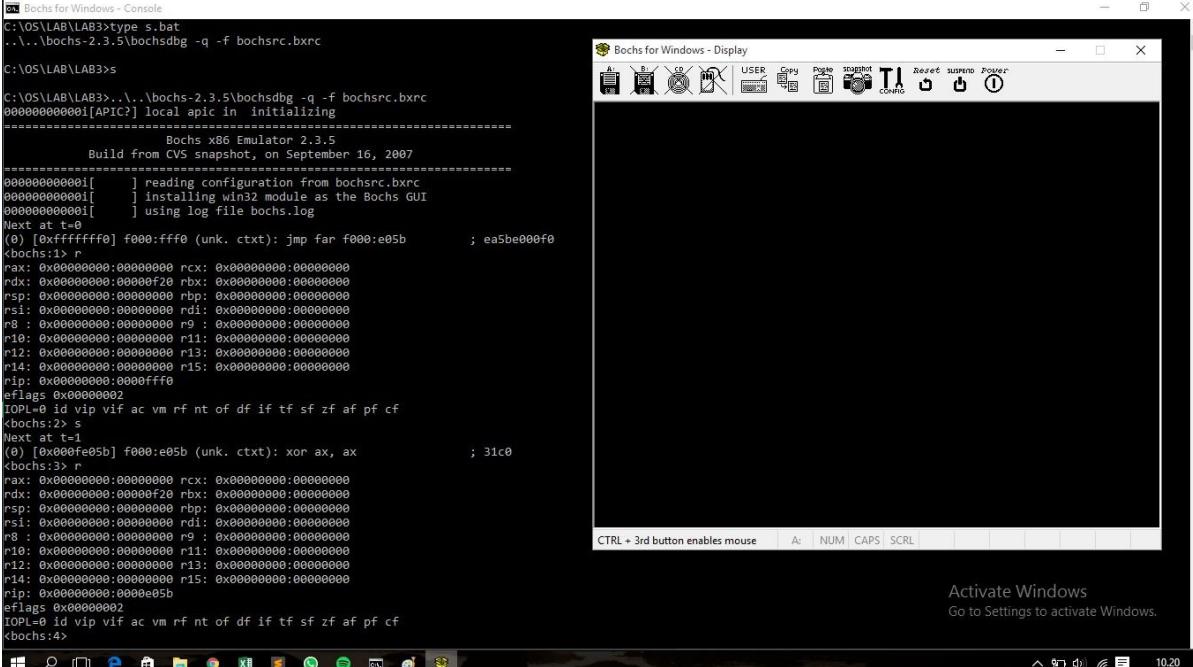
12. Ketikkan ‘r’ untuk melihat isi register CS dan IP.



```
Bochs for Windows - Console
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\User>cd C:/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\System
C:\OS>cd lab/lab3
C:\OS\LAB\LAB3>type s.bat
....\bochs-2.3.5\bochsrcdbg -q -f bochsrc.bxrc
C:\OS\LAB\LAB3>s
C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsrcdbg -q -f bochsrc.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 bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b      ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000f20 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsl: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2>
```

13. Ketikkan ‘s’



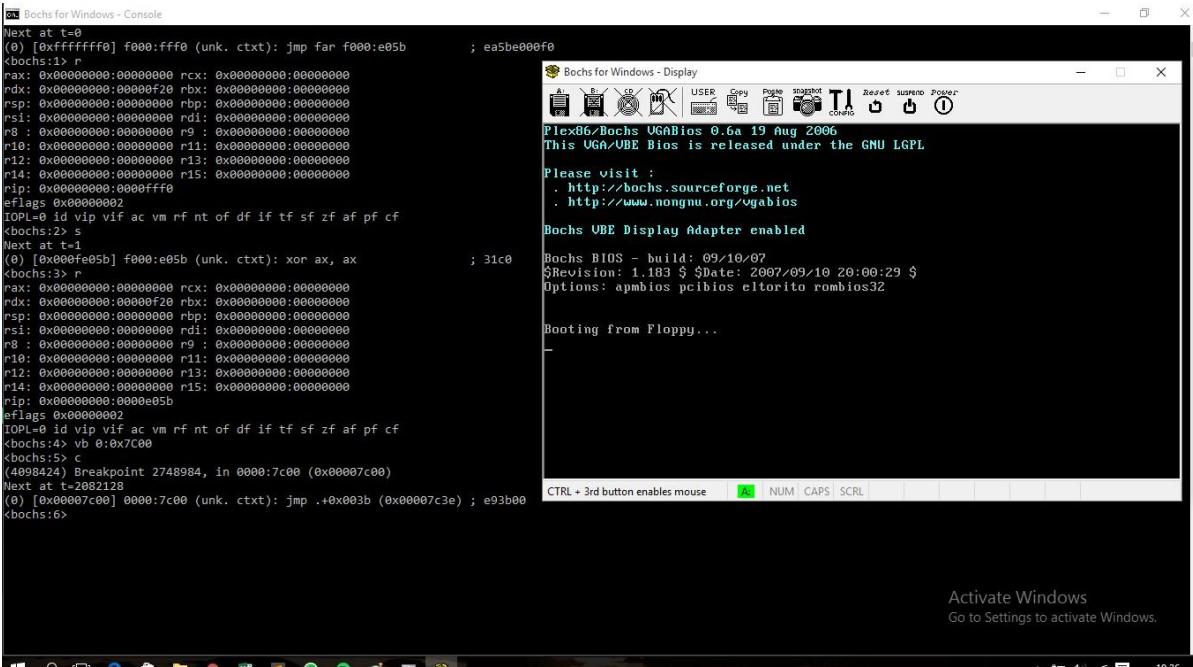
The screenshot shows the Bochs for Windows interface. On the left, a terminal window displays assembly code and register values. On the right, a graphical window titled 'Bochs for Windows - Display' shows a black screen with a toolbar at the top. The taskbar at the bottom shows various icons and the time '10:26'.

```
C:\OS\LAB\LAB3>type s.bat
...\\bochs-2.3.5\bochsrc.bxrc

C:\OS\LAB\LAB3>s

C:\OS\LAB\LAB3>...\\bochs-2.3.5\bochsrc.bxrc
000000000001[APIC2] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000720 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> s
Next at t=1
(0) [0x00fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
<bochs:3> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000720 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:4>
```

14. Kemudian masukkan perintah ‘vb 0:0x7C00’ untuk membuat pemberhentian di alamat tersebut.



The screenshot shows the Bochs for Windows interface. The terminal window now shows the assembly code and registers after setting a breakpoint at address 0:0x7C00. The graphical display window shows the BIOS logo and configuration information. The taskbar at the bottom shows various icons and the time '10:26'.

```
C:\OS\LAB\LAB3>type s.bat
...\\bochs-2.3.5\bochsrc.bxrc

C:\OS\LAB\LAB3>s

C:\OS\LAB\LAB3>...\\bochs-2.3.5\bochsrc.bxrc
000000000001[APIC2] local apic in initializing
=====
Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
000000000001[ ] reading configuration from bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:1> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000720 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000ffff
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:2> s
Next at t=1
(0) [0x00fe05b] f000:e05b (unk. ctxt): xor ax, ax ; 31c0
<bochs:3> r
rax: 0x00000000:00000000 rcx: 0x00000000:00000000
rdx: 0x00000000:00000720 rbx: 0x00000000:00000000
rsp: 0x00000000:00000000 rbp: 0x00000000:00000000
rsi: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac vm rf nt of df if tf sf zf af pf cf
<bochs:4> vb 0:0x7C00
(4098424) Breakpoint 2748984, in 0000:7C00 (0x00007c00)
Next at t=208218
(0) [0x00007c00] 0000:7C00 (unk. ctxt): jmp .+0x003b (0x00007c3e) ; e93b00
<bochs:5>
```

15. Ketikkan ‘c’ untuk continue / melanjutkan. Lalu ketikkan ‘s’ berulang sebanyak 10 kali, dan lakukan pengecekan dengan file boot.asm

The screenshot shows two windows. On the left is the 'Bochs for Windows - Console' window displaying assembly code. On the right is the 'boot - Notepad' window containing the boot.asm assembly code. The assembly code includes instructions for setting up the stack and preparing for the kernel.

```

Bochs for Windows - Console
r5: 0x00000000:00000000 rdi: 0x00000000:00000000
r8 : 0x00000000:00000000 r9 : 0x00000000:00000000
r10: 0x00000000:00000000 r11: 0x00000000:00000000
r12: 0x00000000:00000000 r13: 0x00000000:00000000
r14: 0x00000000:00000000 r15: 0x00000000:00000000
rip: 0x00000000:0000e05b
eflags: 0x00000002
IOPL=0 id vip vif ac rm rf nt of df if tf sf zf af pf cf
<bochs:> s 0:0x7C00
<bochs:> c
(4098424) Breakpoint 2748984, in 0000:7C00 (0x00007C00)
Next at t=2082128
(0) [0xb0007c00] 0000:7C00 (unk. ctxt): jmp .+0x003b (0x00007C3E) ; e93b00
<bochs:> s
Next at t=2082129
(0) [0xb0007c3E] 0000:7C3E (unk. ctxt): cli ; fa
<bochs:> s
Next at t=2082130
(0) [0xb0007C3F] 0000:7C3F (unk. ctxt): mov ax, 0x07C0 ; b8c007
<bochs:> s
Next at t=2082131
(0) [0xb0007C42] 0000:7C42 (unk. ctxt): mov ds, ax ; 8ed8
<bochs:> s
Next at t=2082132
(0) [0xb0007C44] 0000:7C44 (unk. ctxt): mov es, ax ; 8ec0
<bochs:> s
Next at t=2082133
(0) [0xb0007C46] 0000:7C46 (unk. ctxt): mov fs, ax ; 8ee0
<bochs:> s
Next at t=2082134
(0) [0xb0007C48] 0000:7C48 (unk. ctxt): mov gs, ax ; 8ee8
<bochs:> s
Next at t=2082135
(0) [0xb0007C4A] 0000:7C4A (unk. ctxt): mov ax, 0x0000 ; b80000
<bochs:> s
Next at t=2082136
(0) [0xb0007C4D] 0000:7C4D (unk. ctxt): mov ss, ax ; 8ed0
<bochs:> s
Next at t=2082137
(0) [0xb0007C4F] 0000:7C4F (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs:> s
Next at t=2082138
(0) [0xb0007C52] 0000:7C52 (unk. ctxt): sti ; fb
<bochs:>

```

```

boot - Notepad
File Edit Format View Help
BytesPerSector dw 0x0200
SectorsPerCluster db 0x01
ReservedSectors dw 0x0001
TotalFATs db 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"
SystemID db "FAT12"

=====
;(3) Blok BOOT CODE
=====
START:
; Mengatur lokasi kode program pada alamat 7C00:0000, dan mengatur REGISTER SEGMENT
    cli
    mov ax, 0x7C00
    mov ds, ax
    mov es, ax
    mov fs, ax
    mov gs, ax

; Mengatur lokasi stack
    mov ax, 0x0000
    mov ss, ax
    mov sp, 0xFFFF ; sp bergerak dari alamat atas ke bawah
    sti ; activate interrupt

; Mengatur lokasi interrupt
    add byte [ss:0x0000], 0x00 ; activate interrupt

```

16. Ketikkan ‘q’ untuk menghentikan debugging. Kemudian lakukan debugging lagi dengan cara ketikkan ‘s’, kemudian ketikkan ‘vb 0x0100:0x0000’ untuk menghentikan langkah saat

PC mulai mengeksekusi instruksi dari program ‘kernel.bin’, lalu ketikkan ‘c’

The screenshot shows two windows. On the left is the 'Bochs for Windows - Console' window displaying assembly code. On the right is the 'Bochs for Windows - Display' window showing the VGA BIOS interface. The assembly code includes instructions for setting up the stack and preparing for the kernel.

```

Bochs for Windows - Console
<bochs:> s
Next at t=2082134
(0) [0xb0007C48] 0000:7C48 (unk. ctxt): mov gs, ax ; 8e8
<bochs:> s
Next at t=2082135
(0) [0xb0007C4A] 0000:7C4A (unk. ctxt): mov ax, 0x0000 ; b80000
<bochs:> s
Next at t=2082136
(0) [0xb0007C4D] 0000:7C4D (unk. ctxt): mov ss, ax ; 8ed0
<bochs:> s
Next at t=2082137
(0) [0xb0007C4F] 0000:7C4F (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs:> s
Next at t=2082138
(0) [0xb0007C52] 0000:7C52 (unk. ctxt): sti ; fb
<bochs:> q
# In bx_wm32_gui_c::exit(void)!

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

C:\OS\LAB\LAB3>h
'h' is not recognized as an internal or external command,
operable program or batch file.

C:\OS\LAB\LAB3>s

C:\OS\LAB\LAB3>..\bochs-2.3.5\bochsdbg -q -f bochsrc.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 bochsrc.bxrc
000000000001[ ] installing win32 module as the Bochs GUI
000000000001[ ] using log file bochs.log
Next at t=0
(0) [0xffffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be00f0
<bochs:> vb 0x0100:0x0000
<bochs:> c
(9537920) Breakpoint 2748984, in 0100:0000 (0x00001000)
Next at t=2945013
(0) [0xb0001000] 0100:0000 (unk. ctxt): mov ax, 0x0100 ; b80001
<bochs:>

```

17. Kemudian ketikan ‘s’ minimal 10x. Lalu bandingkan hasilnya dengan isi file kernel.asm.

The screenshot shows two windows side-by-side. On the left is the 'Bochs x86 Emulator 2.3.5' window, which displays assembly code and memory dump output. On the right is a 'kernel - Notepad' window containing the source code for the kernel. A red box highlights the assembly code in the emulator window, and another red box highlights the corresponding assembly code in the notepad window, showing they are identical.

```

Bochs x86 Emulator 2.3.5
Build from CVS snapshot, on September 16, 2007
=====
[0] [0xfffffff0] reading configuration from bochsrc.bxrc
[0] [0] installing win32 module as the Bochs GUI
[0] [0] using log file bochs.log
Next at t=0
(0) [0xfffffff0] f000:fff0 (unk. ctxt): jmp far f000:e05b ; ea5be000f0
<bochs:> s
<bochs:> c
(9537920) Breakpoint 2748984, in 0100:0000 (0x00001000)
<bochs:> s
(0) [0xb0001000] 0100:0000 (unk. ctxt): mov ax, 0x0100 ; b80001
<bochs:> s
Next at t=2945014
(0) [0xb0001003] 0100:0003 (unk. ctxt): mov ds, ax ; 8ed8
<bochs:> s
Next at t=2945015
(0) [0xb0001005] 0100:0005 (unk. ctxt): mov es, ax ; 8ec0
<bochs:> s
Next at t=2945016
(0) [0xb0001007] 0100:0007 (unk. ctxt): cli ; fa
<bochs:> s
Next at t=2945017
(0) [0xb0001008] 0100:0008 (unk. ctxt): mov ss, ax ; 8ed0
<bochs:> s
Next at t=2945018
(0) [0xb000100a] 0100:000a (unk. ctxt): mov sp, 0xffff ; bcffff
<bochs:> s
Next at t=2945019
(0) [0xb000100d] 0100:000d (unk. ctxt): sti ; fb
<bochs:> s
Next at t=2945020
(0) [0xb000100e] 0100:000e (unk. ctxt): push dx ; 52
<bochs:> s
Next at t=2945021
(0) [0xb000100f] 0100:000f (unk. ctxt): push es ; 06
<bochs:> s
Next at t=2945022
(0) [0xb0001010] 0100:0010 (unk. ctxt): xor ax, ax ; 31c0
<bochs:> s
Next at t=2945023
(0) [0xb0001012] 0100:0012 (unk. ctxt): mov es, ax ; 8ec0
<bochs:> s

File Edit Format View Help
; Prototype SIMPLE KERNEL ver 0.01
; LAB-INFORMATIKA
; [org 0x0000]
; [bits 16]

[SEGMENT .text]

;START #####
    mov ax, 0x8100
    mov ds, ax
    mov es, ax

    cli
    mov ss, ax
    mov sp, 0xFFFF
    sti

    push dx
    push es
    xor ax, ax
    mov es, ax
    cll

    mov word [es:0x21*4], _int0x21
    mov [es:0x21*4+2], cs ; untuk menampilkan karakter di layar
    sti
    pop es
    pop dx

    mov si, strWelcomeMsg ; Tampilkan informasi proses
    mov al, 0x01 ; request service 0x01
    int 0x21 ; int 0x21

    call _shell ; call the shell Windows
                ; Go to Settings to activate Windows.

; setup interrupt service
; untuk menampilkan karakter di layar
;atur stack segment
;atur stack pointer maksimum 64k
;set interrupt ON
; Lokasi memori untuk menempatkan kernel
; set interrupt OFF
;atur stack segment
;atur stack pointer maksimum 64k
;set interrupt ON
;call the shell Windows
; Go to Settings to activate Windows.

```

TUGAS!

3. Tabel pemetaan memori pada PC

No.	Blok Memori	Alokasi Pemakaian
1	F 0 0 0 0	ROM BIOS, Diagnostic, BASIC
2	E 0 0 0 0	ROM program
3	D 0 0 0 0	ROM program
4	C 0 0 0 0	Perluasan BIOS untuk hardisk XT
5	B 0 0 0 0	Monokrom Monitor
6	A 0 0 0 0	Monitor EGA, VGS, dll
7	9 0 0 0 0	Daerah kerja pemakai s/d 640 KB
8	8 0 0 0 0	Daerah kerja pemakai s/d 576 KB
9	7 0 0 0 0	Daerah kerja pemakai s/d 512 KB
10	6 0 0 0 0	Daerah kerja pemakai s/d 448 KB
11	5 0 0 0 0	Daerah kerja pemakai s/d 384 KB
12	4 0 0 0 0	Daerah kerja pemakai s/d 320 KB
13	3 0 0 0 0	Daerah kerja pemakai s/d 256 KB
14	2 0 0 0 0	Daerah kerja pemakai s/d 192 KB
15	1 0 0 0 0	Daerah kerja pemakai s/d 128 KB
16	0 0 0 0 0	Daerah kerja pemakai s/d 64 KB

4. Perbedaan mode kerja “Real Mode” dan “Protected Mode”

- Real Mode:** Real-Mode adalah sebuah modus di mana prosesor Intel x86 berjalan seolah-olah dirinya adalah sebuah prosesor Intel 8085 atau Intel 8088, meski ia merupakan prosesor Intel 80286 atau lebih tinggi. Karenanya, modus ini juga disebut sebagai modus 8086 (8086 Mode). Dalam modus ini, prosesor

hanya dapat mengeksekusi instruksi 16-bit saja dengan menggunakan register internal yang berukuran 16-bit, serta hanya dapat mengakses hanya 1024 KB dari memori karena hanya menggunakan 20-bit jalur bus alamat. Semua program DOS berjalan pada modus ini.

- b) **Protected Mode:** Modus terproteksi (protected mode) adalah sebuah modus di mana terdapat proteksi ruang alamat memori yang ditawarkan oleh mikroprosesor untuk digunakan oleh sistem operasi. Modus ini datang dengan mikroprosesor Intel 80286 atau yang lebih tinggi. Karena memiliki proteksi ruang alamat memori, maka dalam modus ini sistem operasi dapat melakukan multitasking.

MODUL 5

1. Distro Linux

I. Ubuntu

Ubuntu adalah salah satu distribusi Linux yang berbasiskan pada Debian. Proyek Ubuntu disponsori oleh Canonical Ltd (perusahaan milik Mark Shuttleworth). Nama Ubuntu diambil dari nama sebuah konsep ideologi di Afrika Selatan. "Ubuntu" berasal dari bahasa kuno Afrika, yang berarti "rasa perikemanusian terhadap sesama manusia".

II. CentOS

CentOS adalah sistem operasi bebas yang didasarkan pada Red Hat Enterprise Linux (RHEL). CentOS singkatan dari Community ENTerprise Operating System (Sistem Operasi Perusahaan buatan Komunitas/Masyarakat).

III. Debian

Debian adalah sistem operasi berbasis kernel Linux. Debian adalah 'kernel independent', yaitu sistem operasi Debiandikembangkan murni tanpa mendasarkan pada sistem operasi yang telah ada.

IV. Slackware

Slackware merupakan sistem operasi yang dibuat oleh Patrick Volkerding dari SlackwareLinux, Inc. Slackware merupakan salah satu distro awal, dan merupakan yang tertua yang masih dikelola. Tujuan utama Slackware adalah stabilitas dan kemudahan desain, serta menjadi distribusiLinux yang paling mirip Unix.

V. Red Hat

Red hat dikembangkan oleh perusahaan Red Hat Inc, 2003 diganti menjadi Red Hat Enterprise Linux khusus untuk lingkungan perusahaan. Red Hat pertama kali memperkenalkan penggunaan sistem RPM Package Manager.

2. Perintah Dasar :

- ✓ Head : menampilkan beberapa baris awal pada file teks
- ✓ Nano : mengedit isi dari suatu file teks
- ✓ Wc : menghitung jumlah baris, kata atau karakter dari sebuah file teks
- ✓ Man : menampilkan dokumentasi (manual pages) dari sebuah perintah
- ✓ Useradd : membuat user
- ✓ Chgrp : merubah kepemilikan direktori/kelompok file
- ✓ Chmod : menambah dan mengurangi ijin pemakai untuk mengakses file/direktori
- ✓ Chown : merubah user ID

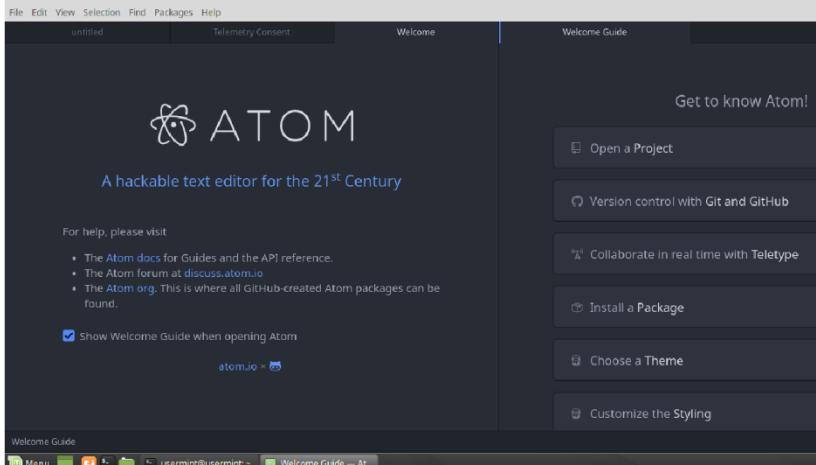
- ✓ Fg : mengembalikan suatu proses yang dihentikan sementara agar berjalan kembali di foreground
- ✓ Find : mencari letak file
- ✓ Gzip : software kompresi zip versi GNU
- ✓ Halt : memberitahu kernel supaya mematikan sistem
- ✓ Hostname : menampilkan host/domain

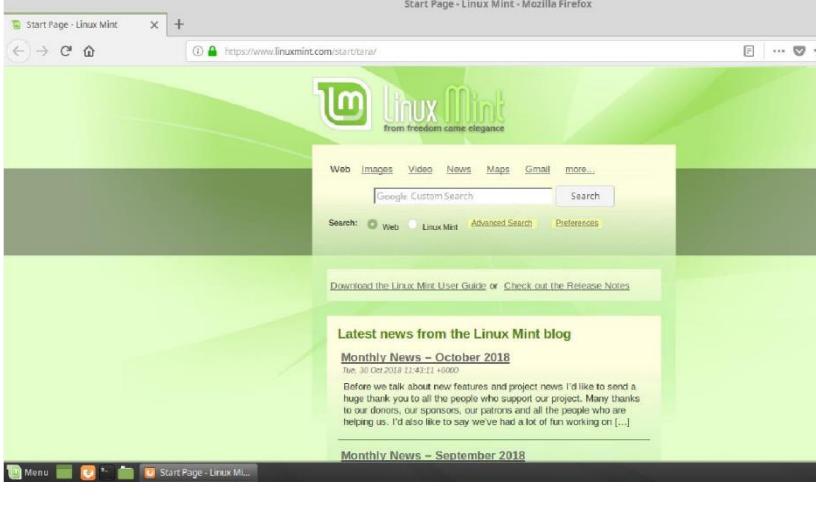
- ✓ Less : perintah more
 - ✓ Login : masuk ke sistem dengan memasukan login ID
 - ✓ Logout : keluar dari sistem
 - ✓ Man : menampilkan teks/manual page
 - ✓ Mesg : memberikan ijin user untuk menampilkan pesan dilayar terminal
 - ✓ More : mempaging hal
 - ✓ Pwd : menampilkan di direktori
 - ✓ Shutdown : mematikan sistem
 - ✓ Su : login sementara sebagai user lain
 - ✓ Talk : percakapan melalui terminal
3. init 0 : untuk maintenance, diagnostic hardware, booting
init 1 : single user mode, tambah patches, backup
init 2 : multiuser mode
init 3 : memperluas multiuser mode
init 4 : alternative multiuser
init 5 : shutdown
init 6 : menghentikan OS kemudian reboot dan kembali ke init default yang ada di etc / inittab
4. perintah “Quota” : perangkat administrasi sistem untuk membatasi dan memantau pemakaian suatu partisi oleh user atau group

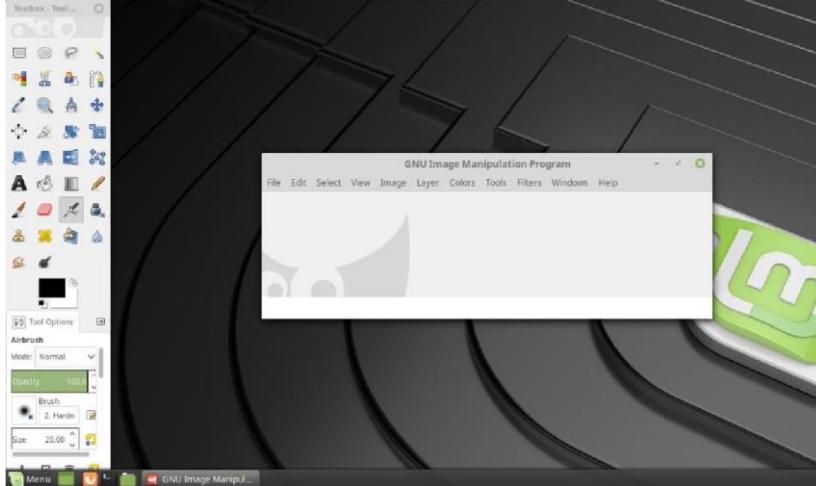
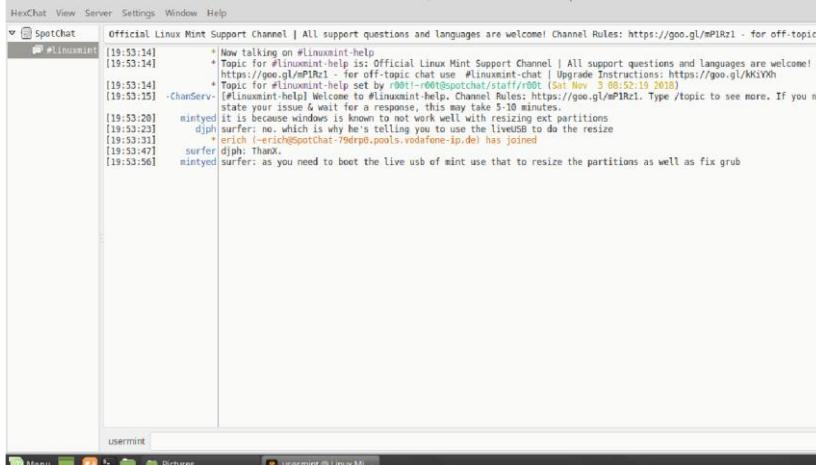
MODUL 6

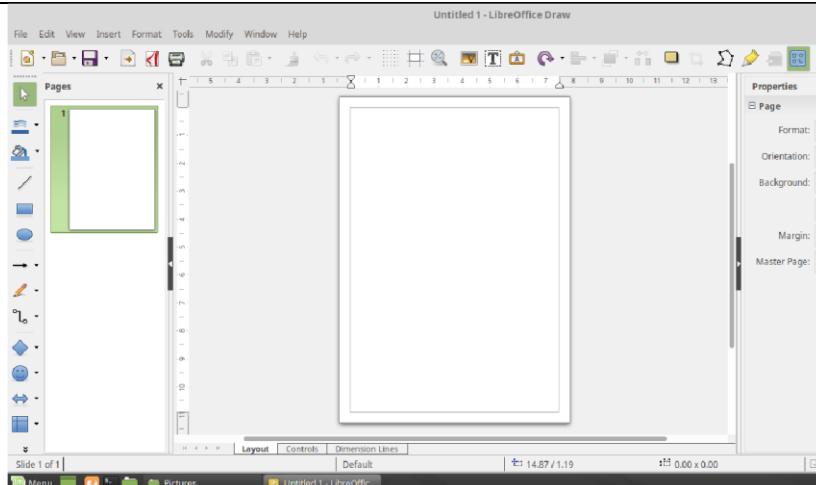
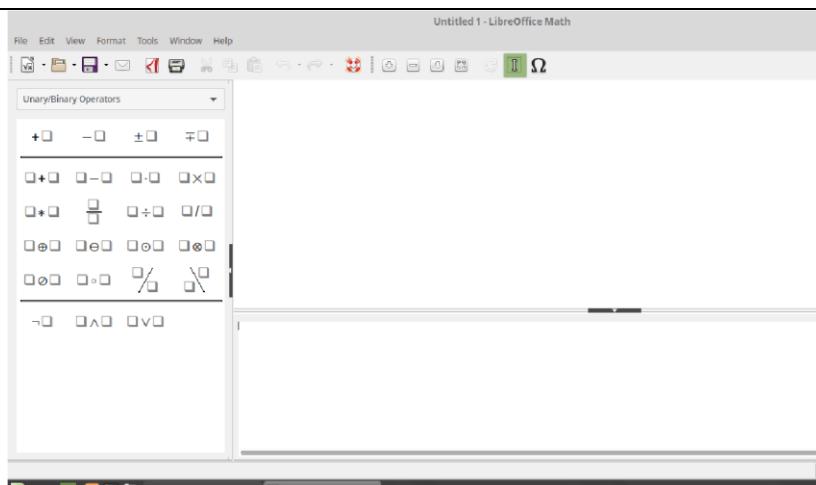
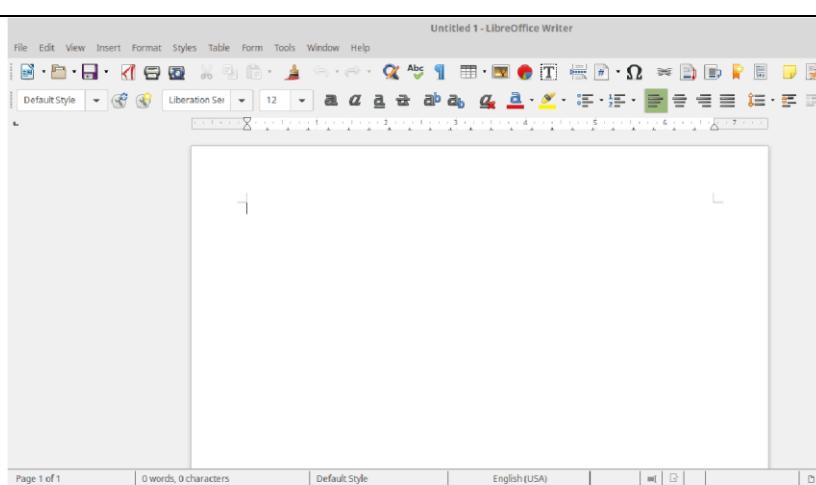
MANAGEMEN USER dan PERMISSION DIREKTORI/ FILE PADA LINUX

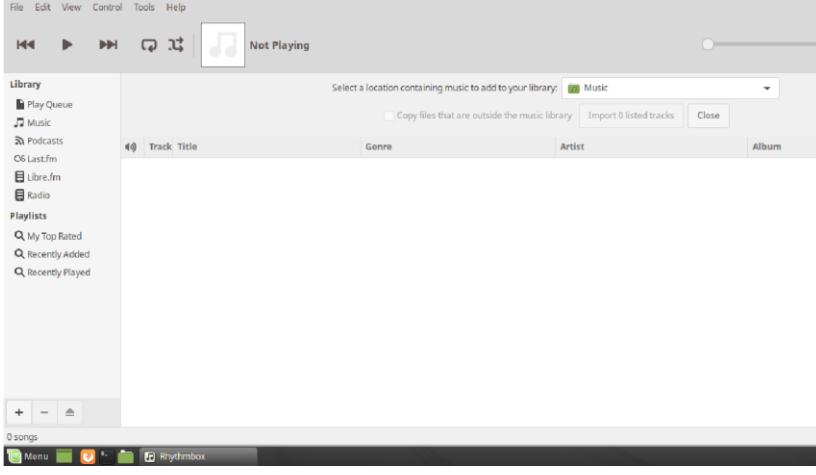
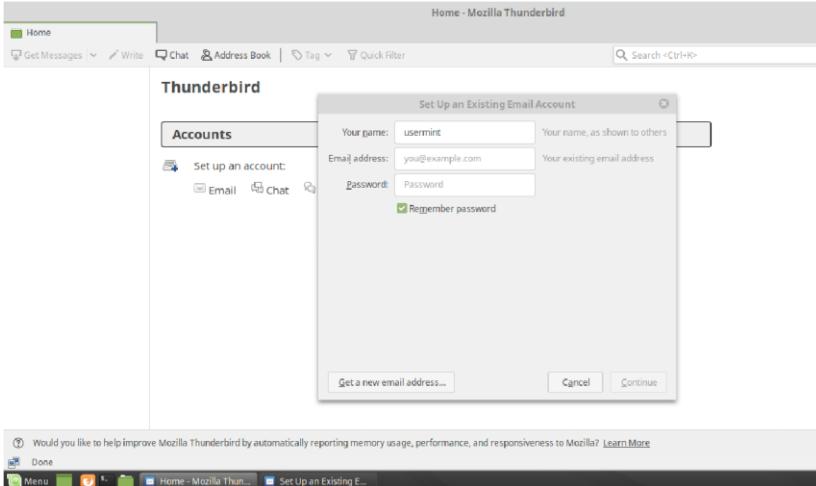
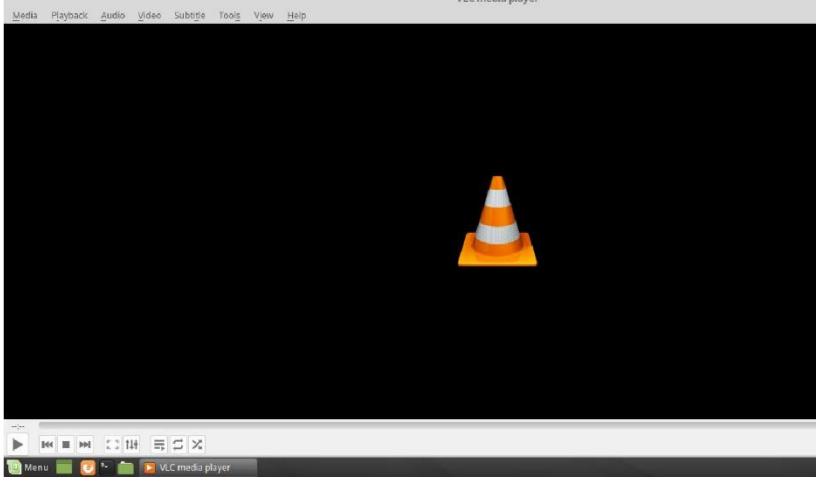
No	Aplikasi	Tampilan	Fungsi

1	Atom	 <p>The screenshot shows the Atom text editor's welcome guide. At the top, there's a menu bar with File, Edit, View, Selection, Find, Packages, Help, and a Telemetry Consent button. Below the menu is a toolbar with Untitled, Welcome, and Welcome Guide buttons. The main area displays the Atom logo and the text "A hackable text editor for the 21st Century". It also includes a "Get to know Atom!" sidebar with links for Open a Project, Version control with Git and GitHub, Collaborate in real time with Teletype, Install a Package, Choose a Theme, and Customize the Styling. At the bottom, there's a status bar with a "Welcome Guide" tab and a URL atom.io.</p>	Berfungsi sebagai teks editor.
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2	Firefox Web Browser	 <p>The screenshot shows a Firefox browser window displaying the Linux Mint start page. The address bar shows "https://www.linuxmint.com/startbar/". The page features the Linux Mint logo and navigation links for Web, Images, Video, News, Maps, Gmail, and more. A search bar is present with "Google Custom Search" and a "Search" button. Below the search bar, there are links for "Download the Linux Mint User Guide" and "Check out the Release Notes". A section titled "Latest news from the Linux Mint blog" lists "Monthly News – October 2018" and "Monthly News – September 2018". The bottom of the page shows the Linux Mint desktop environment with a taskbar.</p>	Sebagai webbrowser atau penjelajah web.
---	---------------------	---	---

3	Gimp		<p>Berfungsi sebagai aplikasi pengolah gambar.</p>
4	HexChat	 <pre> usermint@Linux Mint / #linuxmint-help - HexChat HexChat View Server Settings Window Help v Spotchat #linuxmint-help [19:53:14] * Now talking on #linuxmint-help [19:53:14] * Topic for #linuxmint-help is: Official Linux Mint Support Channel All support questions and languages are welcome! Channel Rules: https://goo.gl/mPIRz1 - for off-topic chat use #linuxmint-chat Upgrade Instructions: https://goo.gl/kK3YXh [19:53:14] * Topic for #linuxmint-help set by r9001-r00t@spotchat/staff/r00t (Sat May 3 08:52:19 2014) [19:53:15] -ChanServ [#linuxmint-help] Welcome to #linuxmint-help. Channel Rules: https://goo.gl/mPIRz1. Type /topic to see more. If you need help with a specific topic, just type it in and someone will respond. [19:53:20] mintyed surfer: as you need to boot the live usb of mint use that to resize the partitions [19:53:23] diph surfer: no, which is why he's telling you to use the liveUSB to do the resize [19:53:31] * erich (~erich@SpotChat-79drp0.pools.vodafone-ip.de) has joined [19:53:47] surfer diph: ThanX. [19:53:56] mintyed surfer: as you need to boot the live usb of mint use that to resize the partitions as well as fix grub </pre>	<p>Berfungsi sebagai aplikasi chatting IRC.</p>
5	LibreOffice Draw		<p>Berfungsi untuk membuat dan memanipulasi data</p>

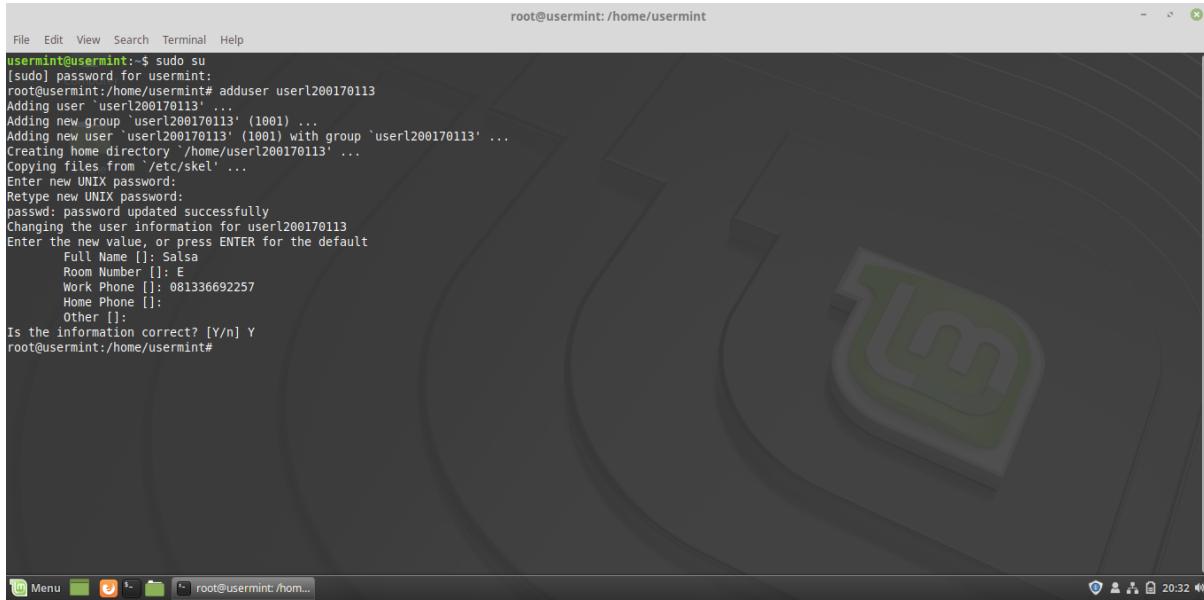
			gambar digital 2 dimensi.
6	LibreOffice Math		Berfungsi sebagai penyunting rumus atau persamaan pada dokumen teks seperti LibreOffice Writer.
7	LibreOffice Writer		Berfungsi sebagai aplikasi pengolah kata.

8	Rhythmb ox		<p>Berfungsi sebagai aplikasi pemutar lagu.</p>
9	ThunderB ird		<p>Berfungsi sebagai aplikasi klien surat elektronik.</p>
10	VLC Media Player		<p>Berfungsi sebagai aplikasi pemutar berkas multimedia .</p>

MODUL 7

Praktikum 1:

1. Membuat user baru

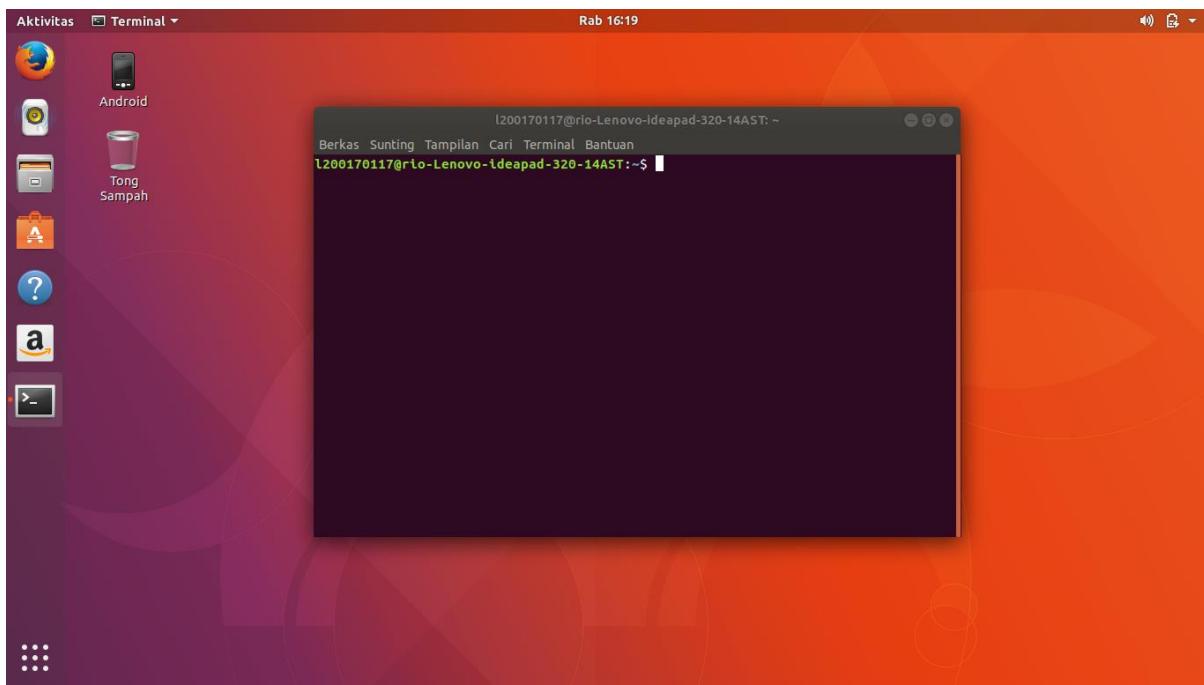


The screenshot shows a terminal window titled "root@usermint:/home/usermint". The terminal displays the following command and its output:

```
root@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# adduser userl200170113
Adding user `userl200170113` (1001) ...
Adding new group `userl200170113` (1001) ...
Adding new user `userl200170113` (1001) with group `userl200170113` ...
Creating home directory `/home/userl200170113` ...
Copying files from `/etc/skel` ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for userl200170113
Enter the new value, or press ENTER for the default
    Full Name []: Salsa
    Room Number []: E
    Work Phone []: 081336692257
    Home Phone []:
    Other []:
Is the information correct? [Y/n] Y
root@usermint:/home/usermint#
```

The terminal window has a dark background with a green logo in the center. The bottom status bar shows icons for menu, file, and system status.

2. Login ke user baru



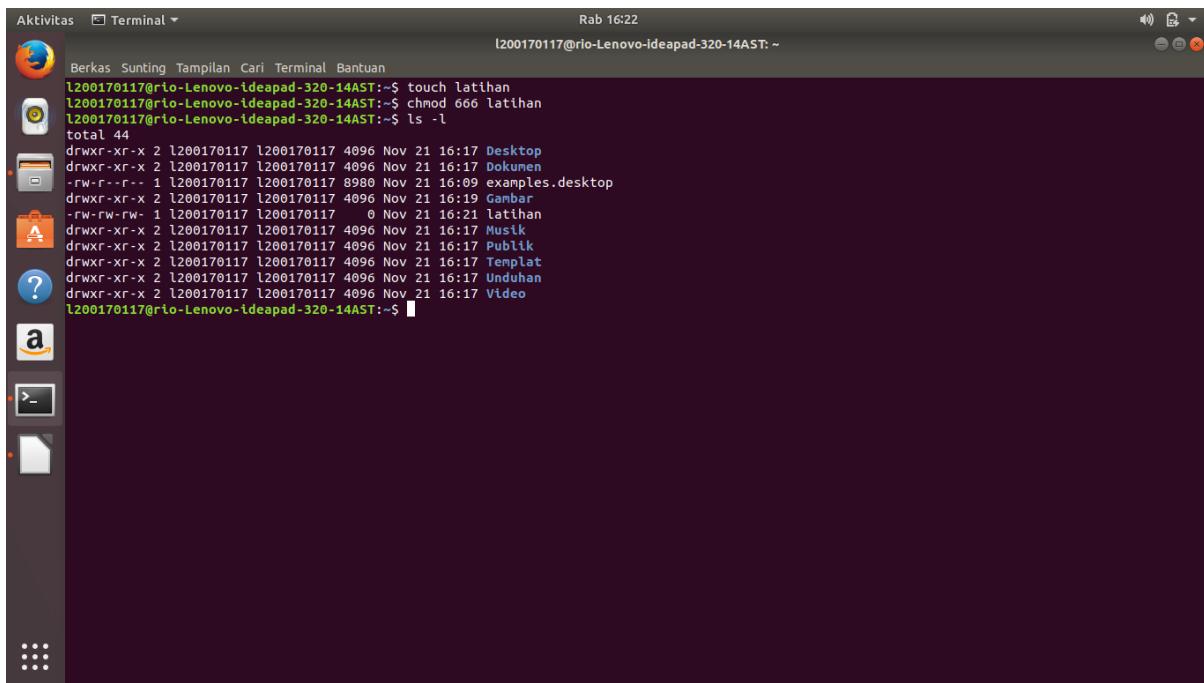
Praktikum 2:

1. Membuat file baru

A screenshot of an Ubuntu desktop environment. The desktop has a purple-to-orange gradient background. On the left, there is a vertical dock with icons for various applications: Aktivitas (Activities), Terminal, Firefox, Android, Tong Sampah (Trash), Help, Amazon, and a terminal icon. A central terminal window is open, showing a command-line session. The terminal title bar says "Rab 16:22". The command history shows:

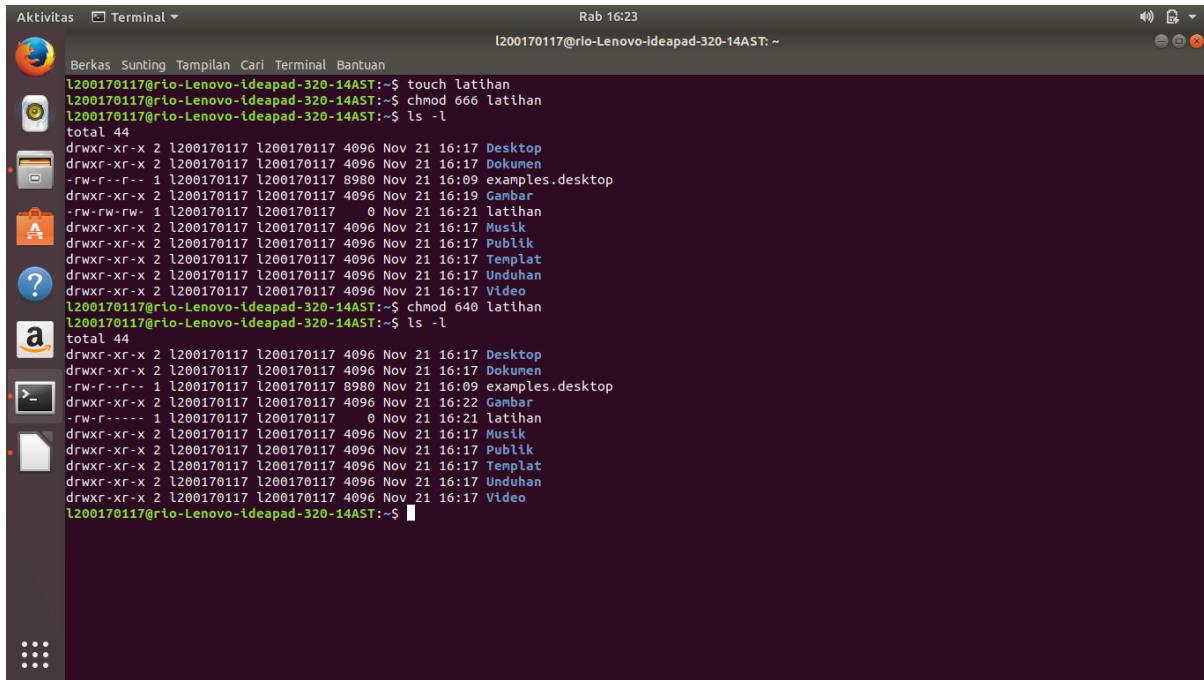
```
Berkas Sunting Tampilan Cari Terminal Bantuan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ touch latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 666 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:19 Gambar
-rw-rw-rw- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

2. Membuat izin akses menjadi read dan write untuk semua pengguna



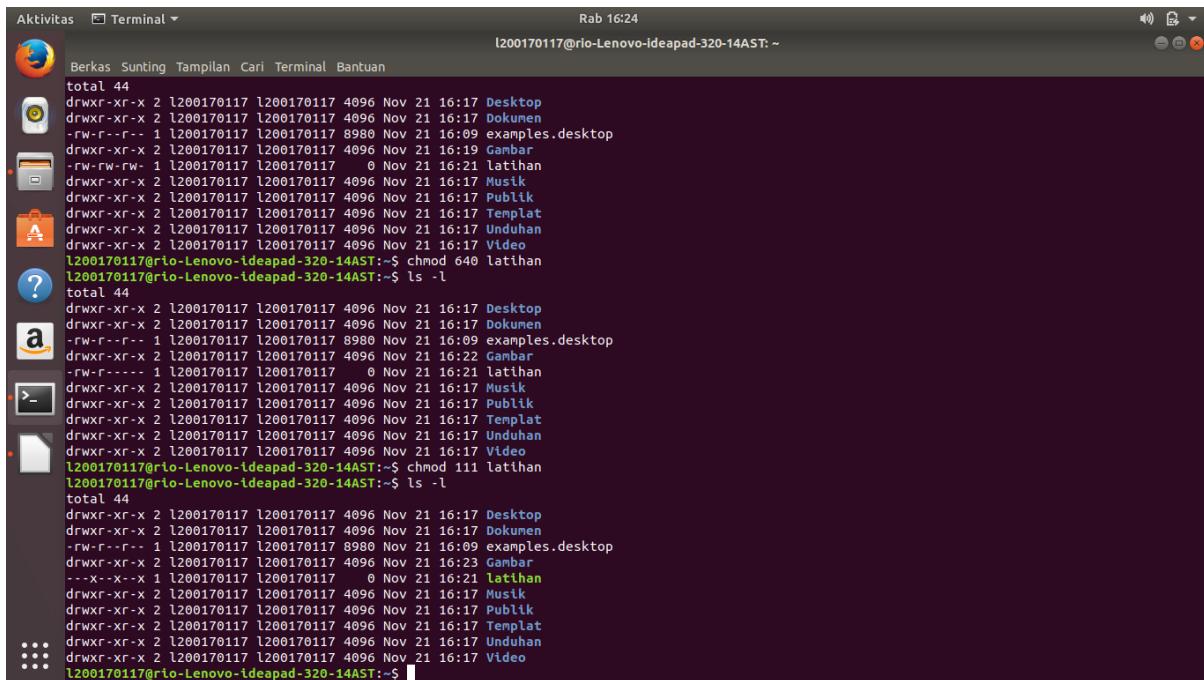
```
Aktivitas Terminal Rab 16:22
Berkas Sunting Tampilan Cari Terminal Bantuan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ touch latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 666 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:19 Gambar
-rw-rw-rw- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

3. Membuat izin akses menjadi read, write untuk user dan read untuk group



```
Aktivitas Terminal Rab 16:23
Berkas Sunting Tampilan Cari Terminal Bantuan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ touch latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 666 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:19 Gambar
-rw-rw-rw- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 640 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:22 Gambar
-rw-r----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

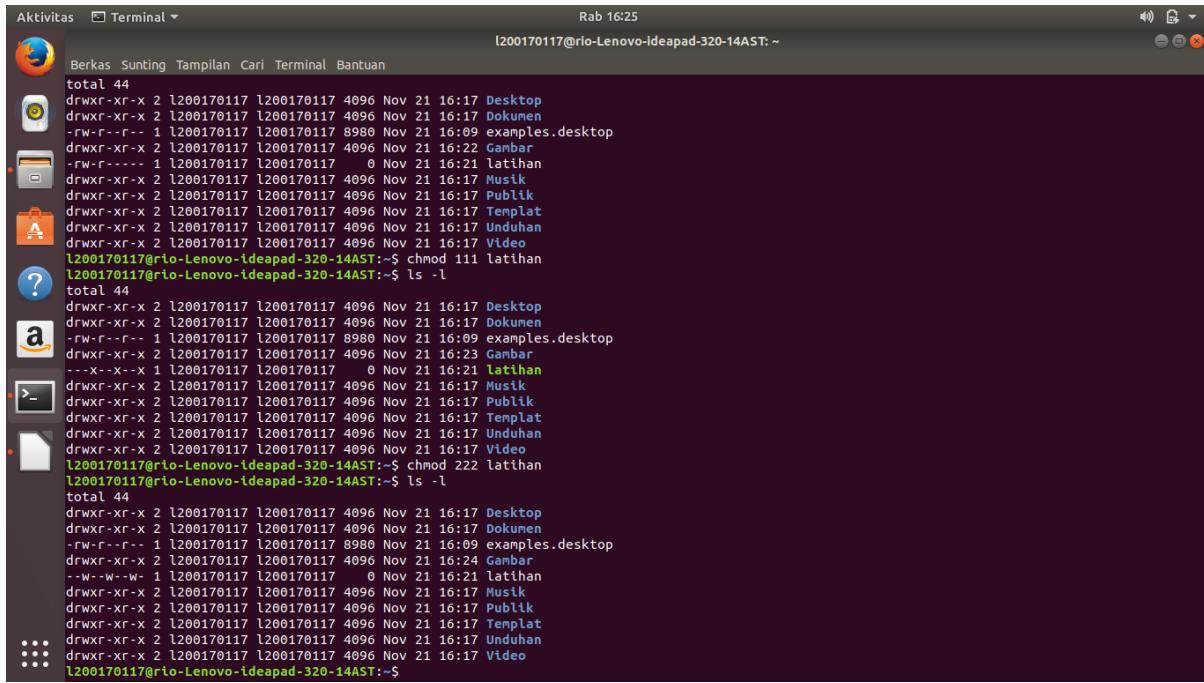
4. Membuat izin akses menjadi execute untuk semua pengguna



A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal window displays a command-line session. The user has run the command "ls -l" twice, once after changing directory to the desktop and once after changing it again. Both times, the output shows a file named "latihan" with permissions set to "rwxr--r--". The user then runs the command "chmod 640 latihan" to change the permissions to "rw-r--r--". Finally, the user runs "chmod 111 latihan" to change the permissions to "rwxr--r--". The desktop background is dark, and there are icons for various applications like a browser, file manager, and system tools.

```
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:19 Gambar
-rw-rw-r- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 640 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:22 Gambar
-rw-r----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 111 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
```

5. Membuat izin akses menjadi write untuk semua pengguna

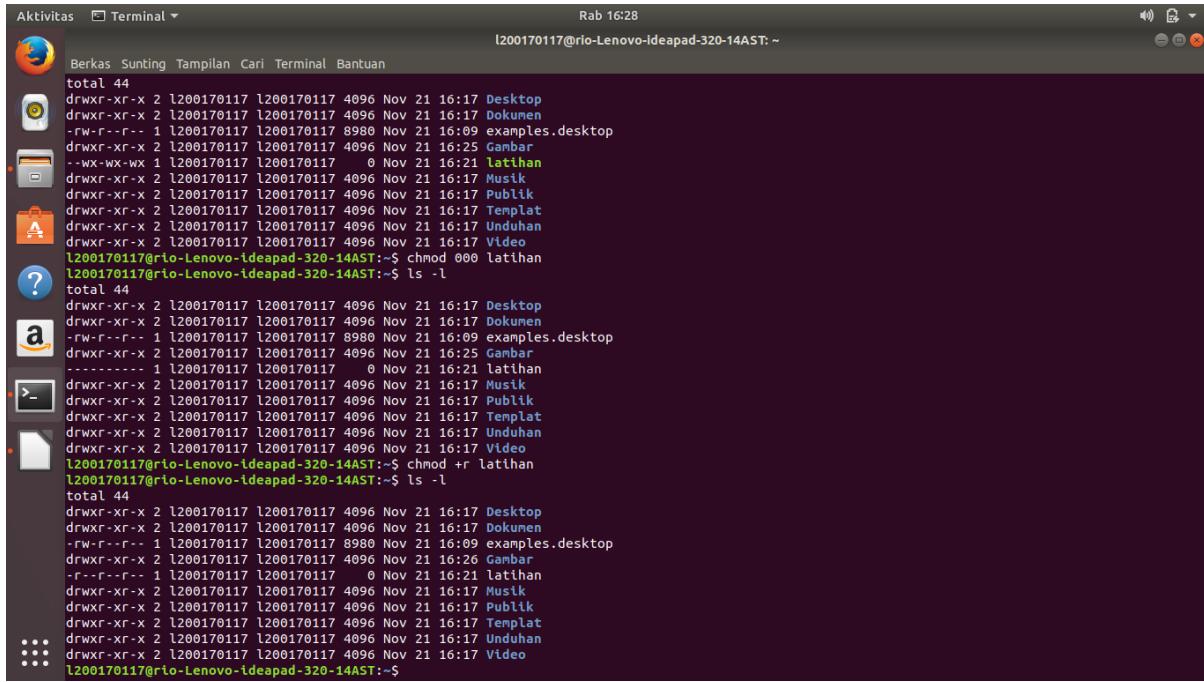


```
Aktivitas Terminal Rab 16:25
l200170117@rio-Lenovo-ideapad-320-14AST: ~

Berkas Sunting Tampilan Cari Terminal Bantuan
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:22 Gambar
-rw-r----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 111 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:24 Gambar
--w--w--w- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 222 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:24 Gambar
--w--w--w- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
```

6. Membuat izin akses menjadi write dan execute untuk semua pengguna

2. Menambah hak akses read

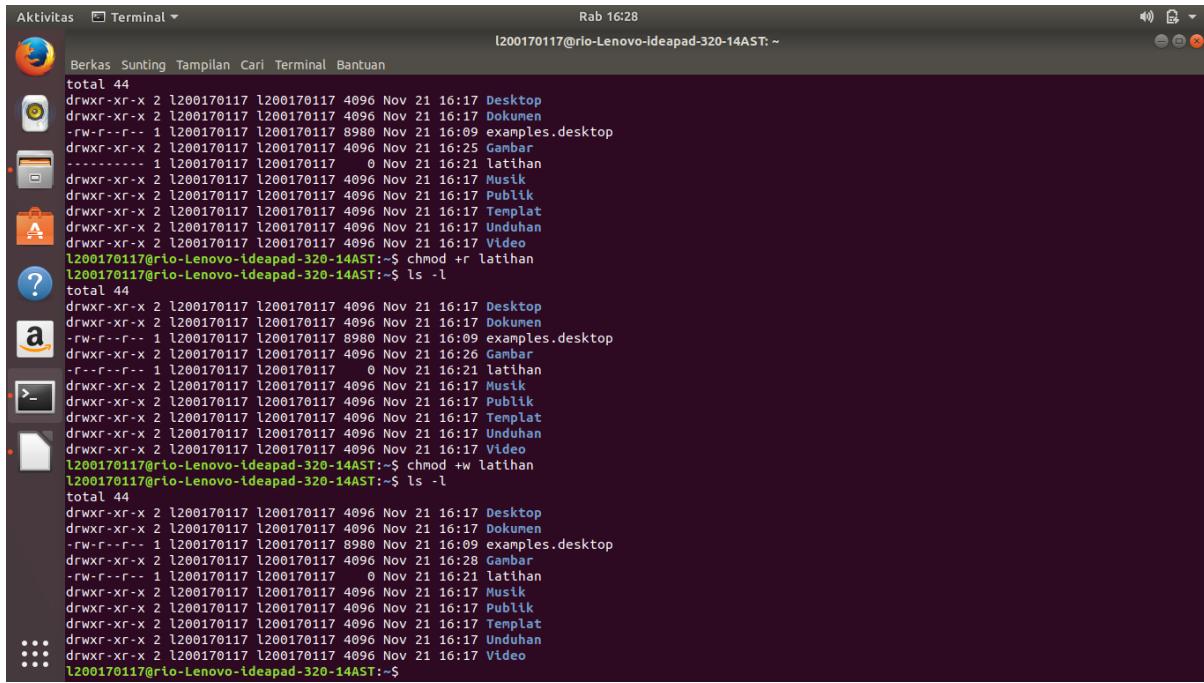


A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal window has a dark background and contains the following command-line session:

```
Rab 16:28
l200170117@rio-Lenovo-ideapad-320-14AST: ~

Berkas Sunting Tampilan Cari Terminal Bantuan
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:25 Gambar
--wxrwx-wx 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod 000 latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:25 Gambar
----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod +r latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:26 Gambar
-r--r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

3. Menambahkan hak akses write



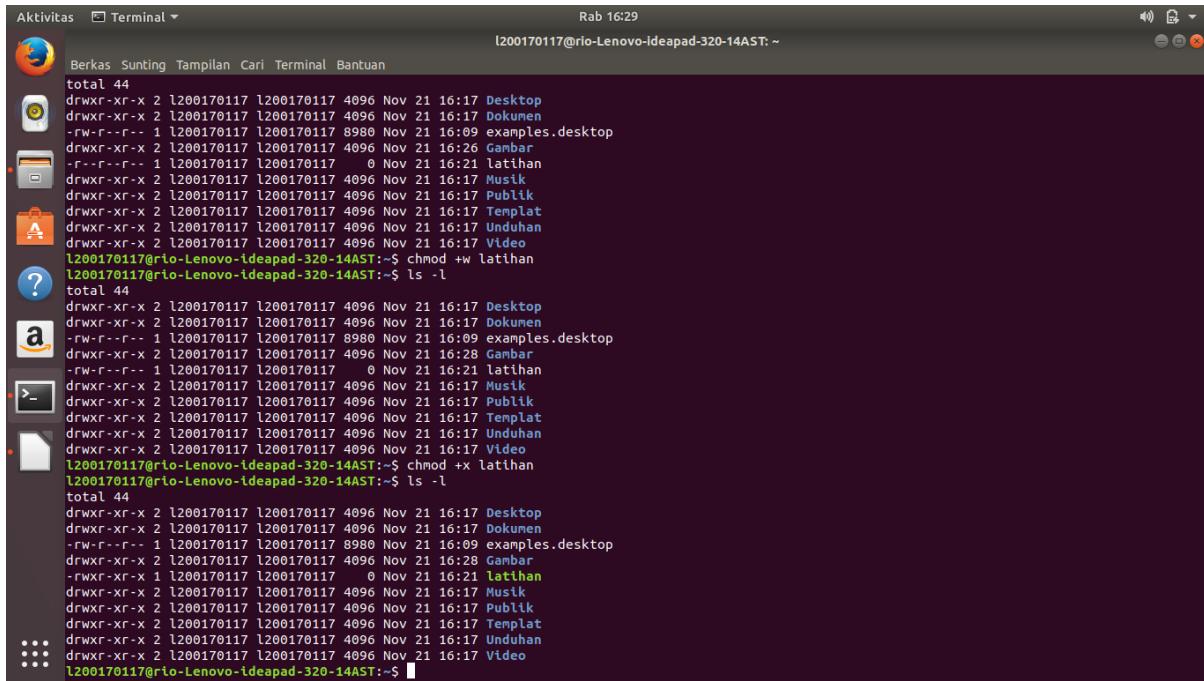
Aktivitas Terminal Rab 16:28 l200170117@rio-Lenovo-ideapad-320-14AST: ~

```
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:25 Gambar
----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod +r latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:26 Gambar
----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod +w latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:28 Gambar
----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

4. Menambahkan hak akses execute

Aktivitas Terminal Rab 16:29

```
[200170117@rio-Lenovo-ideapad-320-14AST: ~]
```

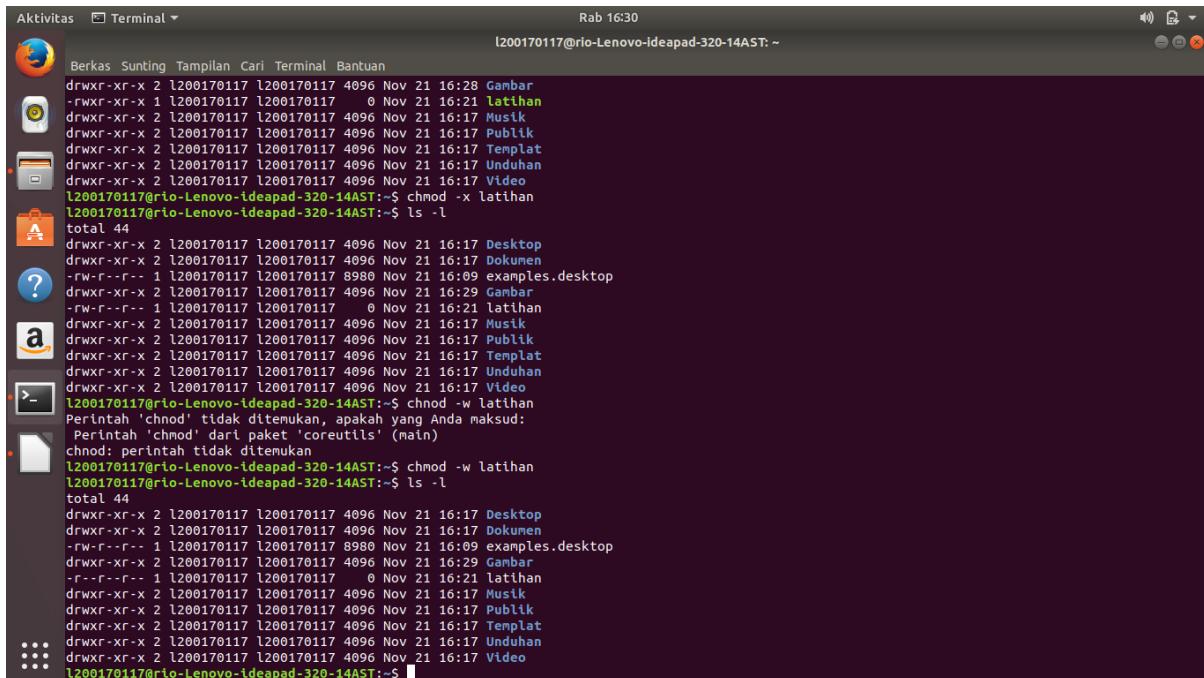


```
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:26 Gambar
-r--r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod +w latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:28 Gambar
-rwxr-xr-x 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod +x latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:28 Gambar
-rwxr-xr-x 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

5. Menghilangkan hak akses execute

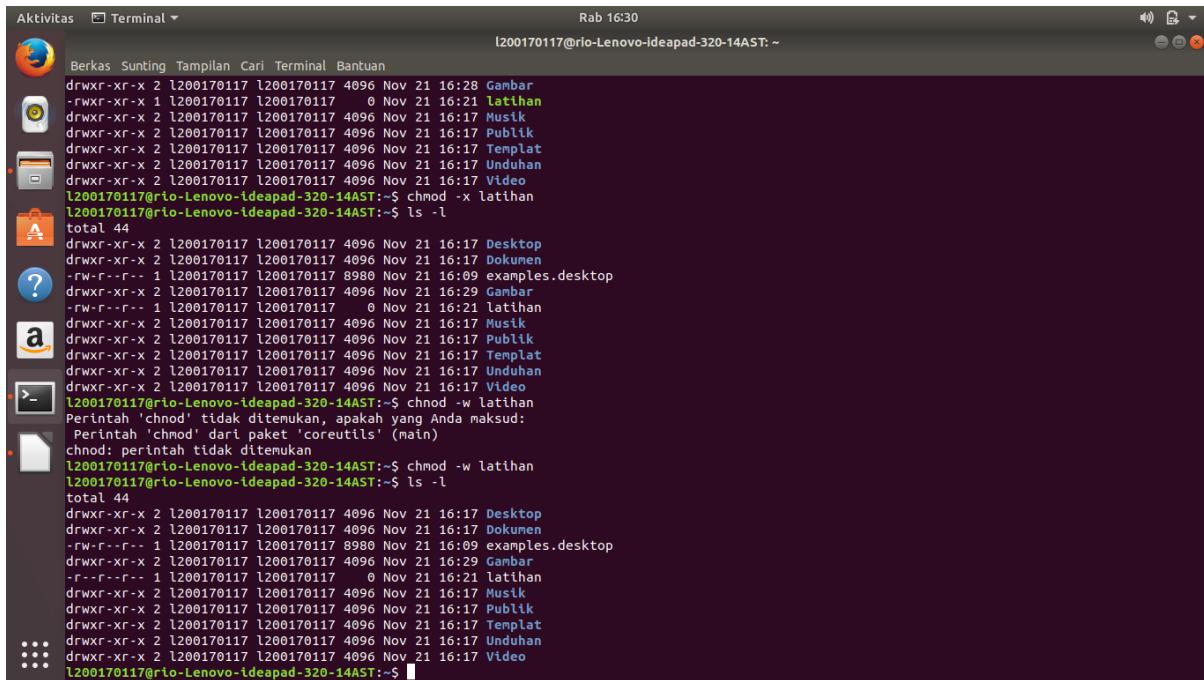
Aktivitas Terminal Rab 16:30

```
[200170117@rio-Lenovo-ideapad-320-14AST: ~]
```



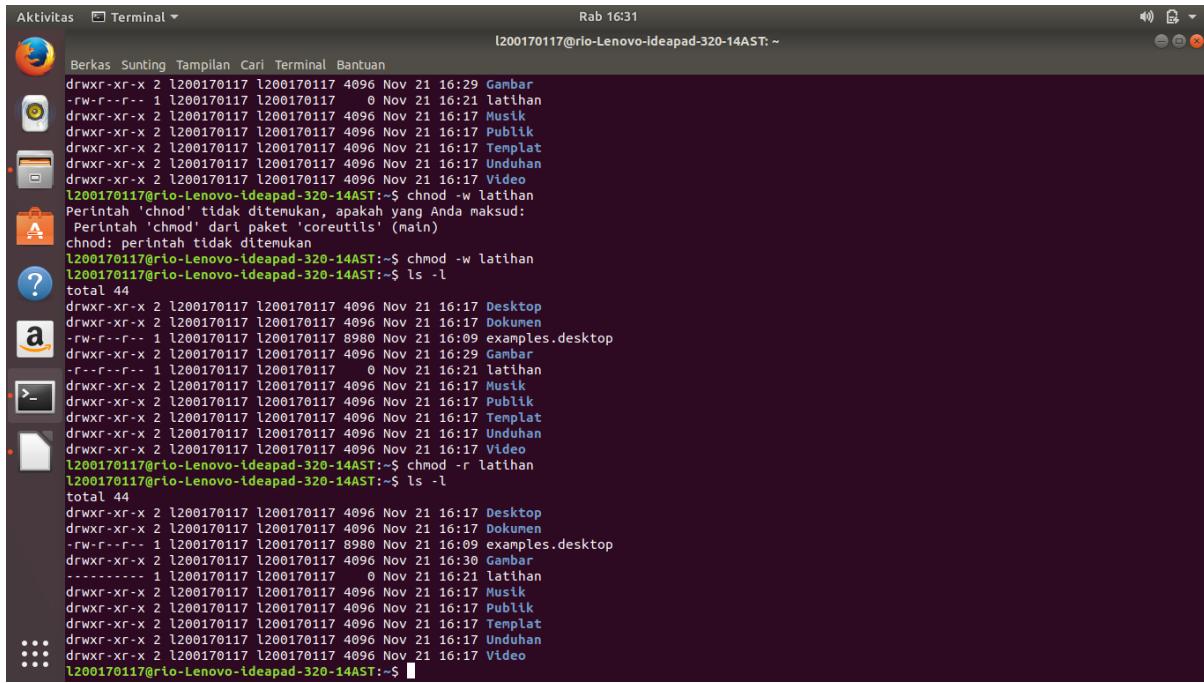
```
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:28 Gambar
-rwxr-xr-x 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -x latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-rw-r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -w latihan
Perintah 'chmod' tidak ditemukan, apakah yang Anda maksud:
  Perintah 'chmod' dari paket 'coreutils' (main)
  chmod: perintah tidak ditemukan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -w latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-r--r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

6. Menghilangkan hak akses write



```
Aktivitas Terminal Rab 16:30
Berkas Sunting Tampilan Cari Terminal Bantuan
l200170117@rio-Lenovo-ideapad-320-14AST: ~
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:28 Gambar
-rwxr-xr-x 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -x latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-rw-r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chnod -w latihan
Perintah 'chnod' tidak ditemukan, apakah yang Anda maksud:
Perintah 'chmod' dari paket 'coreutils' (main)
chnod: perintah tidak ditemukan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -w latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8980 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-r--r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

7. Menghilangkan hak akses read



Aktivitas Terminal Rab 16:31 l200170117@rio-Lenovo-ideapad-320-14AST: ~

```
Berkas Sunting Tampilan Cari Terminal Bantuan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-rw-r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -w latihan
Perintah 'chmod' tidak ditemukan, apakah yang Anda maksud:
Perintah 'chmod' dari paket 'coreutils' (main)
chmod: perintah tidak ditemukan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:29 Gambar
-rw-r--r-- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$ chmod -r latihan
l200170117@rio-Lenovo-ideapad-320-14AST:~$ ls -l
total 44
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Dokumen
-rw-r--r-- 1 l200170117 l200170117 8988 Nov 21 16:09 examples.desktop
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:30 Gambar
----- 1 l200170117 l200170117 0 Nov 21 16:21 latihan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Musik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Publik
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Templat
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Unduhan
drwxr-xr-x 2 l200170117 l200170117 4096 Nov 21 16:17 Video
l200170117@rio-Lenovo-ideapad-320-14AST:~$
```

Praktikum 4

1. Masuk ke bin

```
File Edit View Search Terminal Help  
usermint@usermint:~$ sudo su  
[sudo] password for usermint:  
root@usermint:/home/usermint# usermod -aG sudo userl200170113  
root@usermint:/home/usermint# su userl200170113  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
userl200170113@usermint:/home/usermint$ whoami  
userl200170113  
userl200170113@usermint:/home/usermint$ cd /bin  
userl200170113@usermint:/bin$ sudo su  
[sudo] password for userl200170113:  
root@usermint:/bin# nano infol200170113.sh  
root@usermint:/bin# █
```

2. Membuat file dan sekaligus ketik isi

```
File Edit View Search Terminal Help  
usermint@usermint:~$ sudo su  
[sudo] password for usermint:  
root@usermint:/home/usermint# usermod -aG sudo userl200170113  
root@usermint:/home/usermint# su userl200170113  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
userl200170113@usermint:/home/usermint$ whoami  
userl200170113  
userl200170113@usermint:/home/usermint$ cd /bin  
userl200170113@usermint:/bin$ sudo su  
[sudo] password for userl200170113:  
root@usermint:/bin# nano infol200170113.sh  
root@usermint:/bin# nano infol200170113.sh  
root@usermint:/bin# █
```

```
File Edit View Search Terminal Help
GNU nano 2.9.3           infol200170113.sh

#!/bin/sh
WAKTU="Tanggal dan jam saat ini: \c"
JMLUSER="Jumlah user: \c"
AKU="Status personal: \c"
echo -e "$WAKTU"
date
echo -e "$JMLUSER"
who | wc -l
echo -e "$AKU"
whoami
exit 0

[ Read 11 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Linter ^L Go To Line
```

3. Masukkan perintah logininfo.sh

```
root@usermint:/bin
File Edit View Search Terminal Help
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# usermod -aG sudo userl200170113
root@usermint:/home/usermint# su userl200170113
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

userl200170113@usermint:/home/usermint$ whoami
userl200170113
userl200170113@usermint:/home/usermint$ cd /bin
userl200170113@usermint:/bin$ sudo su
[sudo] password for userl200170113:
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# infol200170113.sh
```

```
root@usermint: /bin
File Edit View Search Terminal Help
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# usermod -aG sudo userl200170113
root@usermint:/home/usermint# su userl200170113
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

userl200170113@usermint:/home/usermint$ whoami
userl200170113
userl200170113@usermint:/home/usermint$ cd /bin
userl200170113@usermint:/bin$ sudo su
[sudo] password for userl200170113:
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# infol200170113.sh
bash: /bin/infol200170113.sh: Permission denied
root@usermint:/bin#
```

5. Ubah hak akses

```
root@usermint: /bin
File Edit View Search Terminal Help
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# usermod -aG sudo userl200170113
root@usermint:/home/usermint# su userl200170113
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

userl200170113@usermint:/home/usermint$ whoami
userl200170113
userl200170113@usermint:/home/usermint$ cd /bin
userl200170113@usermint:/bin$ sudo su
[sudo] password for userl200170113:
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# infol200170113.sh
bash: /bin/infol200170113.sh: Permission denied
root@usermint:/bin# chmod 777 infol200170113.sh
root@usermint:/bin#
```

6. Lihat hasilnya

The screenshot shows a terminal window titled "root@usermint: /bin". The window has a standard title bar with icons for minimize, maximize, and close. Below the title bar is a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The main area of the terminal displays the following command-line session:

```
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# usermod -aG sudo userl200170113
root@usermint:/home/usermint# su userl200170113
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

userl200170113@usermint:/home/usermint$ whoami
userl200170113
userl200170113@usermint:/home/usermint$ cd /bin
userl200170113@usermint:/bin$ sudo su
[sudo] password for userl200170113:
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# nano infol200170113.sh
root@usermint:/bin# infol200170113.sh
bash: /bin/infol200170113.sh: Permission denied
root@usermint:/bin# chmod 777 infol200170113.sh
root@usermint:/bin# infol200170113.sh
-e Tanggal dan jam saat ini: Tue Nov 20 09:27:15 WIB 2018
-e Jumlah user: 2
-e Status personal: root
root@usermint:/bin#
```

A red rectangular box highlights the output of the "infol200170113.sh" command, which shows the current date and time, the number of users, and the personal status as "root".

MODUL 8

Fork.c

LinuxMint19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint: /home/usermint

File Edit View Search Terminal Help

GNU nano 2.9.3 fork.c

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>

int main(){
    pid_t pid;
    int x = 5;
    x++;
    if(pid < 0){
        printf("Process creation error");exit(-1);
    }
    else if(pid == 0){
        printf("Child process:");
        printf("\nProcess id is %d", getpid());
        printf("\nValue of x is %d", x);
        printf("\nProcess id of parent is %d\n\n", getppid());
    }
    else{
        printf("Parent process:");
        printf("\nProcess id is %d", getpid());
        printf("\nValue of x is %d", x);
        printf("\nProcess id of parent is %d\n\n", getppid());
    }
}
```

[Read 25 lines]

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos M-U Undo
^X Exit ^R Read File ^A Replace ^U Uncut Text ^T To Spell ^G Go To Line M-E Redo
M-A Mark Text M-J To Bracket M-▲ Previous M-W WhereIs Next M-▼ Next
M-G Copy Text

root@usermint: /home... 20:38

Menu Right Ctrl 20:38

LinuxMint19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint: /home/usermint

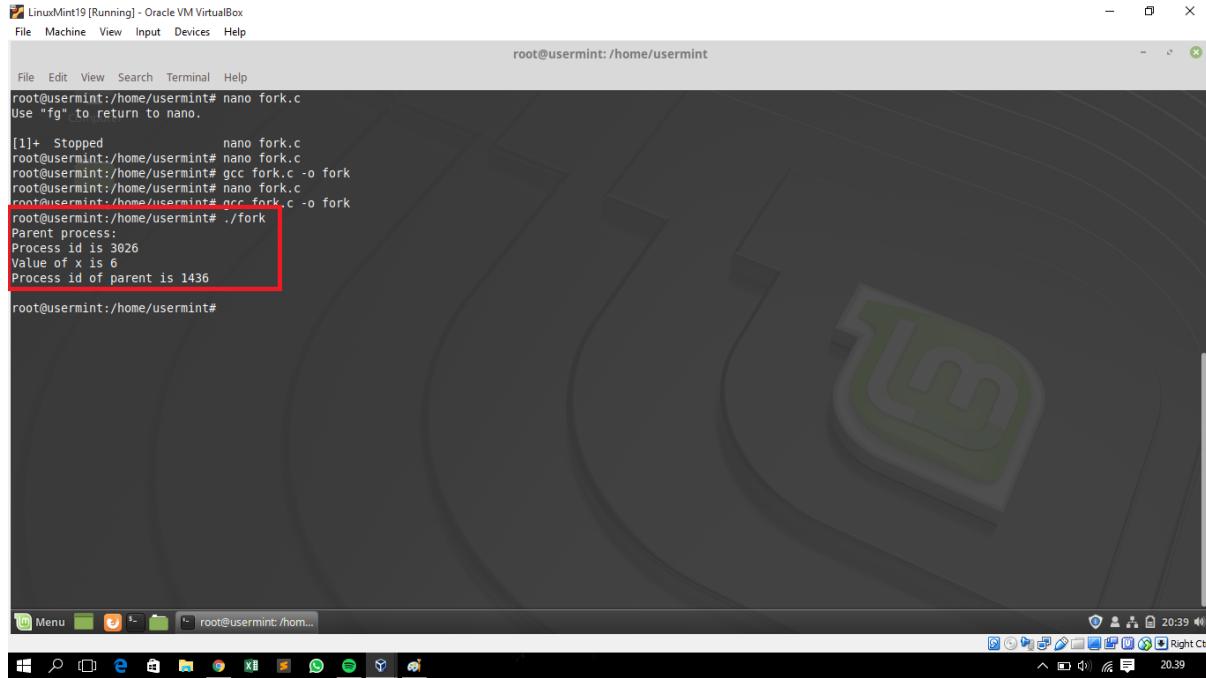
File Edit View Search Terminal Help

```
root@usermint:/home/usermint# nano fork.c
Use "fg" to return to nano.

[1]+  Stopped                  nano fork.c
root@usermint:/home/usermint# nano fork.c
root@usermint:/home/usermint# gcc fork.c -o fork
root@usermint:/home/usermint# nano fork.c
root@usermint:/home/usermint# gcc fork.c -o fork
root@usermint:/home/usermint#
```

root@usermint: /home... 20:39

Menu Right Ctrl 20:39

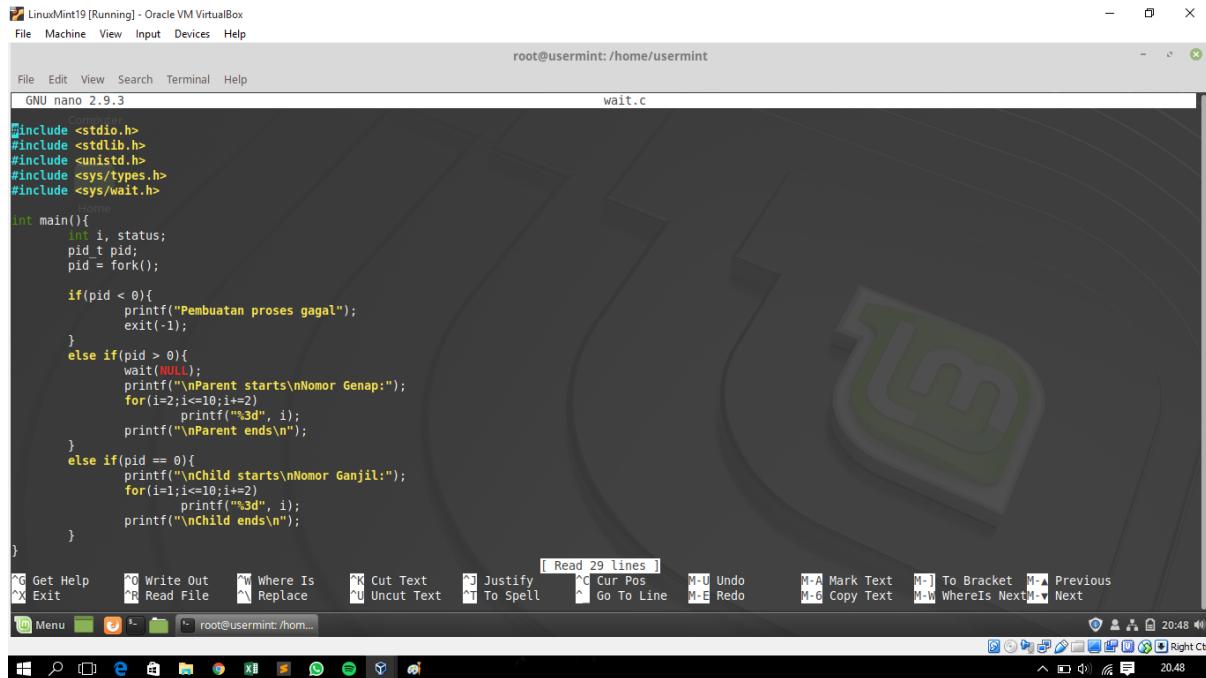


```
root@sermint:/home/sermint# nano fork.c
Use "fg" to return to nano.

[1]+  Stopped                  nano fork.c
root@sermint:/home/sermint# nano fork.c
root@sermint:/home/sermint# gcc fork.c -o fork
root@sermint:/home/sermint# nano fork.c
root@sermint:/home/sermint# gcc fork.c -o fork
root@sermint:/home/sermint# ./fork
Parent process:
Process id is 3026
Value of x is 6
Process id of parent is 1436

root@sermint:/home/sermint#
```

Wait.c



```
root@sermint:/home/sermint# nano 2.9.3
GNU nano 2.9.3
[1]+  Stopped                  nano 2.9.3
root@sermint:/home/sermint# nano 2.9.3
root@sermint:/home/sermint# cat wait.c
#include <Compuer.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/wait.h>

int main(){
    int i, status;
    pid_t pid;
    pid = fork();

    if(pid < 0){
        printf("\nPembuatan proses gagal");
        exit(-1);
    }
    else if(pid > 0){
        wait(NULL);
        printf("\nParent starts\nNomor Genap:");
        for(i=2;i<10;i+=2)
            printf("%d", i);
        printf("\nParent ends\n");
    }
    else if(pid == 0){
        printf("\nChild starts\nNomor Ganjil:");
        for(i=1;i<10;i+=2)
            printf("%d", i);
        printf("\nChild ends\n");
    }
}

[ Read 29 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos  M-U Undo  M-A Mark Text  M-J To Bracket  M-▲ Previous
^X Exit  ^R Read File  ^L Replace  ^U Uncut Text  ^T To Spell  ^G Go To Line  M-E Redo  M-G Copy Text  M-W WhereIs NextM-▼ Next
root@sermint:/home/sermint#
```

```
LinuxMint19 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@usermint:/home/usermint
File Edit View Search Terminal Help
root@usermint:/home/usermint# nano fork.c
Use "fg" to return to nano.
[1]+  Stopped                  nano fork.c
root@usermint:/home/usermint# nano fork.c
root@usermint:/home/usermint# gcc fork.c -o fork
root@usermint:/home/usermint# nano fork.c
root@usermint:/home/usermint# gcc fork.c -o fork
root@usermint:/home/usermint# ./fork
Parent process:
Process id is 3026
Value of x is 6
Process id of parent is 1436

root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
wait.c:3:10: fatal error: unistd.h: No such file or directory
 #include <unistd.h>
           ^
compilation terminated.
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# In function 'main':
wait.c:16:10: error: 'p' undeclared (first use in this function)
 else if(p > 0){

wait.c:16:10: note: each undeclared identifier is reported only once for each function it appears in
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# ./wait
root@usermint:/home/usermint#
```

```
LinuxMint19 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@usermint:/home/usermint
File Edit View Search Terminal Help
root@usermint:/home/usermint# ./fork
Parent process:
Process id is 3026
Value of x is 6
Process id of parent is 1436

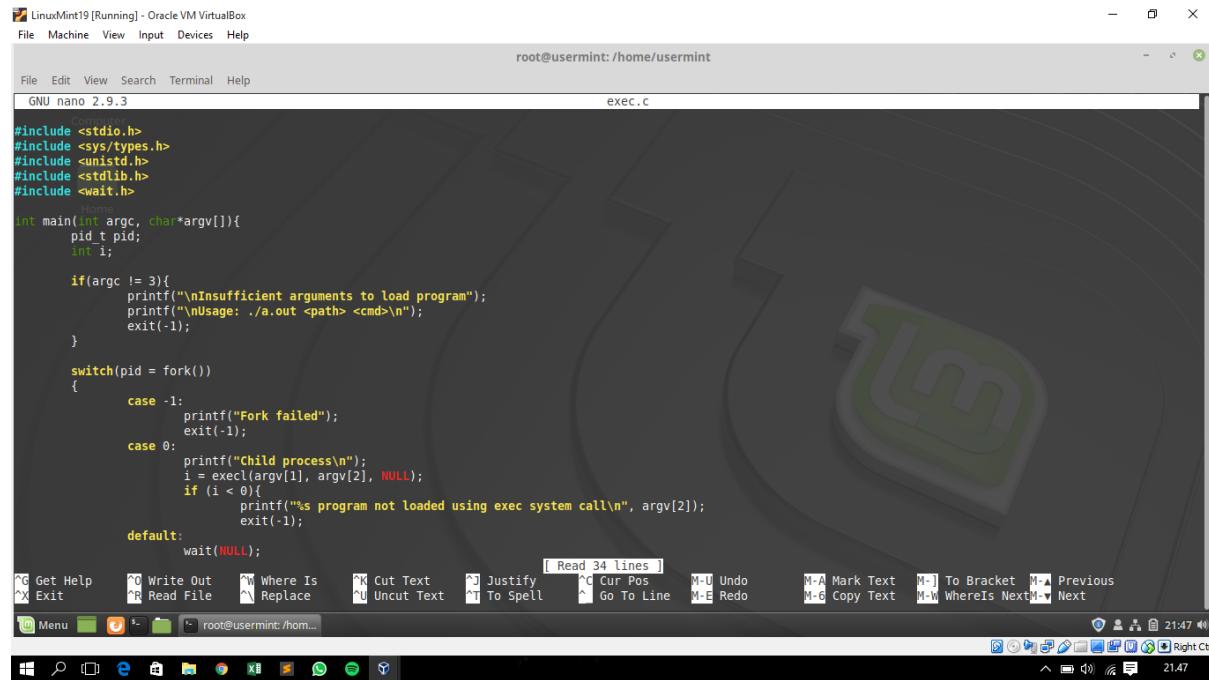
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
wait.c:3:10: fatal error: unistd.h: No such file or directory
 #include <unistd.h>
           ^
compilation terminated.
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# In function 'main':
wait.c:16:10: error: 'p' undeclared (first use in this function)
 else if(p > 0){

wait.c:16:10: note: each undeclared identifier is reported only once for each function it appears in
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# nano wait.c
root@usermint:/home/usermint# gcc wait.c -o wait
root@usermint:/home/usermint# ./wait
root@usermint:/home/usermint#
```

Child starts
Nomor Ganjil: 1 3 5 7 9
Child ends

Parent starts
Nomor Genap: 2 4 6 8 10
Parent ends

Exec.c



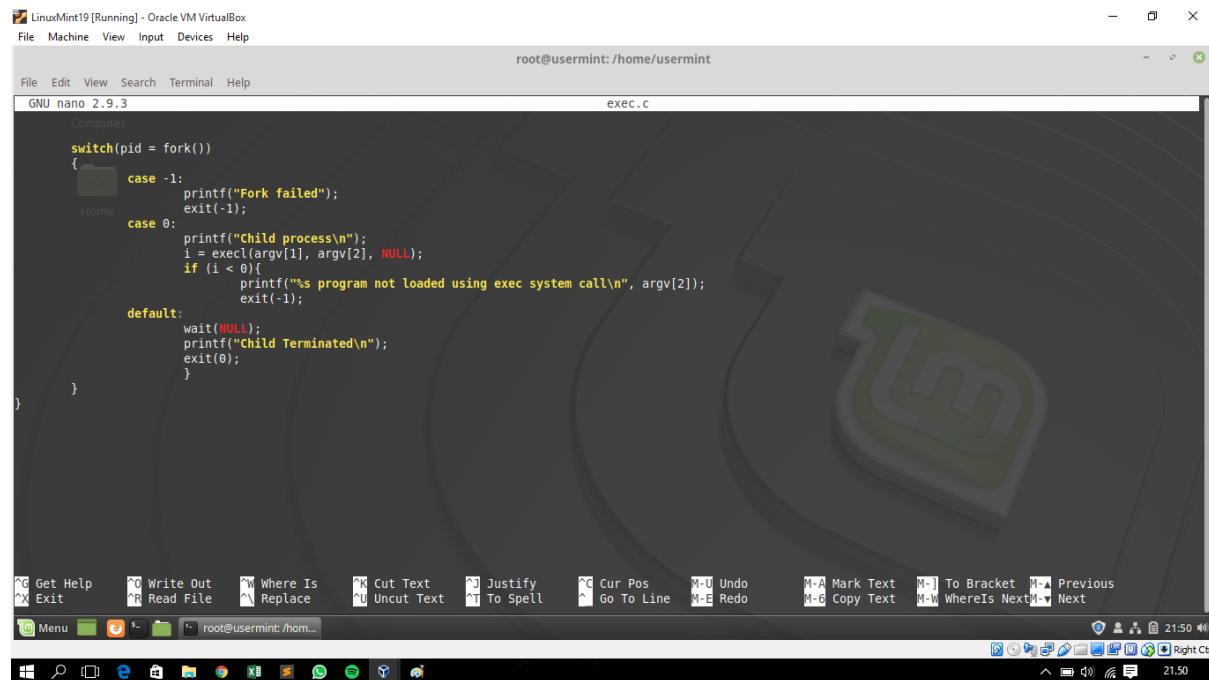
```
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
#include <stdlib.h>
#include <sys/wait.h>

int main(int argc, char*argv[]){
    pid_t pid;
    int i;

    if(argc != 3){
        printf("\nInsufficient arguments to load program");
        printf("\nUsage: ./a.out <path> <cmd>\n");
        exit(-1);
    }

    switch(pid = fork())
    {
        case -1:
            printf("Fork failed");
            exit(-1);
        case 0:
            printf("Child process\n");
            i = exec(argv[1], argv[2], NULL);
            if (i < 0){
                printf("%s program not loaded using exec system call\n", argv[2]);
                exit(-1);
            }
        default:
            wait(NULL);
    }
}

Get Help   Write Out   Where Is   Cut Text   Justify   Cur Pos   Undo   Mark Text   To Bracket   Previous
Exit   Read File   Replace   Uncut Text   To Spell   Go To Line   Redo   Copy Text   WhereIs Next   Next
Menu   root@usermint:/home/...  21:47  Right Ctrl
Windows Taskbar  21:47
```



```
switch(pid = fork())
{
    case -1:
        printf("Fork failed");
        exit(-1);
    case 0:
        printf("Child process\n");
        i = exec(argv[1], argv[2], NULL);
        if (i < 0){
            printf("%s program not loaded using exec system call\n", argv[2]);
            exit(-1);
        }
    default:
        wait(NULL);
        printf("Child Terminated\n");
        exit(0);
}
```

LinuxMint19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint: /home/usermint

```
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# gcc exec.c -o exec
root@usermint:/home/usermint#
```

Home

Menu

root@usermint: /hom...

21:50

Windows Taskbar

LinuxMint19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint: /home/usermint

```
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# gcc exec.c -o exec
root@usermint:/home/usermint# ./a.out /bin/ls
Child process
a.out Desktop dirlist.c Downloads exec.c fork.c Music Public stat.c Videos wait.c
coba.c dirlist Documents exec fork fork.c.save Pictures stat Templates wait
Child Terminated
```

root@usermint:/home/usermint#

Home

Menu

root@usermint: /hom...

21:51

Windows Taskbar

Stat.c

Linux Mint 19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint:/home/usermint

File Edit View Search Terminal Help

GNU nano 2.9.3

```
#include <stdio.h>
#include <sys/stat.h>
#include <stdlib.h>
#include <time.h>

int main(int argc, char*argv[]){
    struct stat
    file; int n;
    if(argc<2){
        printf("Usage: ./a.out <filename>\n");
        exit(-1);
    }
    if ((n = stat(argv[1], &file)) == -1)
    {
        perror(argv[1]);
        exit(-1);
    }
    printf("User id: %d\n", file.st_uid);
    printf("Group id: %d\n", file.st_gid);
    printf("Block size: %d\n", file.st_blksize);
    printf("Blocks Allocated: %d\n", file.st_blocks);
    printf("Inode no.: %d\n", file.st_ino);
    printf("Last Access: %s", ctime(&(file.st_atime)));
    printf("Last Modified: %s", ctime(&(file.st_mtime)));
    printf("File Size: %d bytes\n", file.st_size);
    printf("No. of links: %d\n", file.st_nlink);
    printf("Permission");
    printf("%s", (S_ISDIR(file.st_mode)) ? "d" : "-");
    printf("%s", (file.st_mode & S_IRUSR) ? "r" : "-");
    printf("%s", (file.st_mode & S_IWUSR) ? "w" : "-");
    printf("%s", (file.st_mode & S_IXUSR) ? "x" : "-");
}
```

[Read 43 lines]

File Edit View Search Terminal Help

GN Get Help FN Write Out WN Where Is CK Cut Text JK Justify CC Cur Pos M-U Undo M-A Mark Text M-J To Bracket M-P Previous FN Exit FR Read File WR Replace UN Uncut Text KT To Spell CG Go To Line M-E Redo M-G Copy Text M-W WhereIs Next MN Next

Ubuntu Menu

21:52

LinuxMint19 [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

root@usermint: /home/usermint

File Edit View Search Terminal Help

GNU nano 2.9.3

```
stat.c

Computer exit(-1);
}
printf("User id: %d\n", file.st_uid);
printf("Group id: %d\n", file.st_gid);
printf("Block size: %ld\n", file.st_blksize);
printf("Blocks Allocated: %ld\n", file.st_blocks);
printf("Inode no.: %d\n", file.st_ino);
printf("Last Access: %s", ctime(&file.st_atime));
printf("Last Modified: %s", ctime(&file.st_mtime));
printf("File Size: %ld bytes\n", file.st_size);
printf("No. of links: %d\n", file.st_nlink);
printf("Permission");
printf( (S_ISUID(file.st_mode) ? "d" : "-"));
printf( (file.st_mode & S_IRUSR) ? "r" : "-");
printf( (file.st_mode & S_IWUSR) ? "w" : "-");
printf( (file.st_mode & S_IXUSR) ? "x" : "-");
printf( (file.st_mode & S_IRGRP) ? "r" : "-");
printf( (file.st_mode & S_IWGRP) ? "w" : "-");
printf( (file.st_mode & S_IXGRP) ? "x" : "-");
printf( (file.st_mode & S_IROTH) ? "r" : "-");
printf( (file.st_mode & S_IWOTH) ? "w" : "-");
printf( (file.st_mode & S_IXOTH) ? "x" : "-");
printf("\n");
if(file.st_mode & S_IFREG)
    printf("File type: Regular\n");
if(file.st_mode & S_IFDIR)
    printf("File type: Directory\n");
}
```

Get Help Write Out Where Is Cut Text Justify Cur Pos Mark Text To Bracket Previous

Exit Read File Replace Uncut Text To Spell Go To Line Undo Copy Text WhereIs Next Next

Menu root@usermint:/home/...

21:52

```
LinuxMint19 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@usermint: /home/usermint
File Edit View Search Terminal Help
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# gcc exec.c -o exec
root@usermint:/home/usermint# ./a.out /bin/ls
Child process
a.out Desktop dirlist.c Downloads exec.c fork.c Music Public stat.c Videos wait.c
coba.c dirlist Documents exec fork fork.c.save Pictures stat Templates wait
Child Terminated
root@usermint:/home/usermint# nano stat.c
root@usermint:/home/usermint# gcc stat.c -o stat
root@usermint:/home/usermint#
```

```
LinuxMint19 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@usermint: /home/usermint
File Edit View Search Terminal Help
usermint@usermint:~$ sudo su
[sudo] password for usermint:
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# nano exec.c
root@usermint:/home/usermint# gcc exec.c -o exec
root@usermint:/home/usermint# ./a.out /bin/ls
Child process
a.out Desktop dirlist.c Downloads exec.c fork.c Music Public stat.c Videos wait.c
coba.c dirlist Documents exec fork fork.c.save Pictures stat Templates wait
Child Terminated
root@usermint:/home/usermint# nano stat.c
root@usermint:/home/usermint# gcc stat.c -o stat
root@usermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@usermint:/home/usermint# ./a.out fork.c
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@usermint:/home/usermint# ./a.out fork
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@usermint:/home/usermint# ./a.out wait
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@usermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@usermint:/home/usermint#
```

Dirlist.c

The screenshot shows a terminal window titled "root@usermint: /home/usermint" running on Oracle VM VirtualBox. The window contains the source code for "dirlist.c". The code includes error handling for command-line arguments and uses the `dirent.h` header to list directory contents. The terminal window has a standard Linux-style interface with a menu bar, toolbar, and status bar.

```
#include <stdio.h>
#include <dirent.h>
#include <stdlib.h>

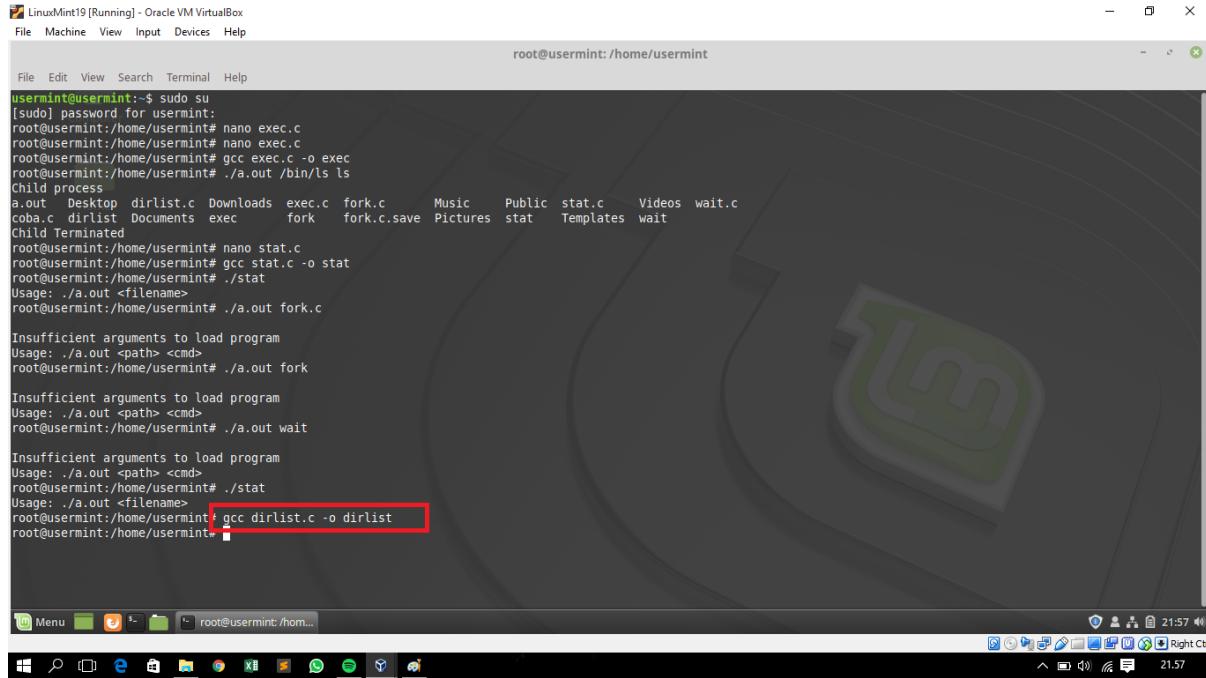
int main(int argc, char *argv[]){
    struct dirent *dptr;
    DIR *dname;

    if(argc != 2){
        printf("Usage: ./a.out <dirname>\n");
        exit(-1);
    }
    if((dname = opendir(argv[1])) == NULL)
    {
        perror(argv[1]);
        exit(-1);
    }
    while(dptr=readdir(dname))
        printf("%s\n", dptr->d_name);

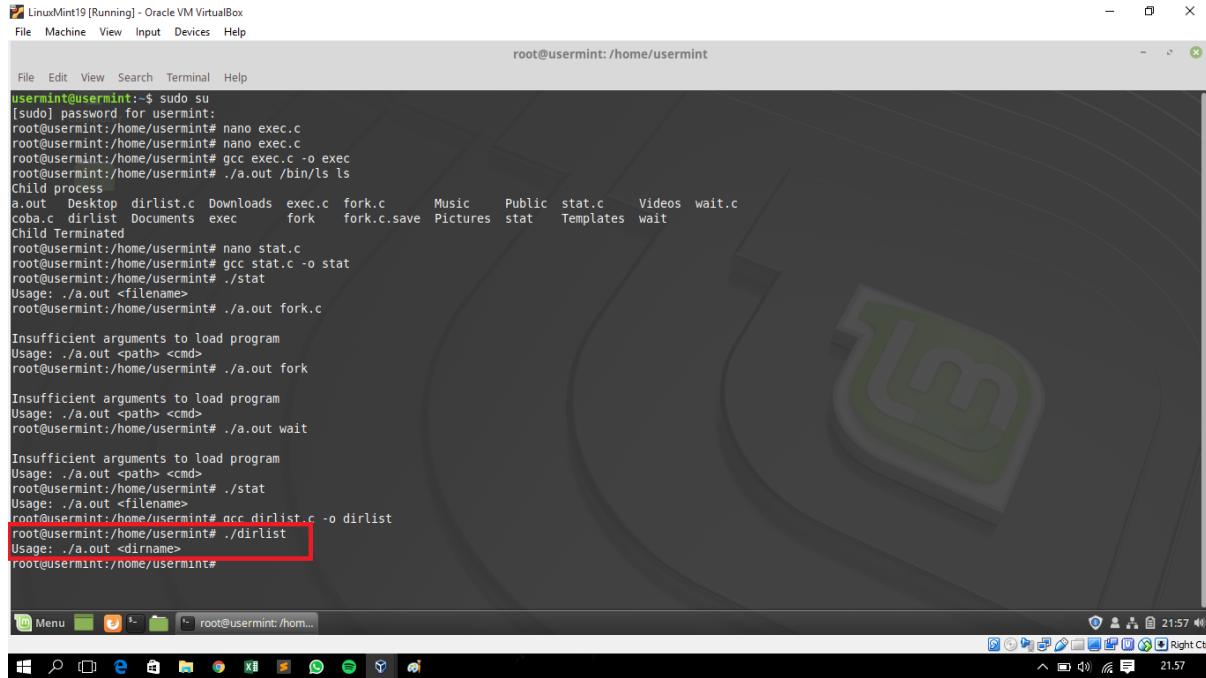
    closedir(dname);
}
```

The screenshot shows a terminal window titled "root@usermint: /home/usermint" running on Oracle VM VirtualBox. The terminal shows the compilation of "exec.c" and the execution of "dirlist.c". The output indicates several warnings about missing sentinels in function calls. The command "gcc dirlist.c -o dirlist" is highlighted with a red box. The terminal window has a standard Linux-style interface with a menu bar, toolbar, and status bar.

```
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
  i = execl(argv[1], argv[2], 0);
^
root@sermint:/home/usermint# g++ exec.c -std=c++11 -Wformat
root@sermint:/home/usermint# gcc exec.c -o exec
exec.c: In function 'main':
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
  i = execl(argv[1], argv[2], 0);
^
root@usermint:/home/usermint# g++ exec.c -std=c++98 -Wformat
root@sermint:/home/usermint# gcc exec.c -o exec
exec.c: In function 'main':
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
  i = execl(argv[1], argv[2], 0);
^
root@usermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# gcc exec.c -o exec
exec.c: In function 'main':
exec.c:23:3: warning: missing sentinel in function call [-Wformat=]
  i = execl(argv[1], argv[2], 0);
^
root@usermint:/home/usermint# nano dirlist.c
root@sermint:/home/usermint# nano dirlist.c
root@sermint:/home/usermint# gcc dirlist.c -o dirlist
dirlist.c:5:16: error: expected ')' before 'char'
  int main(argc, char *argv[]){
                 ^
root@usermint:/home/usermint# gcc dirlist.c -o dirlist
root@usermint:/home/usermint#
```



```
username@sermint:~$ sudo su
[sudo] password for usermint:
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# gcc exec.c -o exec
root@sermint:/home/usermint# ./a.out /bin/ls ls
Child process
a.out Desktop dirlist.c Downloads exec.c fork.c Music Public stat.c Videos wait.c
coba.c dirlist Documents exec fork fork.c.save Pictures stat Templates wait
Child Terminated
root@sermint:/home/usermint# nano stat.c
root@sermint:/home/usermint# gcc stat.c -o stat
root@sermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@sermint:/home/usermint# ./a.out fork.c
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./a.out fork
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./a.out wait
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@sermint:/home/usermint# gcc dirlist.c -o dirlist
root@sermint:/home/usermint#
```



```
username@sermint:~$ sudo su
[sudo] password for usermint:
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# nano exec.c
root@sermint:/home/usermint# gcc exec.c -o exec
root@sermint:/home/usermint# ./a.out /bin/ls ls
Child process
a.out Desktop dirlist.c Downloads exec.c fork.c Music Public stat.c Videos wait.c
coba.c dirlist Documents exec fork fork.c.save Pictures stat Templates wait
Child Terminated
root@sermint:/home/usermint# nano stat.c
root@sermint:/home/usermint# gcc stat.c -o stat
root@sermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@sermint:/home/usermint# ./a.out fork.c
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./a.out fork
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./a.out wait
Insufficient arguments to load program
Usage: ./a.out <path> <cmd>
root@sermint:/home/usermint# ./stat
Usage: ./a.out <filename>
root@sermint:/home/usermint# gcc dirlist.c -o dirlist
root@sermint:/home/usermint# ./dirlist
Usage: ./a.out <dirname>
root@sermint:/home/usermint# root@sermint:/home/usermint#
```

MODUL 9

FILE SYSTEM CALL

FCREATE :

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>

int main(int argc, char *argv[])
{
    int fd, n, len;
    char buf[100];
    if (argc != 2)
    {
        printf("Usage : ./a.out <filename>\n");
        exit(-1);
    }
    fd = open(argv[1], O_WRONLY|O_CREAT|O_TRUNC, 0644);
    if(fd < 0)
    {
        printf("File creation problem\n");
        exit(-1);
    }

    printf("Tekan Ctrl+D di akhir baris:\n");

    while((n = read(0,buf,sizeof(buf)))>0)
    {
        len = strlen(buf);
        write(fd,buf,len);
    }

    close(fd);
}
```

^G Get Help ^M Write Out ^W Where Is ^X Exit
^R Read File ^A Replace ^K Cut Text ^J Justify ^U Uncut Text ^T To Spell ^C Cur Pos ^L Go To Line ^Y Prev Page ^H First Line ^W WhereIs Next ^M Mark Text
^V Next Page ^I Last Line ^B To Bracket ^A Copy Text

```
jarkom@lab-jarkom:~$ gcc -o fread fread.c
jarkom@lab-jarkom:~$ ./fcreate test.txt
Tekan Ctrl+D di akhir baris:
HELLO WORDjarkom@lab-jarkom:~$
```

FREAD :

The screenshot shows a terminal window titled "File: fread.c" with the command "jarkom@lab-jarkom: ~" at the top right. The window title bar also displays "File Edit View Search Terminal Help" and "nano 2.6.0". The main area contains the C code for FREAD:

```
#include <unistd.h>
#include <stdio.h>
#include <stdlib.h>
#include <fcntl.h>
int main (int argc, char *argv[]){
    int fd, i;
    char buf[100];
    if (argc<2)
    {
        printf("Usage: ./a.out <filename>\n");
        exit(-1);
    }
    fd = open(argv[1], O_RDONLY);
    if(fd == -1)
    {
        printf("No file does not exist\n", argv[1]);
        exit(-1);
    }
    printf("Isi dari file %s adalah : \n", argv[1]);
    while(read(fd, buf, sizeof(buf))>0)
        printf("%s", buf);
    close(fd);
}
```

Below the code, there is a menu bar with various keyboard shortcuts for navigating the file.

The screenshot shows a terminal window with the command "jarkom@lab-jarkom: ~" at the top right. The window title bar also displays "File Edit View Search Terminal Help". The main area shows the output of the FREAD program:

```
jarkom@lab-jarkom:~$ ./fread test.txt
Isi dari file test.txt adalah :
HELLO WORD
```

FAPPEND:

The screenshot shows a terminal window titled "File: Fappend.c" with the command "nano 2.6.0" at the bottom. The window title bar includes "File Edit View Search Terminal Help" and the date "Wed, 28 Nov 2018 13:58". The terminal background is light gray, and the code is displayed in black text. The code is a C program that reads from standard input and writes to a file specified on the command line. It includes error handling for file opening and reading.

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <errno.h>
int main (argc, char *argv[])
{
    int fd, n, len;
    char buf[100];
    if (argc != 2)
    {
        printf("Usage: ./a.out <filename>\n");
        exit(-1);
    }
    fd = open(argv[1], O_APPEND|O_WRONLY|O_CREAT, 0644);
    if (fd < 0)
    {
        perror(argv[1]);
        exit(-1);
    }
    while ((n = read(0, buf, sizeof(buf))) > 0)
    {
        len = strlen(buf);
        write(fd, buf, len);
    }
    close(fd);
}
```

At the bottom of the terminal window, there is a menu of keyboard shortcuts:

- ^G Get Help
- ^D Write Out
- ^W Where Is
- ^K Cut Text
- ^J Justify
- [Read 25 lines]
- ^C Cur Pos
- ^Y Prev Page
- M-\ First Line
- M-W WhereIs Next
- ^A Mark Text
- ^X Exit
- ^R Read File
- ^V Replace
- ^U Uncut Text
- ^T To Spell
- ^L Go To Line
- ^V Next Page
- M-/ Last Line
- M-J To Bracket
- M-A Copy Text

MODUL 10

List.c

A screenshot of a terminal window titled "File: list.c". The window shows the source code for a C program named "list.c". The code uses the `scandir` function to list files in a directory, printing each file name followed by its size in bytes. The terminal window has a dark background with green text and a black border. The status bar at the bottom shows various keyboard shortcuts for navigating and editing the text.

```
#include <stdio.h>
#include <dirent.h>
main()
{
    struct dirent
    *namelist; int n,i;
    char pathname[100];
    getcwd(pathname);

    n = scandir(pathname, &namelist, 0, alphasort);
    if(n < 0)
        printf("Error\n");
    else
        for(i=0; i<n; i++) if(namelist[i]->d_name[0] != '.')
            printf("%-20s", namelist[i]->d_name);
}
```

Mygrep.c

A screenshot of a terminal window titled "File: mygrep.c". The window shows the source code for a C program named "mygrep.c". The code reads from a file specified on the command line and prints lines containing a search term. It includes usage instructions for the command-line arguments. The terminal window has a dark background with green text and a black border. The status bar at the bottom shows various keyboard shortcuts for navigating and editing the text.

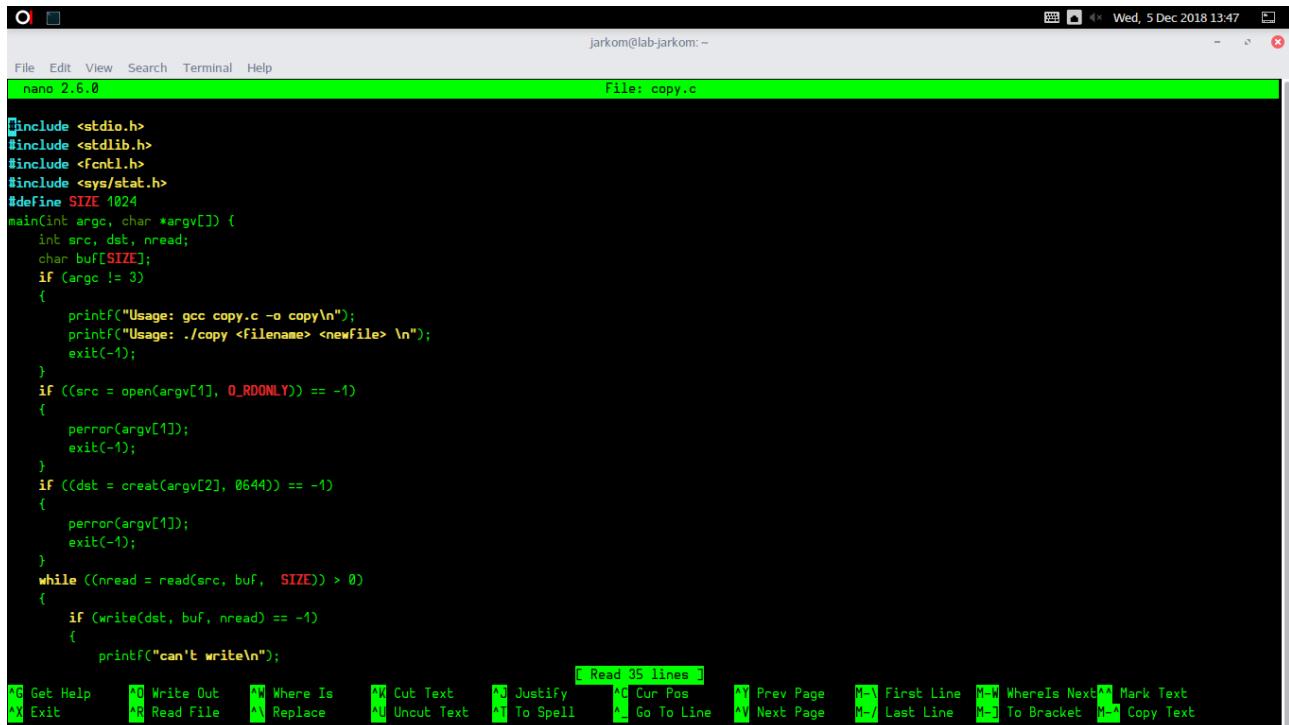
```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
main(int argc,char *argv[])
{
    FILE *fd;
    char str[100];
    char c;
    int i, Flag, j, m, k;
    char temp[30];

    if (argc != 3)
    {
        printf("Usage: gcc mygrep.c -o mygrep\n");
        printf("Usage: ./mygrep <search_text> <filename>\n");
        exit(-1);
    }

    fd = fopen(argv[2],"r");
    if(fd == NULL)
    {
        printf("%s is not exist\n",argv[2]);
        exit(-1);
    }

    while(!feof(fd))
    {
        i = 0;
        while(1)
        {
            [ Read 55 lines ]
```

Copy.c



The screenshot shows a terminal window titled "File: copy.c" running the nano 2.6.0 editor. The code in the buffer is:

```
#include <stdio.h>
#include <stdlib.h>
#include <fcntl.h>
#include <sys/stat.h>
#define SIZE 1024
main(int argc, char *argv[])
{
    int src, dst, nread;
    char buf[SIZE];
    if (argc != 3)
    {
        printf("Usage: gcc copy.c -o copy\n");
        printf("Usage: ./copy <filename> <newfile> \n");
        exit(-1);
    }
    if ((src = open(argv[1], O_RDONLY)) == -1)
    {
        perror(argv[1]);
        exit(-1);
    }
    if ((dst = creat(argv[2], 0644)) == -1)
    {
        perror(argv[1]);
        exit(-1);
    }
    while ((nread = read(src, buf, SIZE)) > 0)
    {
        if (write(dst, buf, nread) == -1)
        {
            printf("can't write\n");
        }
    }
}
```

The status bar at the bottom of the terminal window shows various keyboard shortcuts for nano commands, such as "Read 35 lines", "Get Help", "Write Out", "Where Is", "Cut Text", "Justify", "Cur Pos", "Prev Page", "First Line", "WhereIs Next", "Mark Text", "Exit", "Read File", "Replace", "Uncut Text", "To Spell", "Go To Line", "Next Page", "Last Line", "To Bracket", and "Copy Text".

Del.c

File Edit View Search Terminal Help

File: del.c

```
#include <stdio.h>
#include <stdlib.h>
#include <fcntl.h>
main(int argc, char* argv[]) {
    int fd;
    if (argc != 2)
    {
        printf("Usage: gcc del.c -o del\n");
        printf("Usage: .del <filename>\n");
        exit(-1);
    }
    fd = open(argv[1], O_RDONLY);
    if (fd != -1)
    {
        close(fd);
        unlink(argv[1]);
    } else
        perror(argv[1]);
}
```

[Read 19 lines]

Get Help Write Out Where Is Cut Text Justify Cur Pos Prev Page First Line WhereIs Next Mark Text
Exit Read File Replace Uncut Text To Spell Go To Line Next Page Last Line To Bracket Copy Text

File Edit View Search Terminal Help

jarkom@lab-jarkom:~

```
printf("Error\n");
printf("%-20s", namelist[i]->d_name);
jarkom@lab-jarkom:~$ grep 'printf' list.c
printf("Error\n");
printf("%-20s", namelist[i]->d_name);
jarkom@lab-jarkom:~$ grep 'printf' list.c
printf("Error\n");
printf("%-20s", namelist[i]->d_name);
jarkom@lab-jarkom:~$ nano del.c
jarkom@lab-jarkom:~$ ls
copy.c Downloads fread.c latihan Music Pictures
create fappend.c fread.c.save Latihan mygrep Public
del.c fappend.c.save L200170011 latihan.txt mygrep.c Templates
Desktop fcreate L200170029 list nano.save Videos
Documents fcreate.c L200170180 list.c perintah.odt
jarkom@lab-jarkom:~$ grep
Usage: grep [OPTION]... PATTERN [FILE]...
Try 'grep --help' for more information.
jarkom@lab-jarkom:~$ cp
cp: missing file operand
Try 'cp --help' for more information.
jarkom@lab-jarkom:~$ nano list.c
jarkom@lab-jarkom:~$ nano mygrep.c
jarkom@lab-jarkom:~$ nano copy.c
jarkom@lab-jarkom:~$ nano del.c
jarkom@lab-jarkom:~$ gcc list.c -o list
list.c:3:1: warning: return type defaults to 'int' [-Wimplicit-int]
 main()
 ^
list.c: In function 'main':
list.c:7:5: warning: implicit declaration of Function 'getcwd' [-Wimplicit-function-declaration]
     getcwd(pathname);
     ^
jarkom@lab-jarkom:~$
```

```
File Edit View Search Terminal Help
printf("%-20s", namelist[i]->d_name);
jarkom@lab-jarkom:~# grep 'printf' list.c
    printf("Error\n");
    printf("%-20s", namelist[i]->d_name);
jarkom@lab-jarkom:~# nano del.c
jarkom@lab-jarkom:~# ls
copy.c   Downloads  fread.c    latihan   Music      Pictures
create   fappend.c  fread.c.save  Latihan   mygrep   Public
del.c    fappend.c.save 1200170011 latihan.txt mygrep.c  Templates
Desktop  fcreate   1200170029  list     nano.save  Videos
Documents fcreate.c L200170180  list.c   perintah.odt
jarkom@lab-jarkom:~# grep
Usage: grep [OPTION]... PATTERN [FILE]...
Try 'grep --help' for more information.
jarkom@lab-jarkom:~# cp
cp: missing file operand
Try 'cp --help' for more information.
jarkom@lab-jarkom:~# nano list.c
jarkom@lab-jarkom:~# nano mygrep.c
jarkom@lab-jarkom:~# nano copy.c
jarkom@lab-jarkom:~# nano del.c
jarkom@lab-jarkom:~# gcc list.c -o list
list.c:3:1: warning: return type defaults to 'int' [-Wimplicit-int]
main() {
^
list.c: In function 'main':
list.c:7:5: warning: implicit declaration of function 'getcwd' [-Wimplicit-function-declaration]
    getcwd(pathname);
    ^
jarkom@lab-jarkom:~# gcc mygrep.c -o mygrep
mygrep.c:4:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc,char *argv[]) {
^
jarkom@lab-jarkom:~#
```

```
File Edit View Search Terminal Help
jarkom@lab-jarkom:~# cp
cp: missing file operand
Try 'cp --help' for more information.
jarkom@lab-jarkom:~# nano list.c
jarkom@lab-jarkom:~# nano mygrep.c
jarkom@lab-jarkom:~# nano copy.c
jarkom@lab-jarkom:~# nano del.c
jarkom@lab-jarkom:~# gcc list.c -o list
list.c:3:1: warning: return type defaults to 'int' [-Wimplicit-int]
main() {
^
list.c: In function 'main':
list.c:7:5: warning: implicit declaration of function 'getcwd' [-Wimplicit-function-declaration]
    getcwd(pathname);
    ^
jarkom@lab-jarkom:~# gcc mygrep.c -o mygrep
mygrep.c:4:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc,char *argv[]) {
^
jarkom@lab-jarkom:~# gcc copy.c -o copy
copy.c:6:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char *argv[]) {
^
copy.c: In function 'main':
copy.c:25:21: warning: implicit declaration of function 'read' [-Wimplicit-function-declaration]
    while ((nread = read(src, buf, SIZE)) > 0)
        ^
copy.c:27:13: warning: implicit declaration of function 'write' [-Wimplicit-function-declaration]
    if (write(dst, buf, nread) == -1)
        ^
copy.c:33:5: warning: implicit declaration of function 'close' [-Wimplicit-function-declaration]
    close(src);
    ^
jarkom@lab-jarkom:~#
```

```
File Edit View Search Terminal Help
jarkom@lab-jarkom:~
```

```
list.c: In function 'main':
list.c:7:5: warning: implicit declaration of function 'getcwd' [-Wimplicit-function-declaration]
    getcwd(pathname);
    ^
jarkom@lab-jarkom:~$ gcc mygrep.c -o mygrep
mygrep.c:4:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char *argv[]) {
^
jarkom@lab-jarkom:~$ gcc copy.c -o copy
copy.c:6:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char *argv[]) {
^
copy.c: In function 'main':
copy.c:25:21: warning: implicit declaration of function 'read' [-Wimplicit-function-declaration]
    while ((nread = read(src, buf, SIZE)) > 0)
        ^
copy.c:27:13: warning: implicit declaration of function 'write' [-Wimplicit-function-declaration]
    if (write(dst, buf, nread) == -1)
        ^
copy.c:33:5: warning: implicit declaration of function 'close' [-Wimplicit-function-declaration]
    close(src);
    ^
jarkom@lab-jarkom:~$ gcc del.c -o del
del.c:4:1: warning: return type defaults to 'int' [-Wimplicit-int]
main(int argc, char* argv[]) {
^
del.c: In function 'main':
del.c:15:2: warning: implicit declaration of function 'close' [-Wimplicit-function-declaration]
    close(fd);
    ^
del.c:16:2: warning: implicit declaration of function 'unlink' [-Wimplicit-function-declaration]
    unlink(argv[1]);
    ^
jarkom@lab-jarkom:~$
```