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MAIOT LAB Assignment - 10

Problem Statement: Write a study report to simulate 'cp' command in Linux Environment.

Objective:
1. To understand file handling in Assembly language.
2. Understand the command line arguments

Theory:

1) File Open: It is used to open a file for reading, writing or both. The function takes a filename and a set of flag as a parameters and returns a file-descriptor that can be used to perform subsequent operations on the file.
Ex.

```
mov rax, 2
mov rdi, filename
mov rsi, flags
mov rdx, mode
syscall
```

2) File read: It is used to read data from a file. The function takes a file descriptor, a buffer to read the data into, and the number of bytes to read as parameters, and returns the number of bytes actually read.

Syntax - mov rax, 0
mov rdi, fd
mov rsi, buffer
mov rdx, count
syscall

3) File write : It is used to write data to a file. The function takes a file descriptor, a buffer containing data to write, number of bytes to write as parameters, and returns the number of bytes actually written

Syntax - mov rax, 1
mov rdi, fd
mov rsi, buffer
mov rdx, count
syscall

4) File create : It is used to create a file. The function takes a filename an a set of flags as parameters and returns a file descriptor for newly created file - while creating file, we have to give permissions for the file to owner, user and other group, '4' is to execute '2' is to write and '1' is to read

Syntax - mov rax, 85
mov rdi, filename
mov rsi, mode
syscall.

5) File close: It is used to close a file. The function takes a file descriptor as a parameter and returns 0 if the file is successfully closed, else -1 if error is occured.

Syntax -
```
mov rax, 3
mov rdi, fd
syscall
```

Algorithm

1. Open the source file in read mode
2. Open the destination file in write mode.
3. Read data from a source file and store it in buffer
4. Write data from buffer to the destination file
5. Close both source and destination file

Environment: OS-64bit Ubuntu 12.01/Ubuntu 18 CPU-64bit Core 2Duo

Conclusion: Thus, the study has done to simulate 'cp' command in linux by taking flip classroom.

FAQ's

(1) What is file descriptor?

→ A file descriptor is a unique identifier (usually an integer) that is used to access a file or input/output device such as file, a pipe or a device file. It is used to perform various file operations such as reading, writing and closing files. In assembly language, the 'open', 'read', 'close' and other file related system

calls typically take a file descriptor as an arguments.

2) What is the copy command in Linux?

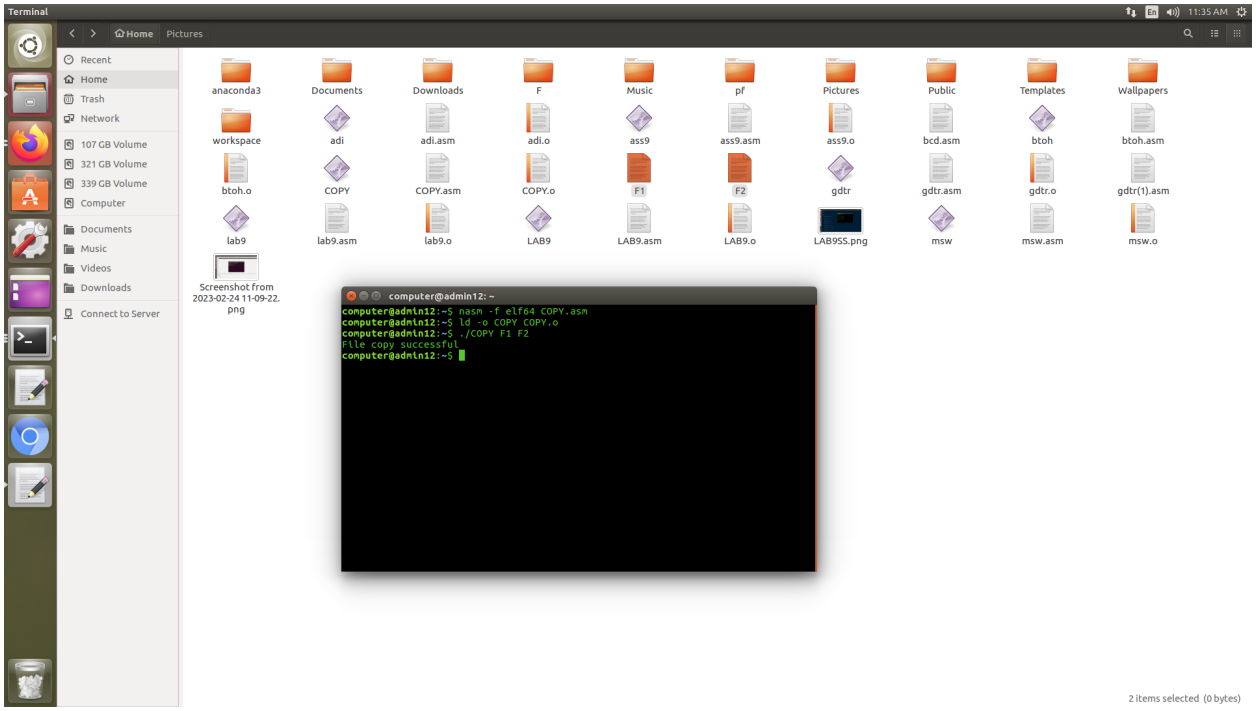
→ In Linux, the 'cp' command is used to copy files and directories from one location to another. The Syntax of 'cp' command is as follows:

cp [options] source destination

```
section .data
msg1 db "error",10
msgl1 equ $-msg1
msg2 db "File copy successful",10
msgl2 equ $-msg2

%macro operate 4
mov rax,%1
mov rdi,%2
mov rsi,%3
mov rdx,%4
syscall
%endmacro

section .bss
fname1 resb 15
fd1 resq 1
fname2 resb 15
fd2 resq 1
buff resb 512
bufflen resq 1

section .txt
global _start
_start:
pop r8
cmp r8,3
jne err
pop r8
pop r8
mov rsi,fname1

above:
mov al,[r8]
cmp al,00
je next
mov [rsi],al
inc r8
inc rsi
jmp above

next:
pop r8
mov rsi,fname2
```

```
above2:
mov al,[r8]
cmp al,00
je next2
mov [rsi],al
inc r8
inc rsi
jmp above2

next2:
operate 2,fname1,0q,0777q
mov [fd1],rax
operate 0,[fd1],buff,512
mov [bufflen],rax
operate 85,fname2,0777q,0
operate 2,fname2,2,0777q
mov [fd2],rax
operate 1,[fd2],buff,[bufflen]
operate 3,[fd2],0,0
operate 3,[fd1],0,0
operate 1,1,msg2,msgl2
jmp end
err:
operate 1,1,msg1,msgl1
end:
operate 60,0,0,0
```

OUTPUT


Terminal
11:35 AM
Home
Pictures
Recent
Home
Trash
Network
107 GB Volume
321 GB Volume
339 GB Volume
Computer
Documents
Music
Videos
Downloads
Connect to Server
anaconda3
Documents
Downloads
F
Music
pf
Pictures
Public
Templates
Wallpapers
workspace
adi
adi.asm
adi.o
ass9
ass9.asm
ass9.o
bcd.asm
btoh
btoh.asm
btoh.o
COPY
COPY.asm
COPY.o
F1
F2
gdtr
gdtr.asm
gdtr.o
gdtr(1).asm
lab9
lab9.asm
lab9.o
LAB9
LAB9.asm
LAB9.o
LAB9SS.png
msw
msw.asm
msw.o
Screenshot from 2023-02-24 11-09-22.png
computer@admin12: ~
computer@admin12:~$ nasm -f elf64 COPY.asm
computer@admin12:~$ ld -o COPY COPY.o
computer@admin12:~$ ./COPY F1 F2
File copy successful
computer@admin12:~$
2 items selected (0 bytes)