OPERATING SYSTEM: UNIX/LINUX

Course 1

Osman SALEM

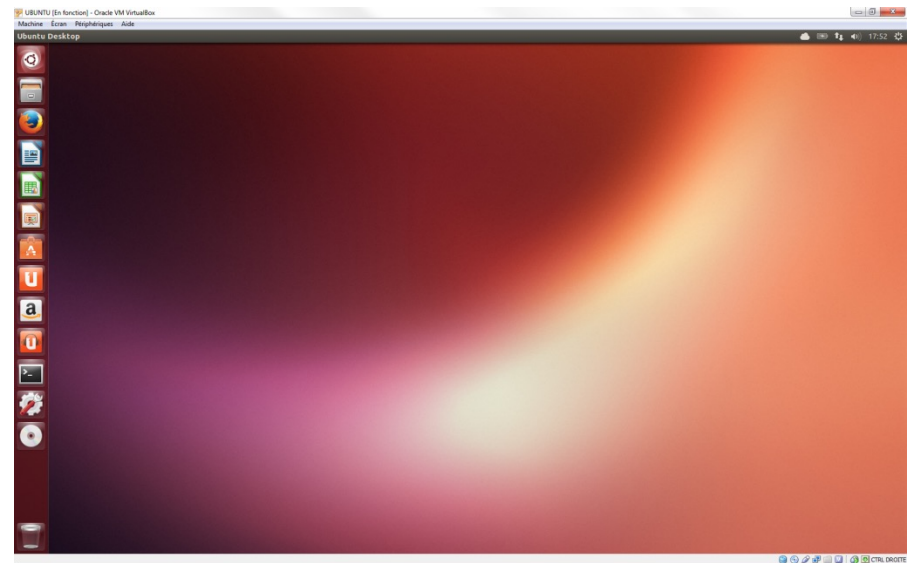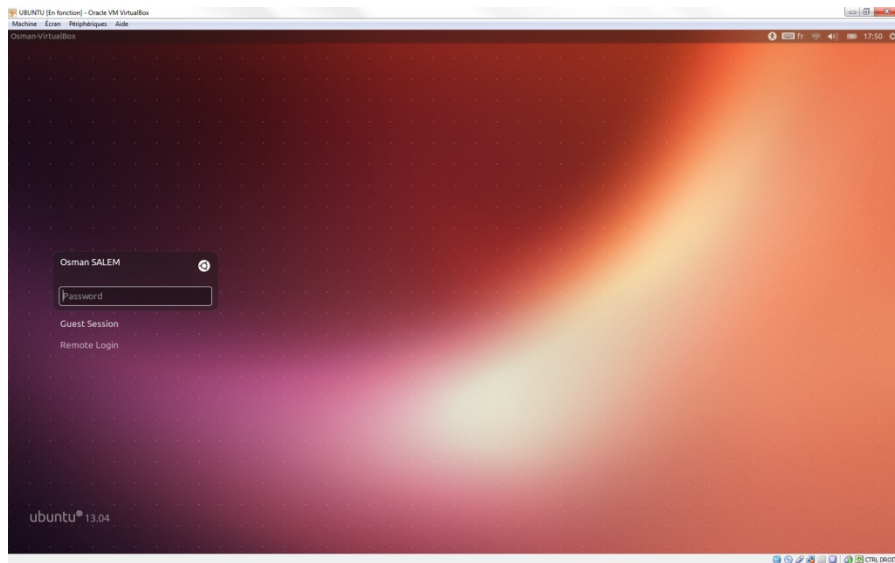**Associate Professor - HDR**

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Ubuntu

- Ubuntu
- You will use your laptop
    - Install Virtualbox/Vmware workstation
    - Install Ubuntu

UNIX

- An operating system

- Developed at AT&T Bell Labs in the **1969**

- By **ken Thompson** and **Dennis Ritchie**

- Objective:
    - Portable OS written in C
    - Not in assembler

- Distributed as Open Source

UNIX

- Command Line Interpreter

- GUIs (Window systems) are now available

- Unix becomes commercial & paying (outside AT&T)

UNIX

- Unix is a multi-user, multi-tasking operating system

- You can have many users logged into a system simultaneously, each running many programs

- It's the kernel's job to keep each process and user separate and to regulate access to system hardware, including cpu, memory, disk and other I/O devices

History of UNIX

- **1980**
  - Richard Stallman decides to create a clone of "Unix"
  - With source code available (Open source)
  - Creates Free software (most beautiful gift for the world!)
    - Open Source
    - You can look and modify the code
    - General Public License (GPL)
  - Stallman want to create a derived version of "Unix"
    - GNU : GNU's Not Unix
    - Develop most of Unix Commands (GCC: C compiler)
  - But they were late to develop the Kernel
    - Communications between software and hardware
    - Memory management, Process management, CPU usage, hard disk, network card, etc.

Richard Stallman

History of LINUX

- Linus Torvals in 1991
    - Has created the kernel using Minix
    - Publish in web forum
    - Like Free Software (General Public License)
    - Error in naming
        - Kernel : Linux à la place de Linus
    - Invite other to join his project

Linus Torvalds

- Like kernel is the most important part
    - Linux + GNU = *Linux*
    - *Stallman* ask to call it: *GNU /Linux*
        - It's so late, because it was widely known as Linux
        - Kernel version: "x.y.z"
            - if "y" is even => stable version
            - If "y" is odd=> development version (under progress and unstable)
            - $uname –r => 3.8.0-19-generic
            - $cat /etc/lsb-release: ubuntu version, independent of kernel version
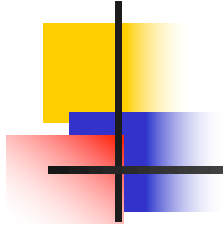   - $lsb_release –a et cat /etc/issue

Unix vs. LINUX

- Unix was the predecessor of Linux
- Linux is a variant of Unix
    - So is Mac OS X, so much of this tutorial applies to Macs as well
    - Linux is open source
    - Linux is free
    - It's fully customizable
    - It's stable (i.e. it almost never crashes)
    - These characteristics make it an ideal OS for programmers and scientists

LINUX Distributions

- Mandrake: http://www.mandrakesoft.com/
- RedHat: http://www.redhat.com/
- Fedora: http://www.fedora-fr.org/
- CentOs : http://www.centos.org/
- Debian: http://www.debian.org/ (very secure)
- Ubuntu: http://www.ubuntu-fr.org/
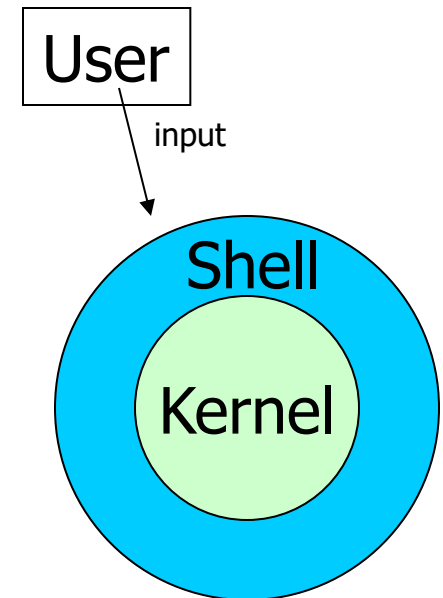- SuSE/Novell: http://www.suse.com/
- etc.

Installation

Installation

- Root password
- Network Devices
- Services
- Users
- Hardware

UNIX Structure

<u>Shell</u>

- Command line interpreter

- Shell is an interface between user and kerne

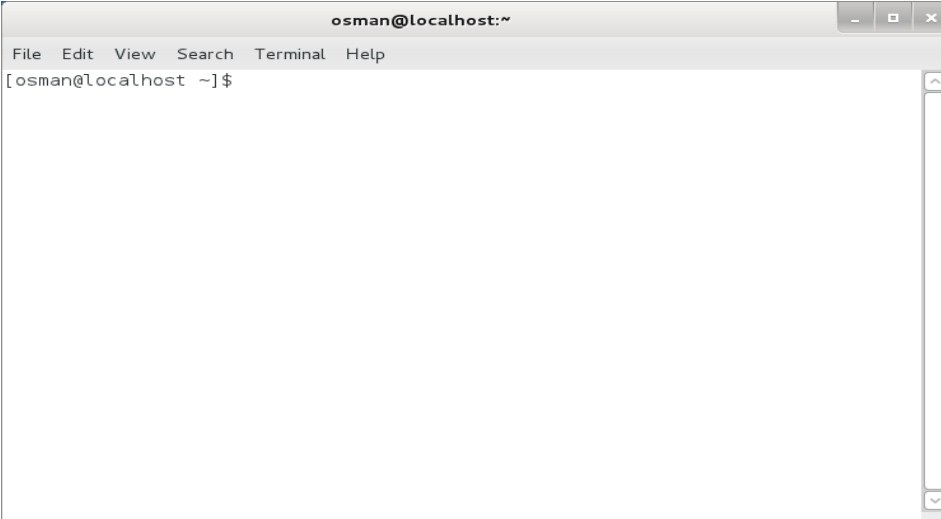- Shell interprets your input as commands and pass them to kernel

User

input

Shell

Kernel

Connecting to a Unix/Linux system

- Attention:
  - Linux is case sensitive
  - **<u>file.txt</u>** is different from ***FILE.txt***
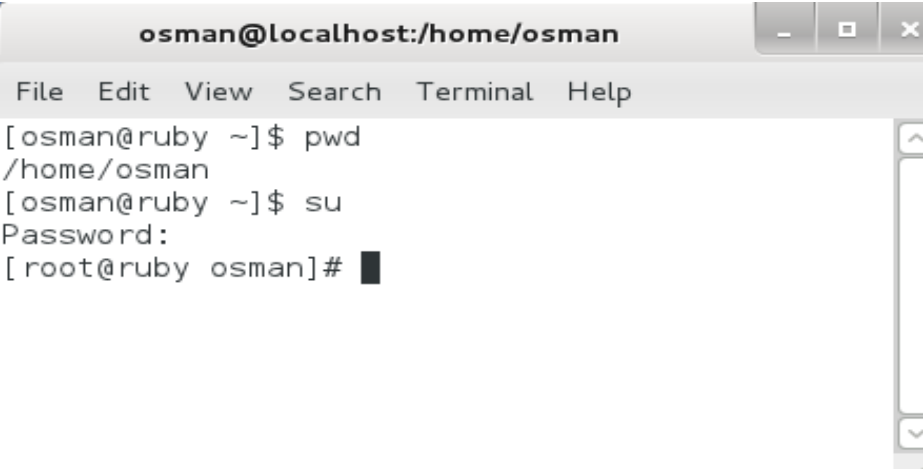
Really ! Why they are different ?
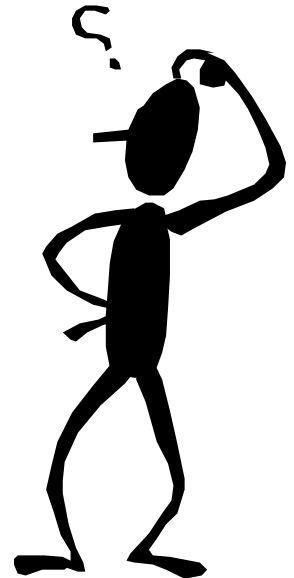
Terminal

How to open a terminal ?

osman@localhost:~
File Edit View Search Terminal Help
[osman@localhost ~]$

osman@localhost:/home/osman
File Edit View Search Terminal Help
[osman@ruby ~]$ pwd
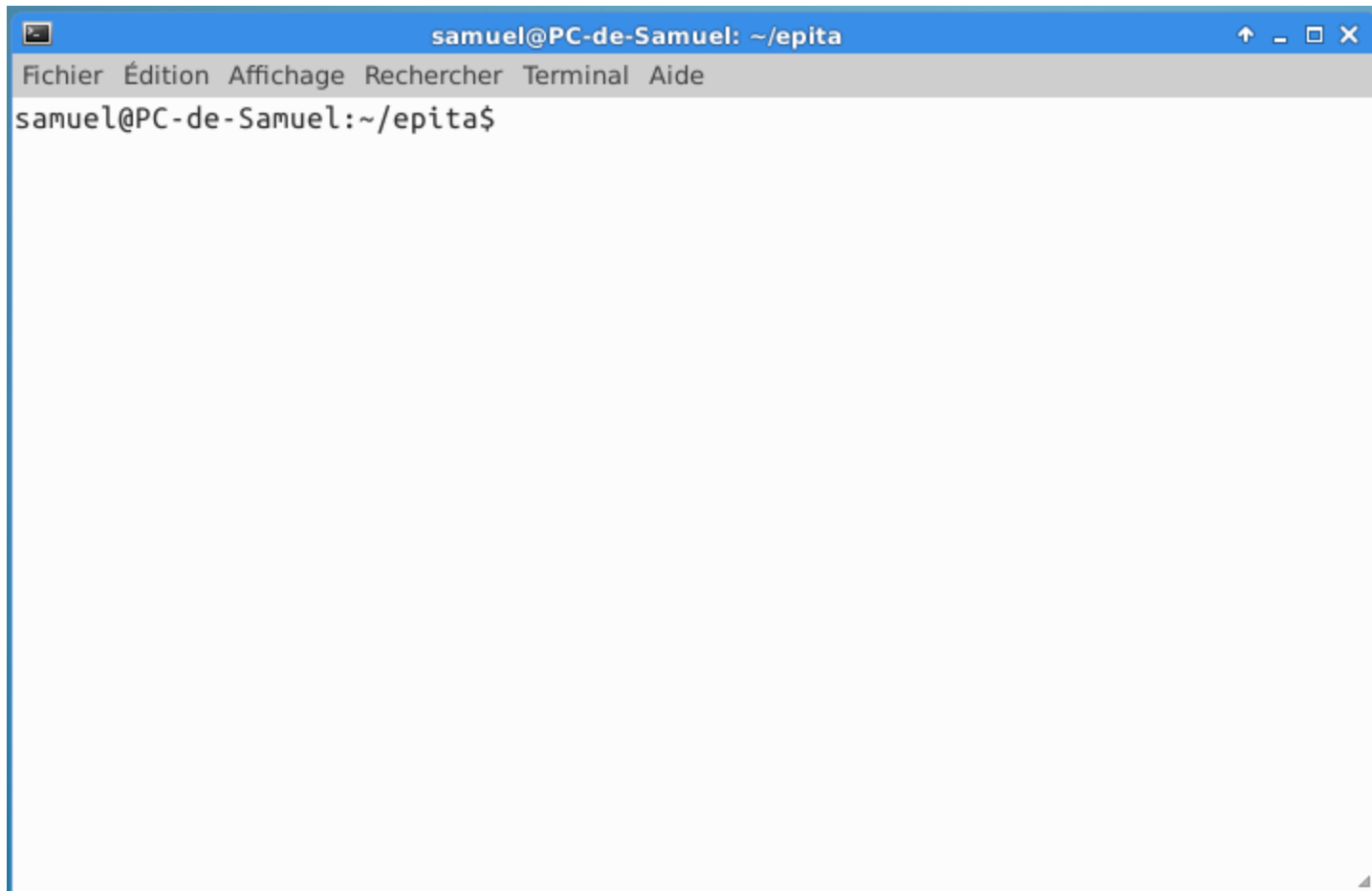/home/osman
[osman@ruby ~]$ su
Password:
[root@ruby osman]#

hostname

location in file system

user indicator, $ = regular user
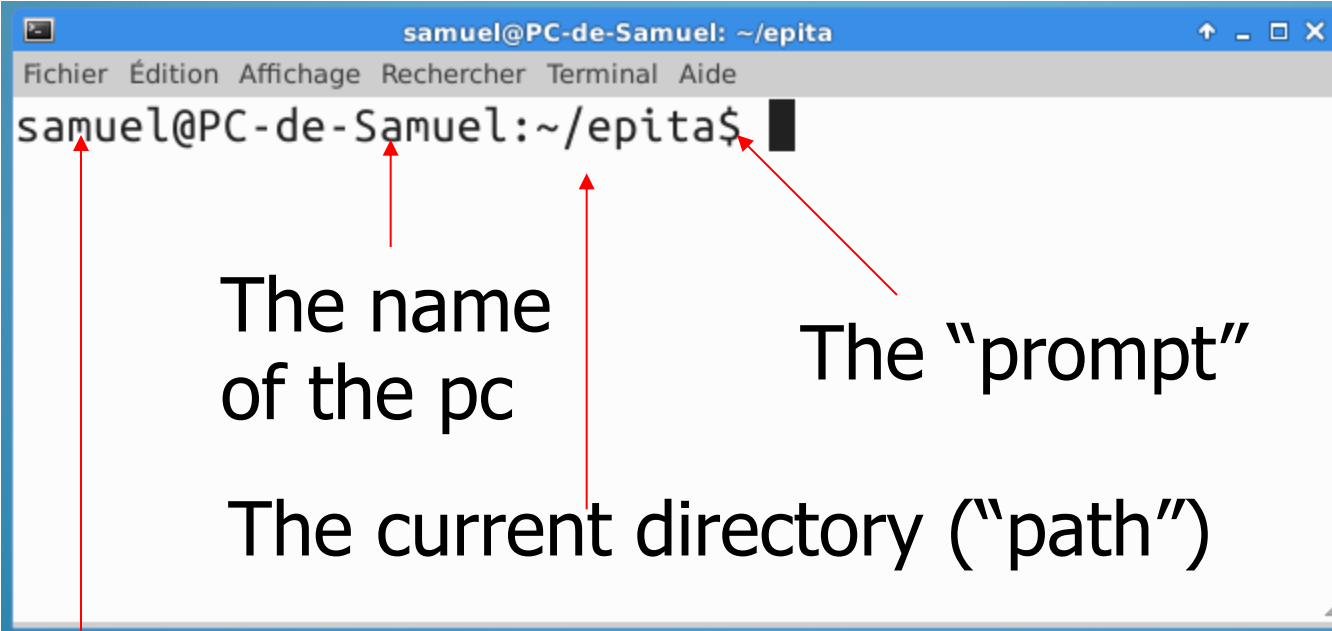
Connecting to a Unix/Linux system

- Open up a terminal:

Connecting to a Unix/Linux system

- Open up a terminal:

The name of the pc

The "prompt"

The current directory ("path")

The host

Shell commands

- **_Some commands_**
  - date
  - who am i : account used
  - who: list of connected users to the system
  - cal: calender
  - uname: OS & kernel version
  - id: identity of user
  - su: switch user
  - script -a => exit: save in file name typescript
  - file _filename_: the type of the file

Shell commands

- **_Some commands_**
  - date
  - ls, cp, rm, mv, ln, pwd, cd, mkdir, find, cat, more, less, grep, sort, tail, head, wc, whereis, alias, unalias, type
  - chgrp, df, file, tac, rev, tr, date, clear, diff, passwd, who, whoami
  - Wildcards symbol: *, ?, []

Customize your shell

- **# nano /home/login/.bashrc**
  - alias lll="ls | less"
  - alias x= "ls -l"
  - alias n= "nano"

- Restart your terminal
- Or
- *source .bashrc*

Help!

- Whenever you need help with a command type "man" and the command name

- The **man** command is used to display the manual entry associated with **word** entered as argument.

- The **-k** option is used to display a list of manual entries that contain entered **keyword**.

     man [chapter] *word*
     man -k *keyword*
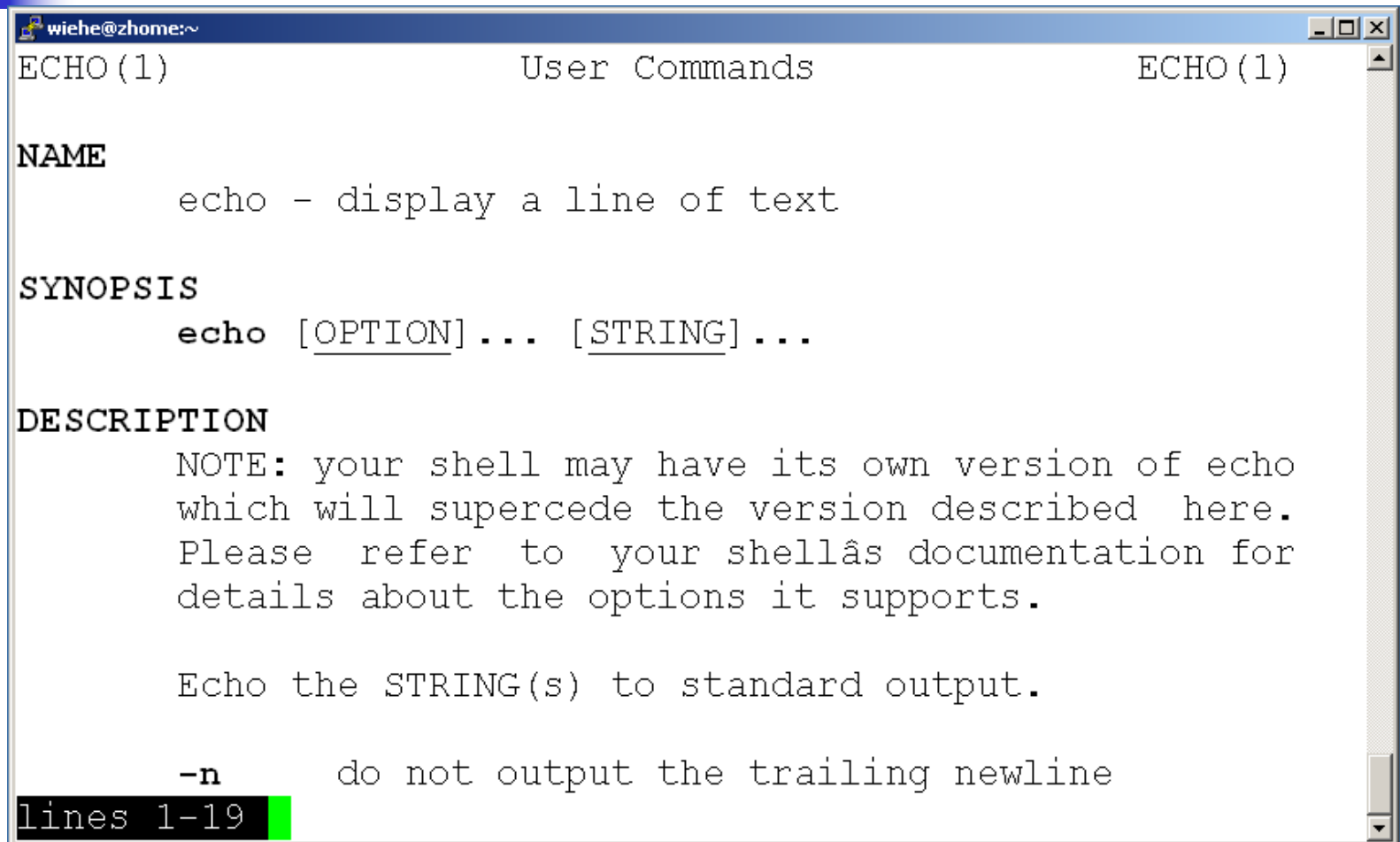
Help!


```
wiehe@zhome:~/linux_tutorial
zhome:~/linux_tutorial$ man
What manual page do you want?
zhome:~/linux_tutorial$ man echo
zhome:~/linux_tutorial$ █
```

Help!

```
wiehe@zhome:~                                                        _ □ ×
ECHO(1)                      User Commands                      ECHO(1)


NAME
       echo - display a line of text


SYNOPSIS
       echo [OPTION]... [STRING]...


DESCRIPTION
       NOTE: your shell may have its own version of echo
       which will supercede the version described  here.
       Please  refer  to  your shellâs documentation for
       details about the options it supports.

       Echo the STRING(s) to standard output.

       -n       do not output the trailing newline
lines 1-19
```
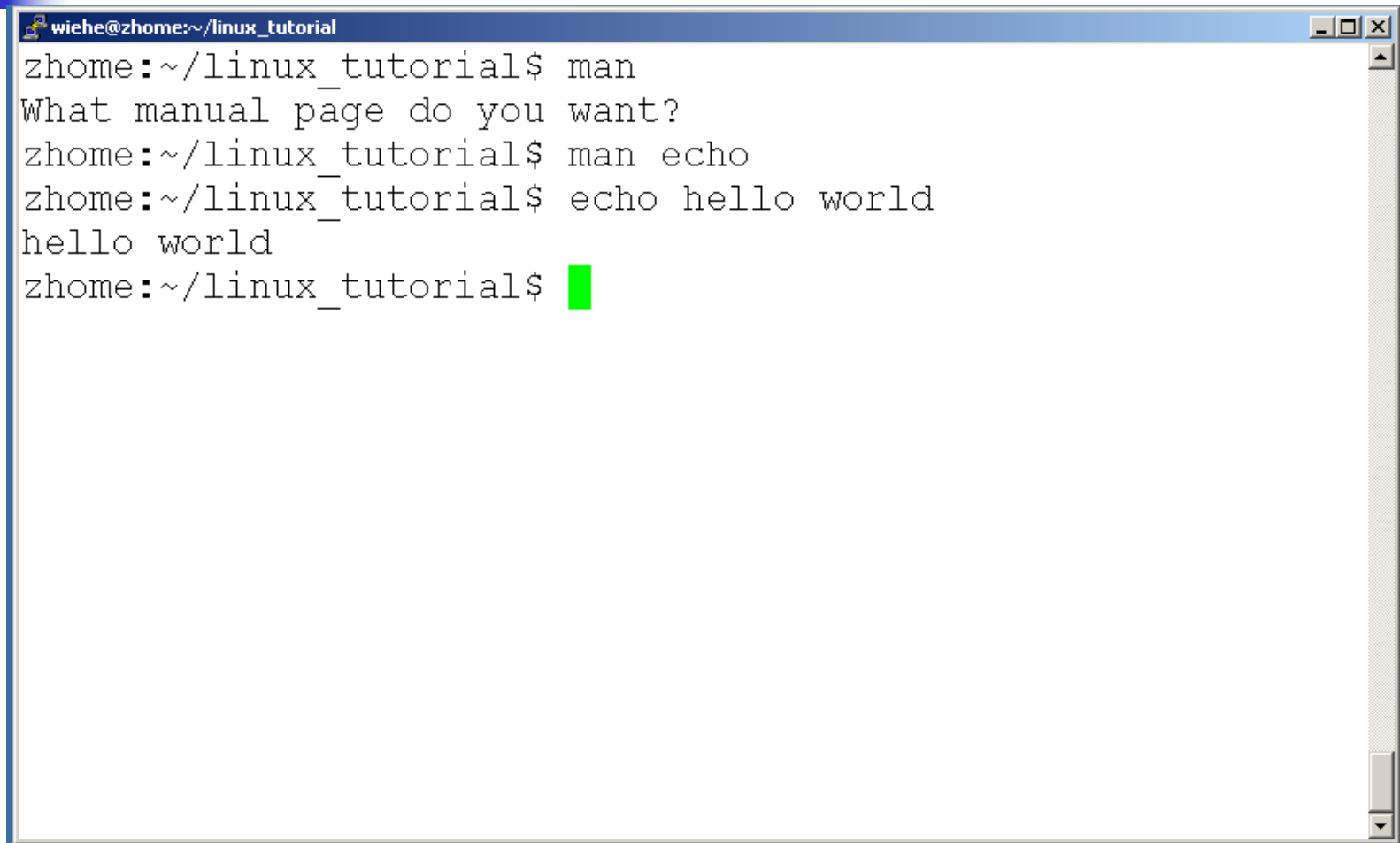
Help!


```
wiehe@zhome:~/linux_tutorial

zhome:~/linux_tutorial$ man
What manual page do you want?
zhome:~/linux_tutorial$ man echo
zhome:~/linux_tutorial$ echo hello world
hello world
zhome:~/linux_tutorial$ █
```