Lecture 1

Introduction to Computer Operating Systems and Programming

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Course Description

- This course will introduce students to the basics of Operating Systems, the use of Linux/Unix operating system and the Bash shell. This course will also expose students to the programming language python. Most of the content taught in this course will be done at the command line on a Linux computer. The command line is harder to use than the graphical user interfaces we are used to. But the command line is more powerful and gives us full access to all the features of the operating system. Students will also be exposed to the basics of the programming language in python.

Course Goal:

- Upon completion, students should be able to:
- - install and apply basic practical operations on the operating system Linux
- - manage the file system on the operating system Linux
- - write basic shell scripts on Linux to automate command line
- - use the vi/vim text editor
- - install common applications in Linux
- - make use the powerful command line in Linux to bring production in daily life, such as interacting with pdf, docx and common files
- - write basic programming language codes in python

Textbooks and Resources:

- Linux Command Line: Beginners Guide to Learn Linux Commands and Shell Scripting by David A. Williams

- 链接 : https://pan.baidu.com/s/1w3bOodJEGimtpZ0l9pwAIA 提取码 : ap2y

- The Linux Command Line by William E. Shotts, Jr. (https://wiki.lib.sun.ac.za/images/c/ca/TLCL-13.07.pdf)

- The Python Tutorial (https://docs.python.org/3/tutorial/index.html)

Grades

- Attendance 30% Quizzes 30% Final 40%

Before we begin:

- One of the important rules of learning concepts, skills and knowledge in computer science is:

- Check the I/O (Input/Output)

Introduction to Operating Systems

Comparisons

MAC
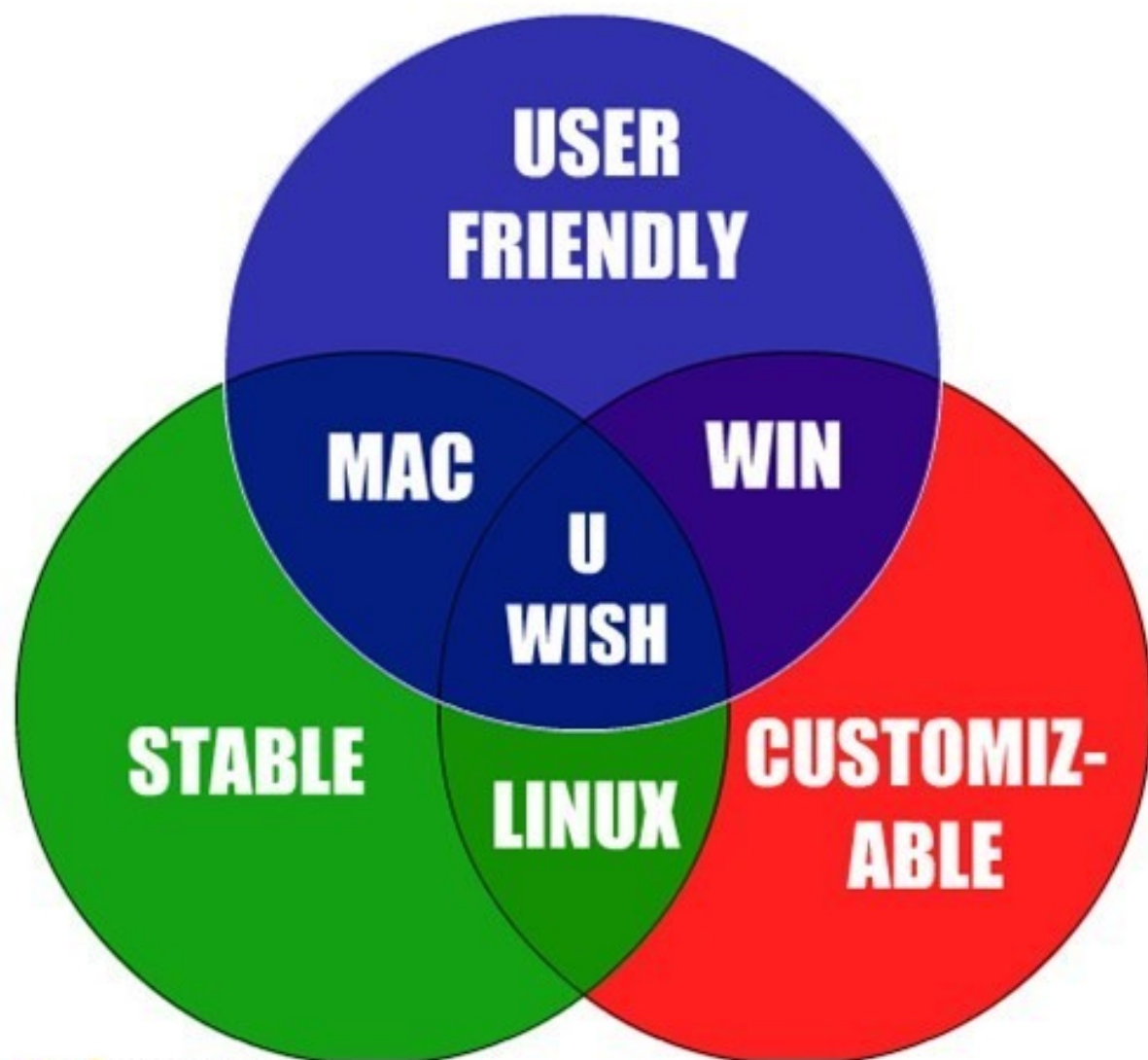
WINDOWS

LINUX

COMPARISON

PRICE

MAC OS	WINDOWS OS	LINUX OS
APPLE DEVICES ARE TOO MUCH EXPENSIVE	WINDOWS IS LESS EXPENSIVE THAN MAC	LINUX SOFTWARE IS TOTALLY FREE

COMPARISON

SECURITY

MAC OS	WINDOWS OS	LINUX OS
THERE IS NO VIRUS IN MAC OS BECAUSE YOU CAN INSTALL MAC ONLY ON APPLE DEVICES	THERE ARE AMNY TYPES OF VIRUSES IN WINDOWS OS BECAUSE OF A LARGE AMOUNT OF MARKET SHARE	THERE ARE LESSER AMOUNT OF VIRUSES IN LINUX AS COMPARED TO WINDOWS BECAUSE LINUX IS AN OPEN SOURCE OS

Linux Distributions
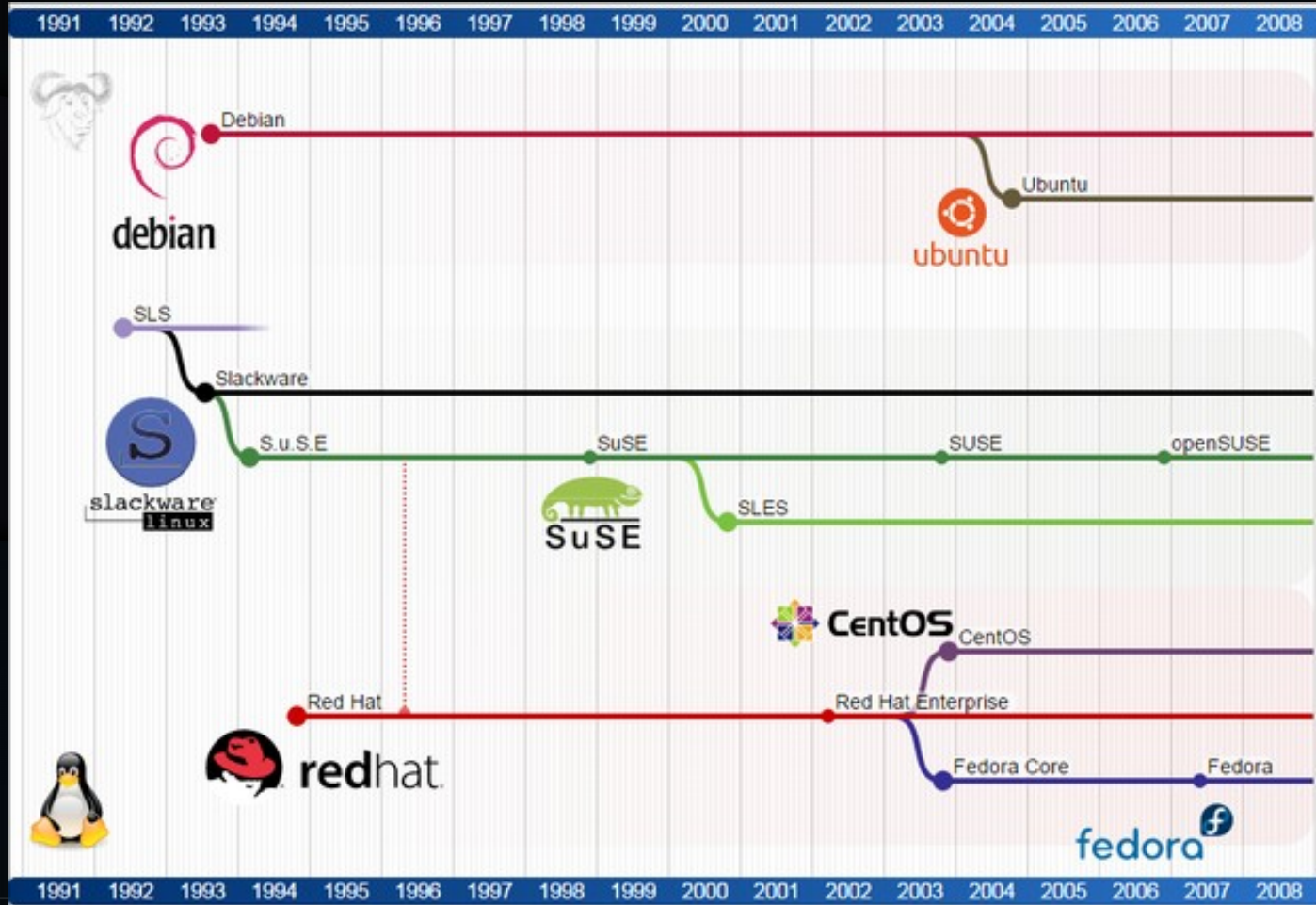
	Fedora	Red Hat	Oracle Linux	Ubuntu	SUSE
Pros	Free, provides the latest and greatest Linux features	Excellent management tools, great support options including self-help options for those on a budget	OS is free, lots of extras included with support subscriptions, affordable 24/7 support options	Basic OS is free, excellent Landscape management tools, scalability and long-term support	Custom installation options, long-term support versions available
Cons	Short support cycles and no support options beyond community support	Red Hat gets costly in a hurry, especially with any management tools added	Management tools are not Linux specific	Install could use a 'facelift', support can quickly become expensive with multiple servers	Support costs can get costly for larger installations, SUSE Manager is a bit more cumbersome than the competition
Best for	Those wanting a truly free Linux server and also access to the latest Linux technology	Those needing some comprehensive support options and the backing of a large commercial Linux provider	Those running other Oracle applications or looking for a robust Red Hat clone at a lower cost of ownership	Those needing a Linux server with long-term support and solid cloud credentials	Those needing a long-term support version of Linux and custom installation options

Ubuntu   https://ubuntu.com/

Installation/SystemRequirements

- https://help.ubuntu.com/community/Installation/SystemRequirements

- 2 GHz dual core processor
- 4 GiB RAM (system memory)
- 25 GB of hard-drive space (or USB stick, memory card or external drive but see LiveCD for an alternative approach)
- VGA capable of 1024x768 screen resolution
- Either a CD/DVD drive or a USB port for the installer media
- Internet access is helpful

You need a computer first...

- - taobao.com

- - jd.com

- - apple.com

- - shop

- Specification:

- CPU, GPU, SSD, Motherboard, Power supply, Fan, Monitor, etc.

1.1. What is Ubuntu?

- Ubuntu is a complete Linux operating system, freely available with both community and professional support. The Ubuntu community is built on the ideas enshrined in the Ubuntu Manifesto: that software should be available free of charge, that software tools should be usable by people in their local language and despite any disabilities, and that people should have the freedom to customize and alter their software in whatever way they see fit.

- https:// help.ubuntu.com/lts/ installation-guide/ s390x/ch01s01.html

1.1. What is Ubuntu?

- Ubuntu will always be free of charge, and there is no extra fee for the "enterprise edition", we make our very best work available to everyone on the same Free terms.

- Ubuntu includes the very best in translations and accessibility infrastructure that the Free Software community has to offer, to make Ubuntu usable by as many people as possible.

1.1. What is Ubuntu?

- Ubuntu is shipped in stable and regular release cycles; a new release will be shipped every six months. Every two even years an Ubuntu long term support (LTS) release will become available, that is supported for 5 years. The Ubuntu releases in between (known as development or non-LTS releases) are supported for 9 month each.

- Ubuntu is entirely committed to the principles of open source software development; we encourage people to use open source software, improve it and pass it on.

1.1. What is Ubuntu?

- Ubuntu is suitable for both desktop and server use. The current Ubuntu release supports Intel x86 (IBM-compatible PC), AMD64 (x86-64), ARMv7, ARMv8 (ARM64), IBM POWER8/POWER9 (ppc64el), IBM Z zEC12/zEC13/z14 and IBM LinuxONE Rockhopper I+II/ Emporer I+II (s390x)

- Ubuntu includes thousands of pieces of software, starting with the Linux kernel version 5.4 and GNOME 3.28, and covering every standard desktop application from word processing and spreadsheet applications to internet access applications, web server software, email software, programming languages and tools and of course several games.

- Explore ubuntu download:
https://ubuntu.com/#download
- Basic Installation Steps:
1. Download
2. Burn a USB/DVD
3. Install
Installation Method:
https://ubuntu.com/tutorials/create-a-usb-stick-on-windows

What if..

- You want to play around linux in Windows 7: install virtualbox

- You want to play around linux with Cloud:

Post Installation

- Explore Ubuntu Help

- GNOME: GNu Object Model Environment

- GNU: GNU's Not Unix, GNU (pronounced g'noo) is a free software project to provide a distributable replacement for Unix.

Some Pracitacal Pros about Lniux

- Fast Boot
- Donwload videos: e.g. you-get
- Combine pdf: pdfunite
- Convert filetype: convert
- Internet Speed: Speedtest
- Disk Drive Speed: hdparm
- Etc.

Textbooks

- The Linux Command Line: https://wiki.lib.sun.ac.za/images/c/ca/TLCL-13.07.pdf

- Part 1 Shell

- Part 2 Config and Environment

- Part 3 Common tasks

- Part 4 Scripts

Textbooks

- Linux Audio Book

Python Documentation

- Www.python.org

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- You want to play around linux with Cloud:

More resources...

- Www.bing.com

- "Linux Cheatsheet"

Getting started with keyboard keys:

- Get familiar with all keys in the keyboard

Basics of Commands

- All commands are case-sensitive.

- To shutdown computer: shutdown

- Ctrl + Alt + t to open a new terminal in a new window

- Ctrl + Shift + t to open a new terminal in a new tab

- Alt + Numbers to switch between terminals(different tab)

More shortcuts

- Ctrl + c "interrupt" or "exit"

- Ctrl + d "logs out of the interface" or "end of file"