CSCI-UA-4-005

Intro to Web Design + Computer Principles

Operating Systems + Unix

Professor Emily Zhao

M/W 12:30PM – 1:45PM

Class Website

bit.ly/web-with-emily

Agenda

- What is a computer?
- Operating Systems
- Unix
- Visual Studio Code
- Setting up i6 accounts

What is a computer?

What is a computer?

A machine that processes information based on a program

Computers:

- Laptops
- Smartphones
- Smart watches
- Cars
- Gaming devices
- Toasters
- Calculators

What is a computer?

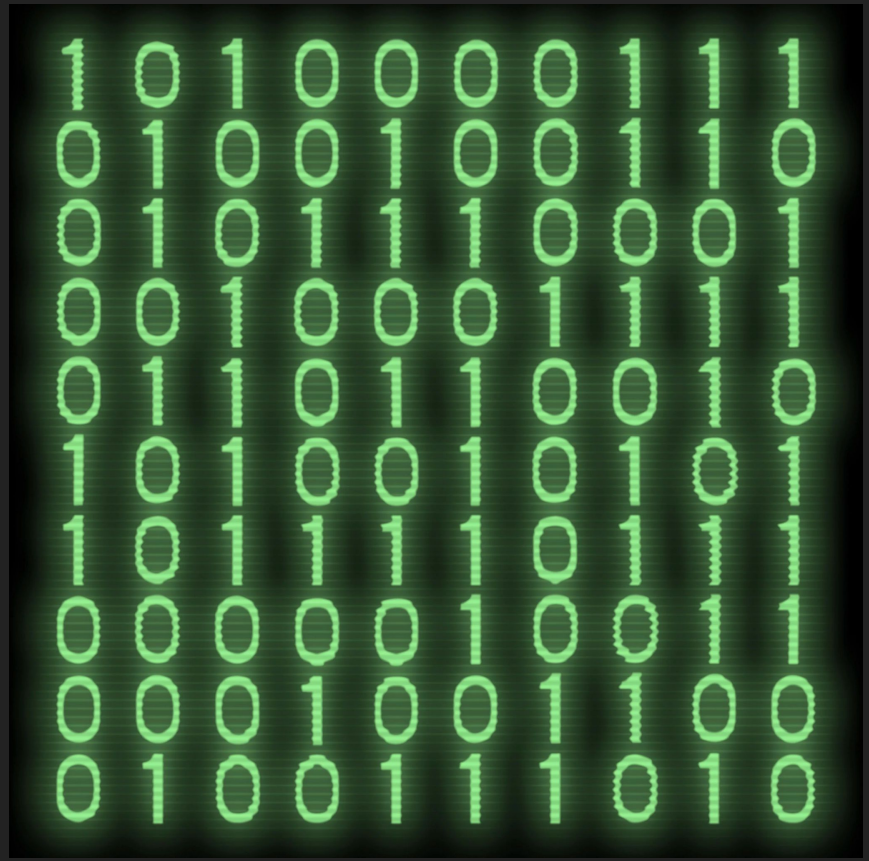
A machine that processes information based on a program

What is a program?

Instructions written to accomplish certain tasks

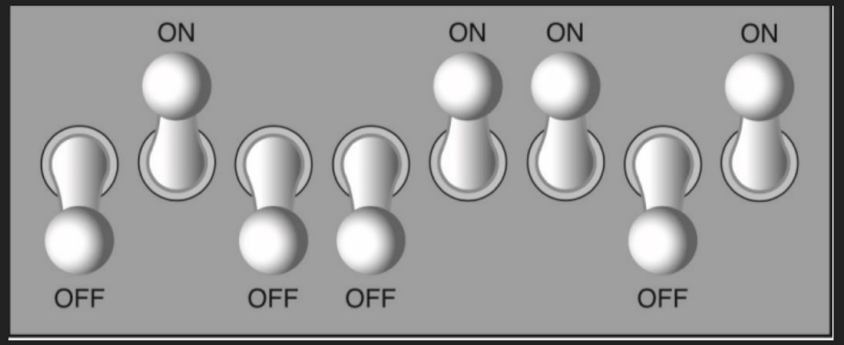
It’s all ones and zeros

- Everything that communicates with a computer “speaks” the same language (binary)
- Binary language: "0" and "1" (which really correspond to electrical impulses +5v / -5v)

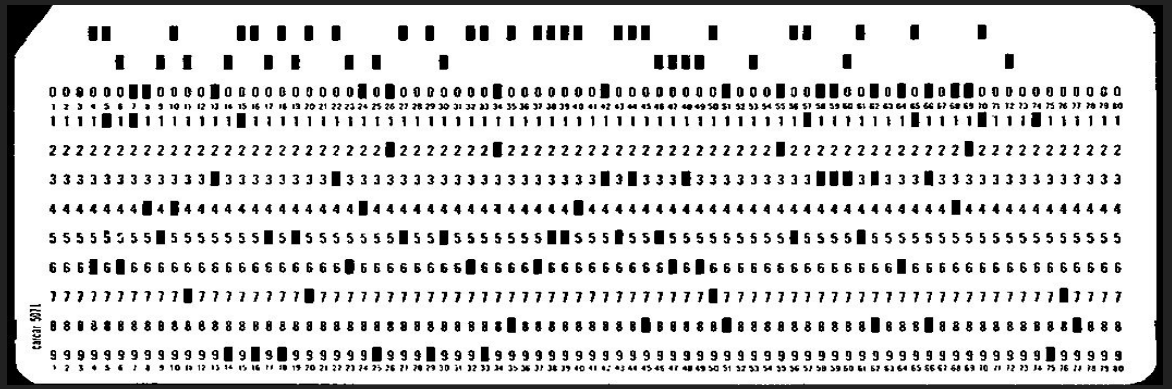


It’s all ones and zeros

- Bit: 1 | Byte: 01001011
- 1 byte has the possibility of 256 unique "states"



Early programming



Punch Card in Punch Card Machine

Bits + Bytes

1 Bit	=	Binary Digit
1 Byte	=	8 Bits
1 Kilobyte (KB)	=	1024 Bytes
1 Megabyte (MB)	=	1024 KB
1 Gigabyte (GB)	=	1024 MB
1 Terabyte (TB)	=	1024 BG

Images

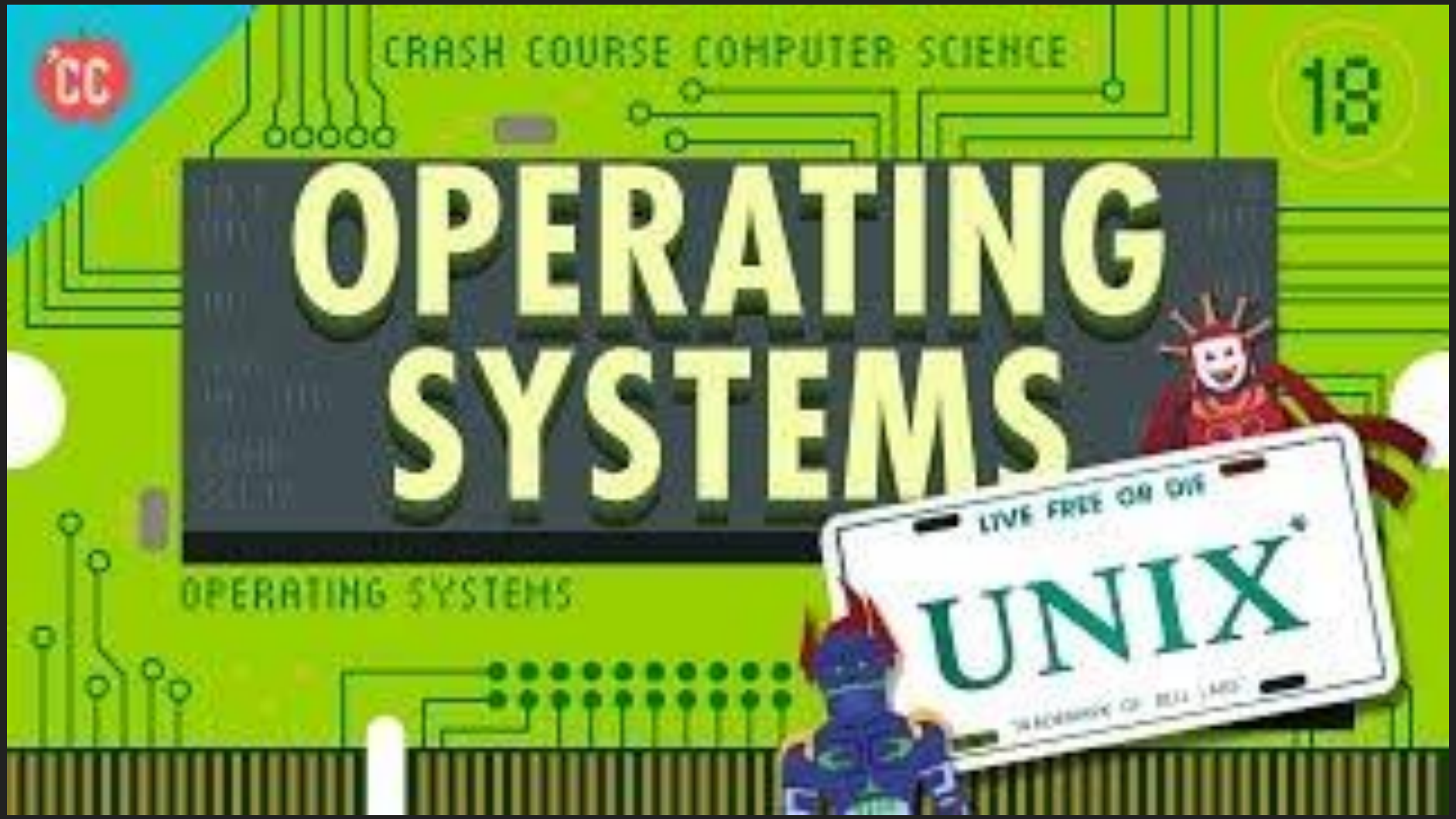
PNG	2 – 4 kB
GIF	6 – 8 kB
JPG	9 – 12 kB

Documents

DOCX	4 – 8 kB
PDF	18 – 20 kB

Media Files

eBook	1 – 5 MB
MP3 song	3 – 4 MB
DVD Movie	4 GB
HD Movie	5 – 8 GB
Blu-Ray	20 – 25 GB


CRASH COURSE COMPUTER SCIENCE
18
OPERATING SYSTEMS
OPERATING SYSTEMS
LIVE FREE OR DIE
UNIX

Early computers

- Ran on punch cards
- One program at a time
- Not user friendly
- Limited resources
- No standardization
- Minimal security + protection

Hardware

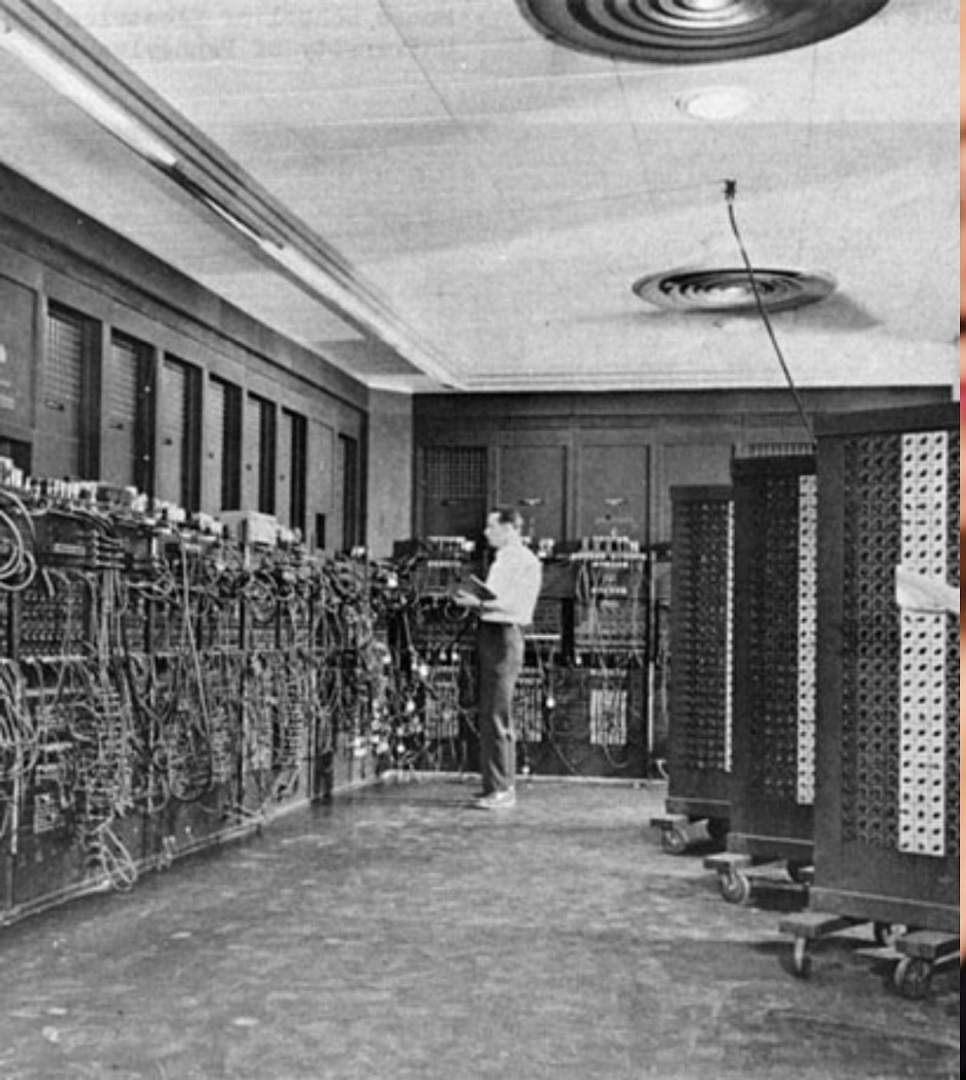
the tangible, physical parts of a computer responsible for executing and performing the actual physical operations

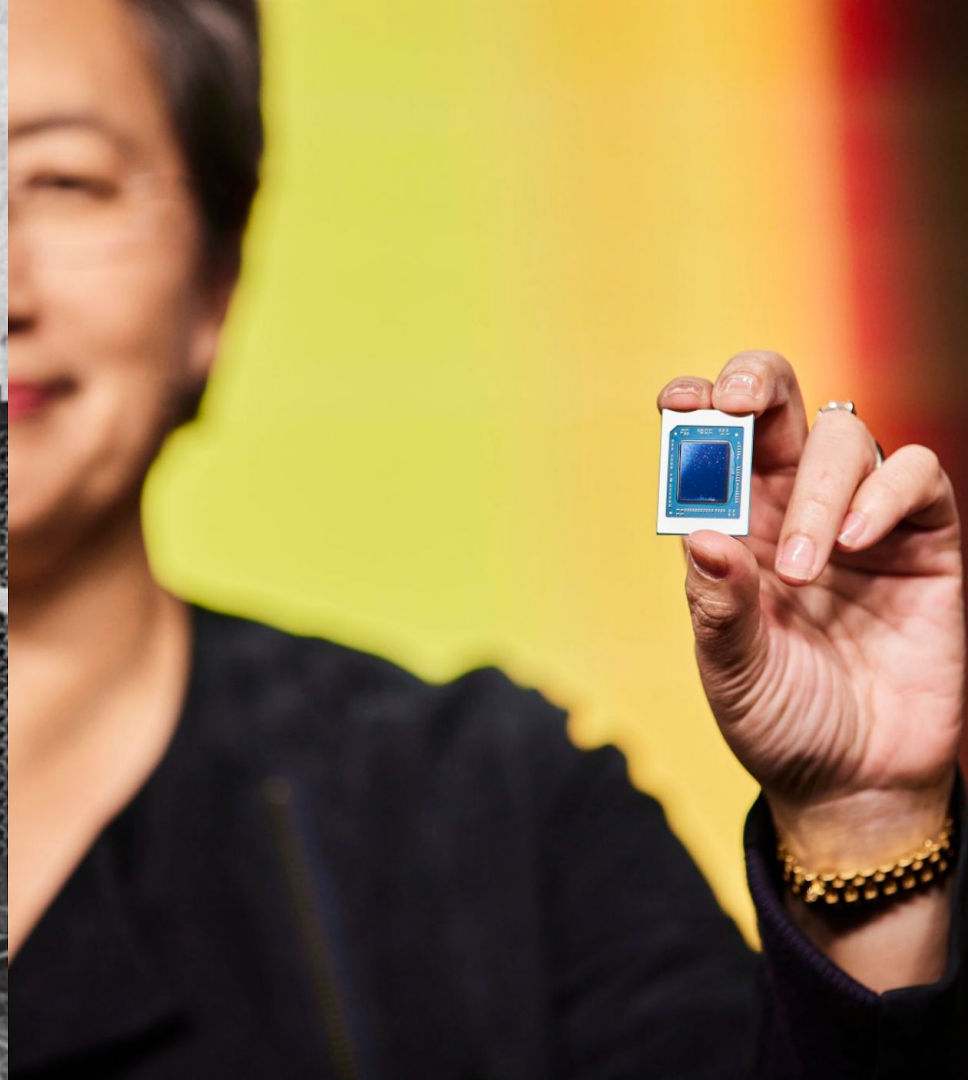
→ central processing unit (CPU)
→ memory (RAM)
→ hard drive
→ monitor, keyboard, mouse
→ peripheral devices (printers + scanners)

Software

the programs, data, and instructions that tell the hardware what to do

→ operating systems
→ applications (like word processors, web browsers, and games)
→ system utilities





Operating Systems

Intermediaries between software programs + hardware peripherals

Operating Systems

- Abstract the hardware
- Better resource management
- Multi-programming
- User interfaces (CLI, GUI)
- Security + protection

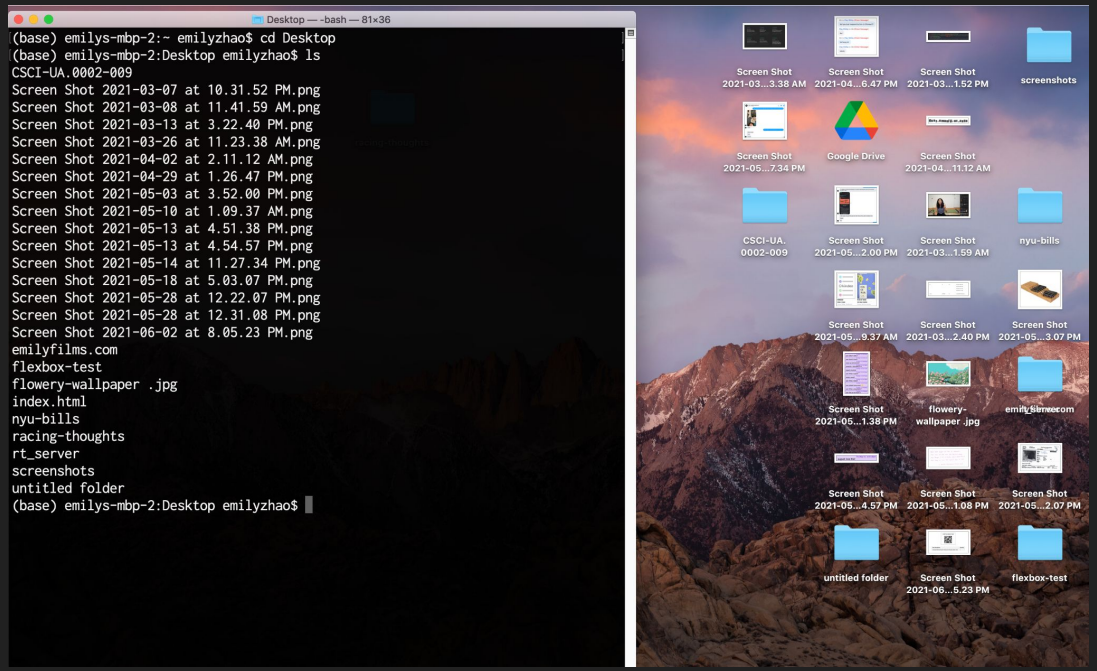
The User Interface

Portion of system software that allows you to interact with data

Two types

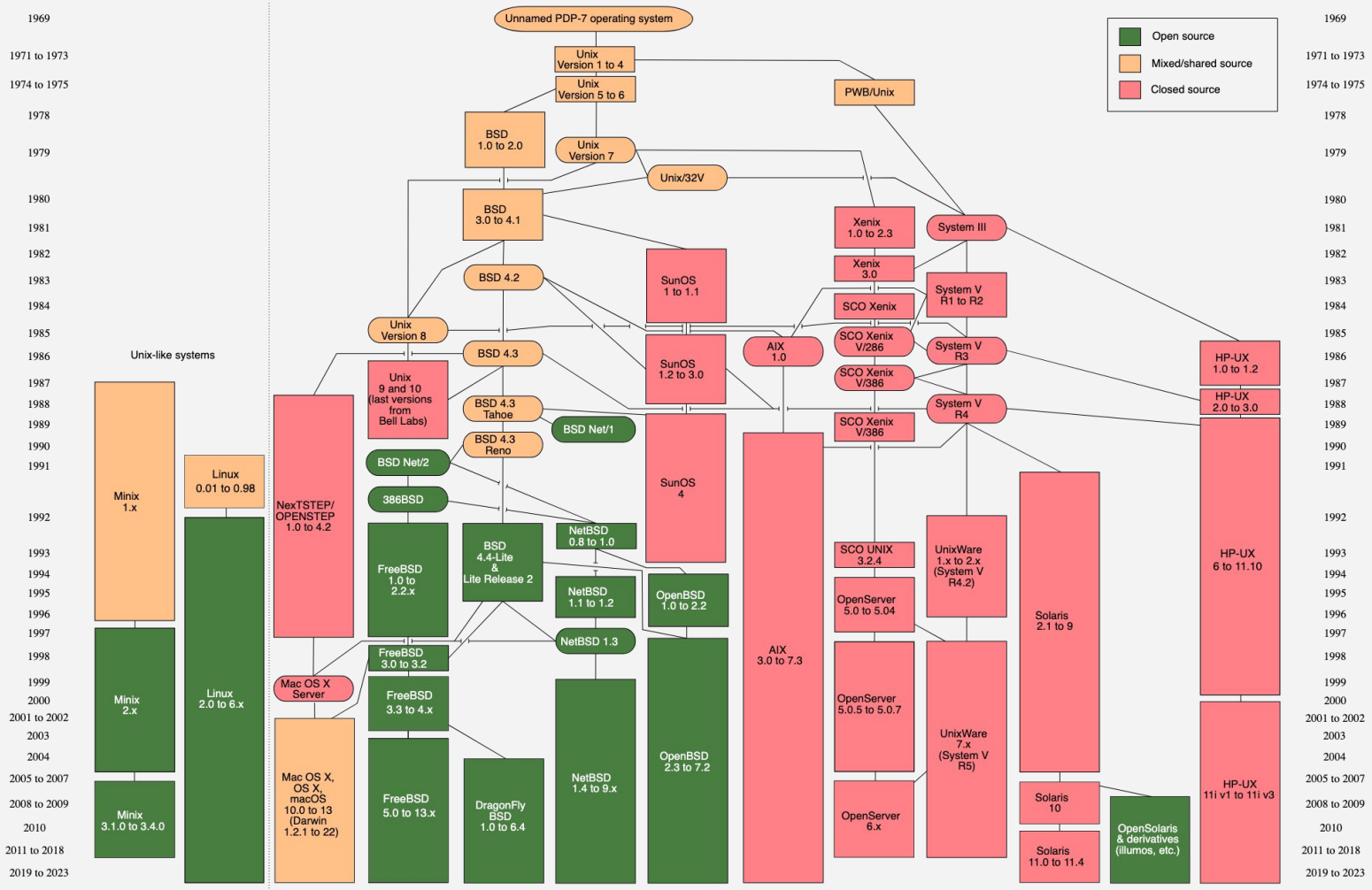
- Graphical (GUI)
- Command Line (CLI)

* GUI is more user-friendly, but command line is faster



Unix

- An open source OS produced by AT&T Bell Labs
- Originally developed in 1969
- Command line interface
- Portable, multi-tasking, multi-user
- Free distribution, open system
- Servers (including i6), workstations, mobile devices
- Basis of Linux and MacOS


Open source
Mixed/shared source
Closed source
1969
1971 to 1973
1974 to 1975
1978
1979
1980
1981
1982
1983
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1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001 to 2002
2003
2004
2005 to 2007
2008 to 2009
2010
2011 to 2018
2019 to 2023
Unix-like systems
Unnamed PDP-7 operating system
Unix Version 1 to 4
Unix Version 5 to 6
Unix Version 7
PWB/Unix
BSD 1.0 to 2.0
Unix/32V
BSD 3.0 to 4.1
Xenix 1.0 to 2.3
System III
Xenix 3.0
BSD 4.2
SunOS 1 to 1.1
System V R1 to R2
SCO Xenix
Unix Version 8
BSD 4.3
SunOS 1.2 to 3.0
AIX 1.0
SCO Xenix V/286
System V R3
SCO Xenix V/386
HP-UX 1.0 to 1.2
HP-UX 2.0 to 3.0
Unix 9 and 10 (last versions from Bell Labs)
BSD 4.3 Tahoe
BSD Net/1
BSD 4.3 Reno
System V R4
BSD Net/2
386BSD
SunOS 4
Minix 1.x
Linux 0.01 to 0.98
NexTSTEP/ OPENSTEP 1.0 to 4.2
FreeBSD 1.0 to 2.2.x
BSD 4.4-Lite & Lite Release 2
NetBSD 0.8 to 1.0
NetBSD 1.1 to 1.2
OpenBSD 1.0 to 2.2
SCO UNIX 3.2.4
UnixWare 1.x to 2.x (System V R4.2)
OpenServer 5.0 to 5.04
Solaris 2.1 to 9
HP-UX 6 to 11.10
Minix 2.x
Linux 2.0 to 6.x
NetBSD 1.3
FreeBSD 3.0 to 3.2
Mac OS X Server
FreeBSD 3.3 to 4.x
AIX 3.0 to 7.3
OpenServer 5.0.5 to 5.0.7
UnixWare 7.x (System V R5)
Mac OS X, OS X, macOS 10.0 to 13 (Darwin 1.2.1 to 22)
FreeBSD 5.0 to 13.x
DragonFly BSD 1.0 to 6.4
NetBSD 1.4 to 9.x
OpenBSD 2.3 to 7.2
OpenServer 6.x
Solaris 10
Solaris 11.0 to 11.4
OpenSolaris & derivatives (illumos, etc.)
HP-UX 11i v1 to 11i v3
Minix 3.1.0 to 3.4.0

Operating System Lineage

Unix-Based:
MacOS
Android
iOS
Linux

Non-Unix:
Microsoft OS

Common Unix Commands

`% ls`	list directory files
`% pwd`	show current directory
`% cd`	change directory
`% cd ~`	go to home directory
`% cd ..`	go to parent directory
`% touch`	create, change, modify timestamp of file
`% mkdir`	create directory

Set up i6 accounts

chmod

Every file and directory has nine permissions associated with it

The Unix `chmod` command sets permissions of files and directories

Files and directories have three types of permissions (or none):

- r (read)
- w (write)
- x (execute)
- - (no permission)

The above permissions occur for each of the following classes

- or users:
- u (user/owner)
- g (group)
- o (other/world)

Standard Web Permissions

Permissions	Unix Commands
U G W	
rwx rwx rwx	% chmod 777 filename
rwx rwx r-x	% chmod 775 filename
rwx r-x r-x	% chmod 755 filename
rw- rw- r--	% chmod 664 filename
rw- r-- r--	% chmod 644 filename

Standard **file** permission: 644

Owner can read and write file;
group can read file;
others can read file

Standard **directory** permission: 755

Owner can read, write and execute file;
group can read and execute file;
others can read and execute file

For next time

- Finish Assignment #1
- Read Chapter 4: Creating a Simple Page