Introduction to Programming for Public Policy Lecture 1

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Overview

Why learn programming?

Do things better

- Automation
  - Automate downloading and merging and cleaning of data
- Speed
- Collaboration using git
- Clarity and reproducibility

Do new things

- Data sources
  - web APIs, web scraping, databases, geographic data, etc.)
- Visualizations
- Models
  - “machine learning”

Why now?

- Software is easier and more powerful than ever
- More data is publicly available than ever
  - e.g. municipal data portals
- More organizations are using these tools

Syllabus

Administrative

- Course website: https://harris-ippp.github.io
- TAs will host lab sessions:
  - TODO
- Canvas for discussion, etc.
- Link to slides

Content

- Low level tools: command line
- Thinking algorithmically with python
- Fundamentals of databases and the web
- Putting it all together to execute a project

Assignments

Plagarism policy

Quizzes

Final Projects

Command Line

How does a computer work?

Hardware

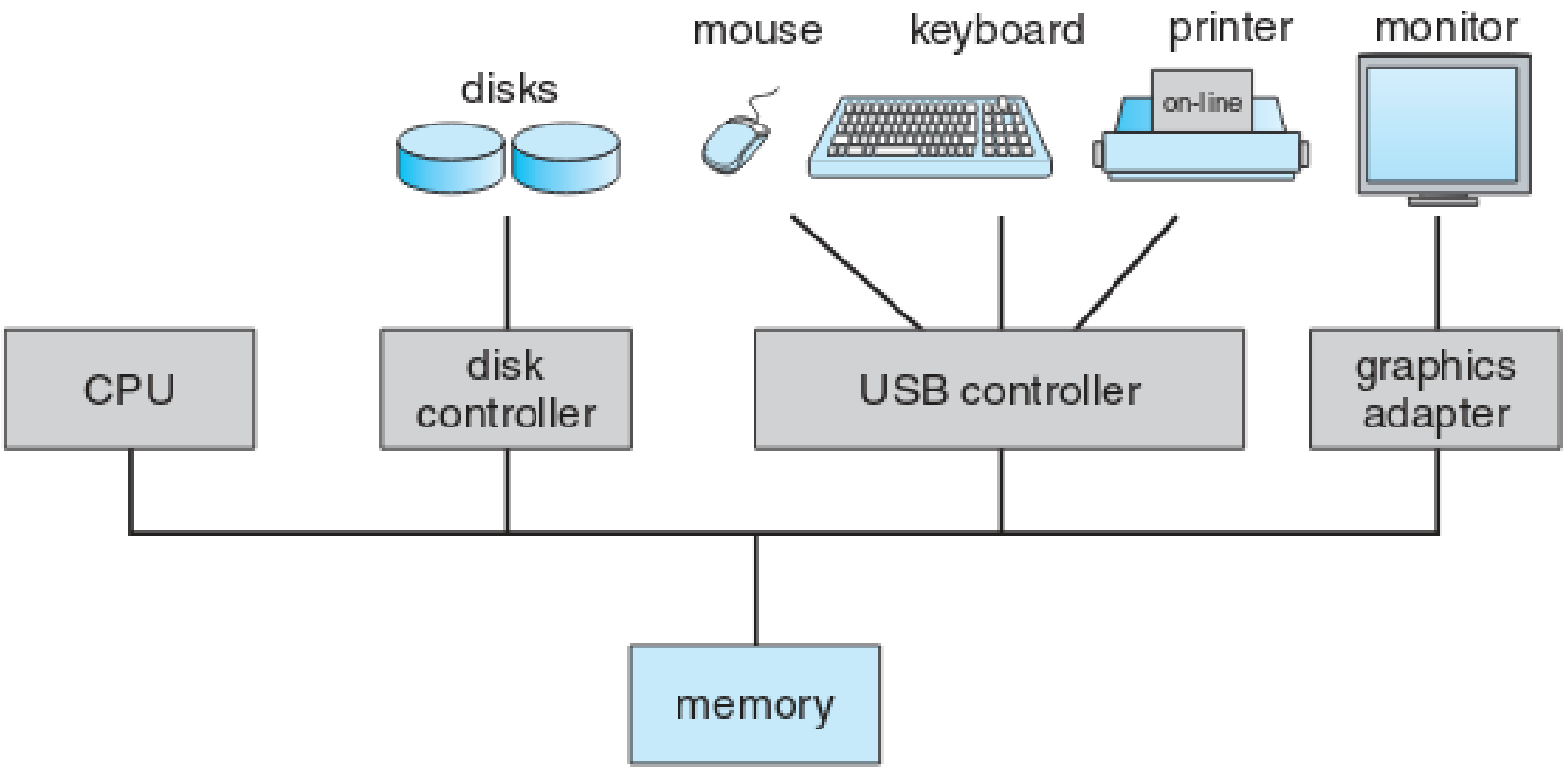

Figure 1: Computer hardware (Silberschatz et. al 2014)

Software

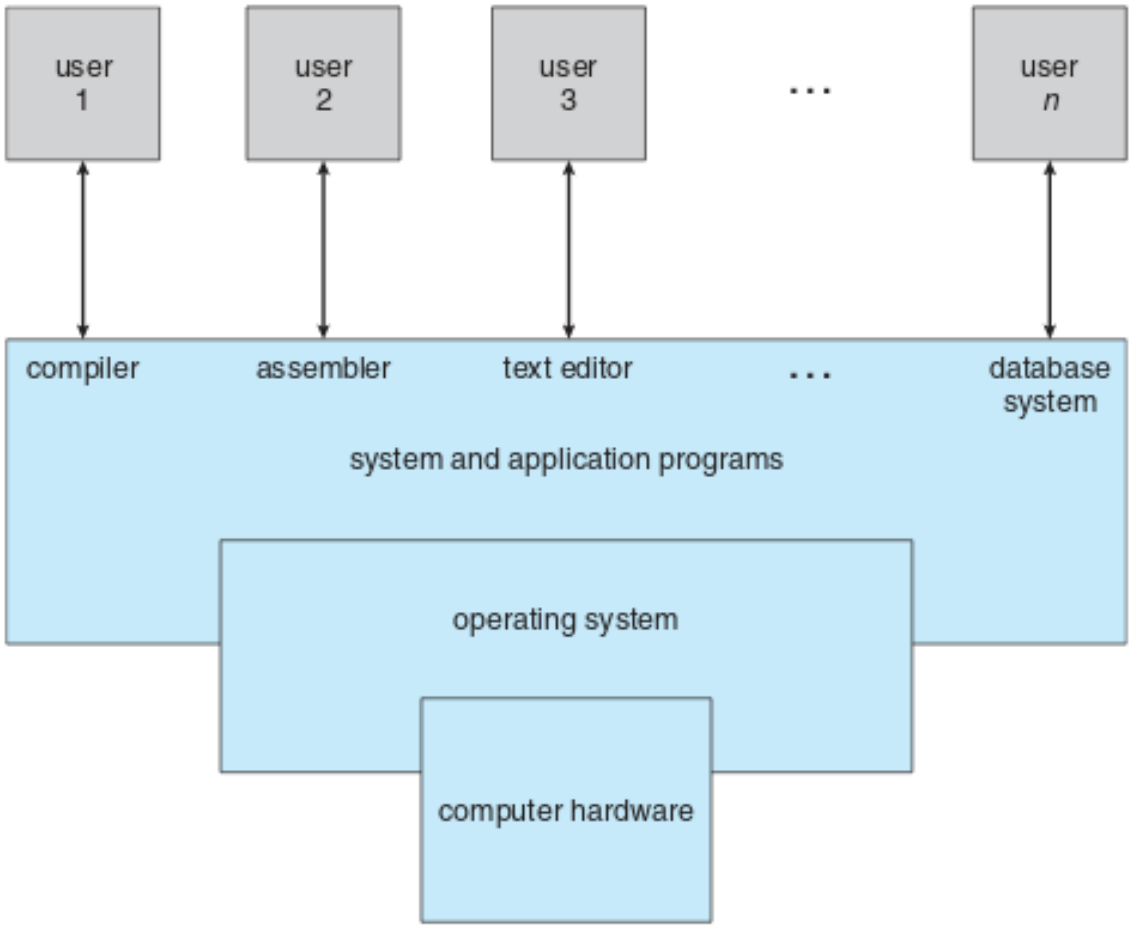

Figure 2: Computer hardware (Silberschatz et. al 2014)

Operating System

- Does things that the user doesn't need or want to deal with
- Makes system more efficient and convenient
- Intermediary between user and hardware

Unix

- In the 1970s AT&T Bell Labs developed an operating system called Unix
- The code was licensed to academic (Berkeley) and commercial (IBM, Sun) vendors who created Unix variants
- Today there are many Unix variants
  - Linux
    - Google's Android is based on Linux, making Linux (and Unix) the most popular operating system in the world
  - Mac OS X is also a Unix variant
  - Windows is *not* Unix
    - We'll use Cygwin to provide a "Unix-like" environment

Command Line

Overview

- One of the essential features of Unix for users is its command line (also called shell, prompt, etc.)
- Text interface for executing commands
- Hides the details of the underlying operating system

Mac OS X

TODO: screenshot

Linux

TODO: screenshot

Windows (Cygwin)

TODO: screenshot

Anatomy

- The prompt typically ends in a $ and contains information about the username, the system name, and the current directory.
- The character ~ is an alias for your home directory.

```
eric@laptop:~$
```

cd

- To **c**hange **d**irectories, use the `cd` command:

```
eric@laptop:~$ cd harris-ippp
eric@laptop:~/harris-ippp$
```

ls

```
eric@laptop:~/harris-ippp$ ls
index.md
mac_install.md
windows_install.md
eric@laptop:~/harris-ippp$
```

`ls` options

Syntax

Man pages

Useful commands

wget

du

head and tail

sort

Pipes

Scripts

Git

Version control