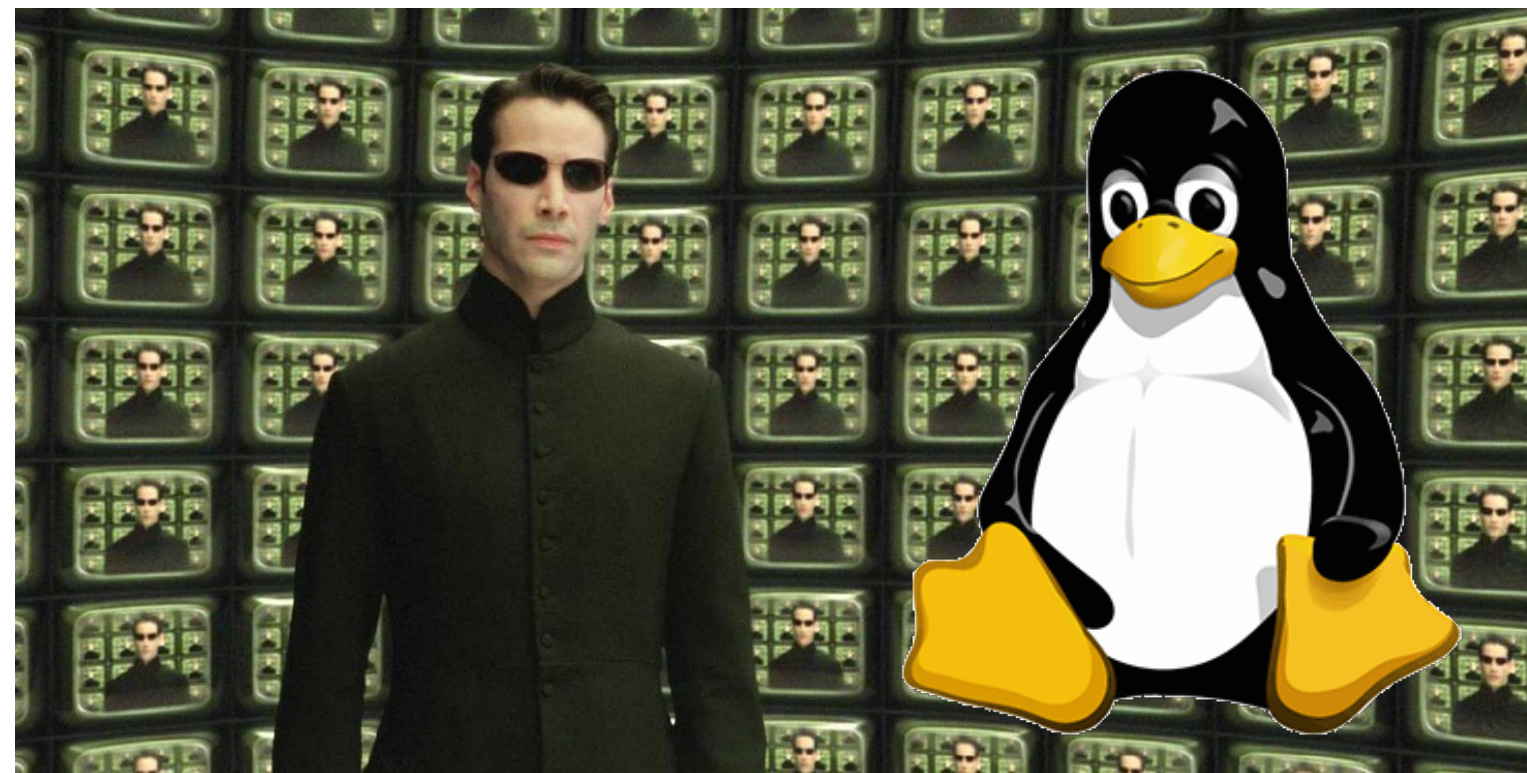




CSCI 125

Introduction to Computer Science and Programming II

Lecture 0: Introduction to CS



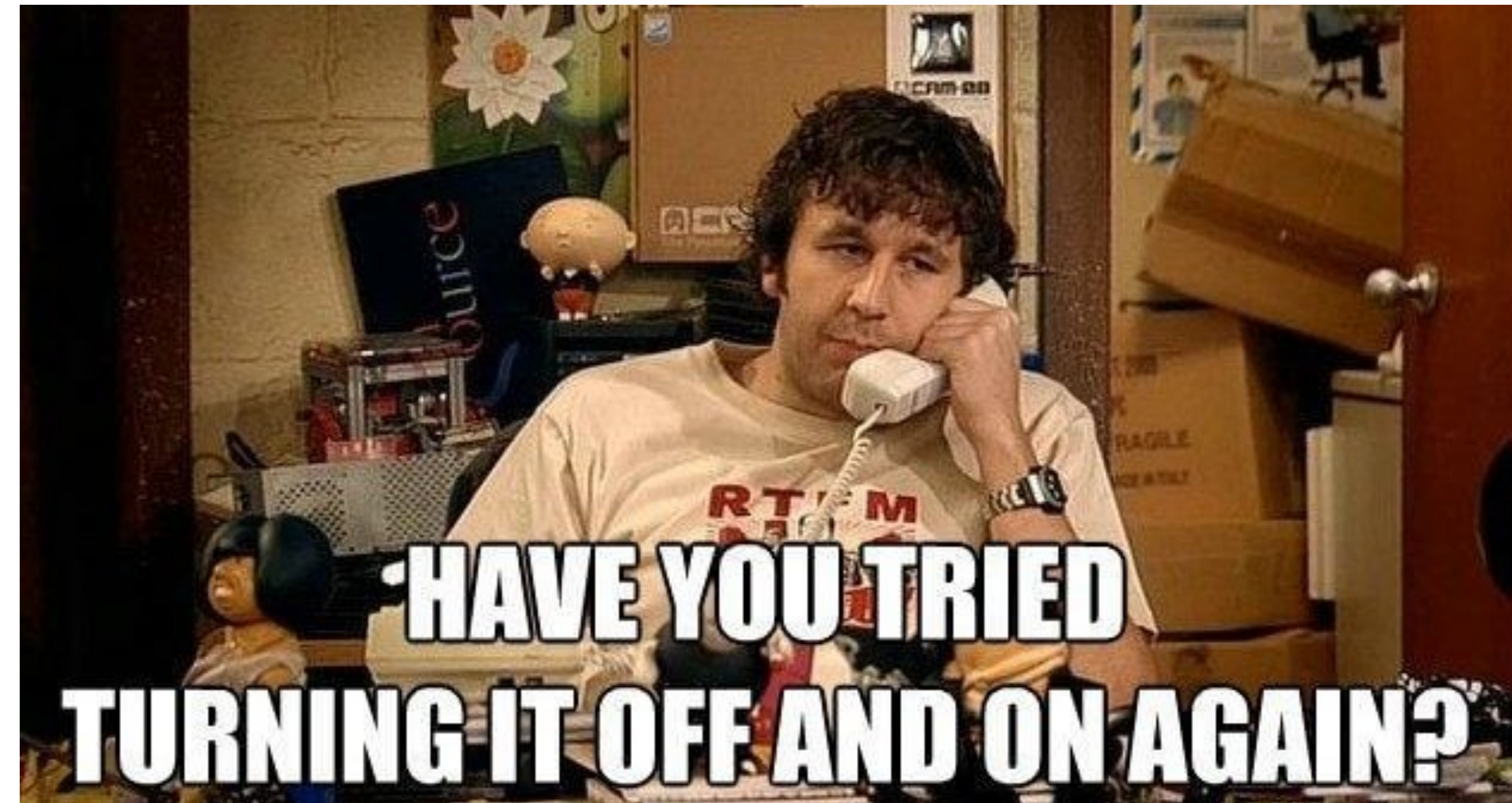
Jetic Gū
2020 Summer Semester (S2)

Overview

- Focus: Introduction to CS
- Architecture: Chat
- Core Ideas:
 1. What is Computer Science? What are the other stuff that you thought were CS?
 2. Roadmap to CS: A Systematic Overview
 3. From Windows to Linux: why is it important?

What is Computer Science?

- IT: Information Technology
- Computer Engineering
- Software Engineering
- Data Science; Data Analysis
- Artificial Intelligence
- Cloud Computing



What is Science?

- Discovering the way the physical world works (e.g. Laws of Gravity)
- Scientific
 - Verifiability: a theory can stand field tests
 - Consistency: the same test when repeated gives consistent results
- Empirical
 - Theory are supported by empirical experiment

What is Engineering?

- Practical knowledge transforming scientific theories into products
- "Without engineers, science is just philosophy."

Information Technology

- Equivalent to Computer Science
- Anything that has anything to do with information processing using non-human labour (basically, computing machinery)

Computer Engineering

- Subset of CS/IT
- More about hardware design
- e.g. Embedded system, Networking equipment, Scientific/High-Performance Design, Multimedia hardware chips

Software Engineering

- Subset of CS/IT
- Vast majority of IT professionals
 - Developing software required by customers/project managers
- Systematic design of complex software systems

Data Science/Analysis

- Subset mostly Math (Statistics) and CS/IT
- NOT Science: there is no science of data
 - DA is more on the Engineering side
- Use computer as tools, try to statistically analyse the data
 - e.g. How many people visited amazon.ca after Googling the term 'Refrigerator'?
 - e.g. "60% probability of 10% profit increase if we invest 100K on XXX advertising"

Artificial Intelligence

- Subset of mostly Math (Statistics) and CS/IT
- Pure empirical: we don't have very good theories of why it works
 - or why it doesn't work: lack of verifiability

Cloud Computing

- Subset of CS/IT
 - Stuff that you used to do on your own computer is now done by Amazon/Google/Microsoft online
 - You just see the results and interact with their servers
 - Engineering: a complicated hardware/software design problem
 - Science: optimisation, optimisation, optimisation

Roadmap to CS

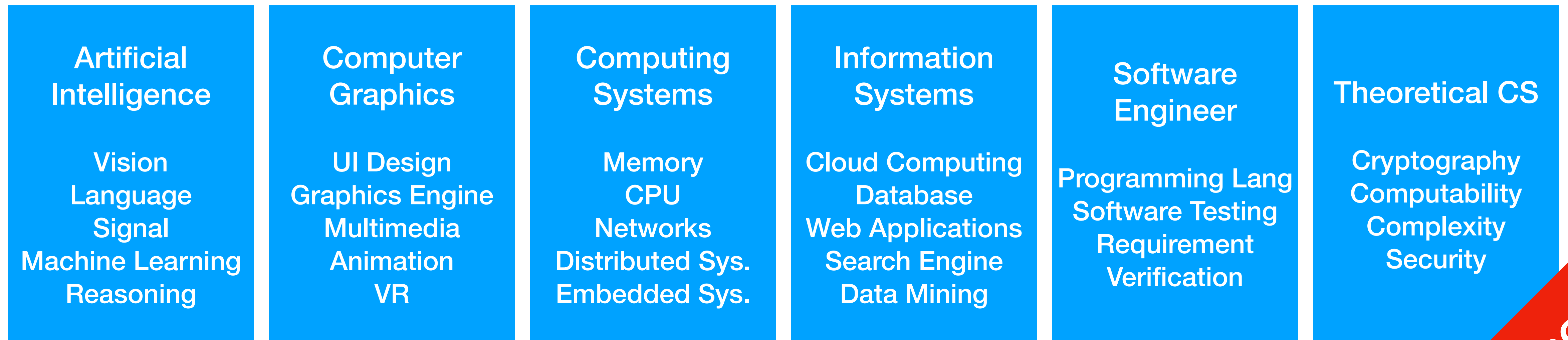
- You are (or considering) majoring in CS (B.Sc), now what?
- First two years of study: Basic of CS
 - Python, C/C++, Software Engineering Theories, OOP, Logical Circuits and Computer Organisation, algorithms and data structures, etc.
- Last 2 years of B.Sc: Pinpoint your interest, develop in-depth professional skills
 - SE, Cloud, Communications, Hardware, Graphics, AI, Network, Robotics, etc.

Roadmap to CS

- Columbia College (or first 2 years)
 - CSCI 101: fun
 - CSCI 120, CSCI 125: Python, C/C++. Basic programming skills
 - CSCI 150, CSCI 250, CSCI 295: Computer Hardware. How Computers work
 - CSCI 165: Internet
 - CSCI 225: Data Structure and Programming: algorithms
 - CSCI 237: CS for business students
 - CSCI 275: Basic Software Engineering stuff

Roadmap to CS

- University (or last 2 years of B.Sc)
- Advanced Algorithms, Operating System. Database System, Advanced Networks



End of Chit-chat

Environmental Setup

Linux, Command Line, Vim, G++, Gdb
Online Judge

Introduction to Linux

- It's just another OS
- It's open source
 - You can see the kernel code here: <https://github.com/torvalds/linux>
- It's most useful in a wide-range of fields
 - ALL major Online Servers, even Microsoft's own Webservers / cloud system
 - ALL scientific computers, including smallest cluster to SFU's super computers
 - Used in ALL software development except for Windows apps

For This Course

- You will need access to Linux or Unix-based OS (macOS is Unix)
- Use Linux/Unix as your primary desktop OS
- Dual OS desktop
- Install a Linux distribution in Virtual Machine
- Install Windows 10's Linux subsystem (SLOWWWWWW)
- You need to be comfortable with command line

For This Course

- You will need to register an account on the Online Judge ([link](#) on my website)
- Use your Columbia College email ONLY.
- It is recommended for you to NOT use your real name (privacy)
- Your coding assignments/exams will be published and submitted on the OJ as Contests. I may post optional exercises there as well.
- The OJ compares code submissions against each other to detect Plagiarism. DO NOT CHEAT!

Common Questions

- Do we have to?
 - Yes. In your later life, you can use whatever GUI based code editor. But you must know how to work using command line only, so for this course you must complete all coding assignments using command line.
- Why is macOS ok but not Windows?
 - macOS is a UNIX operating system which shares many common features with Linux, such as intuitive command line. In fact most commands and operations are identical, including the way we compile and debug everything.
 - Windows on the other hand is more cumbersome. Even Microsoft employees use linux/mac for webdev and building cloud services.

List of Linux commands you will need

- Open Terminal, a command line prompt will show up
 - `ls`: list present directory
 - `cd`: change directory
 - `cat`: view file as text
 - `man`: see manual
 - `vim`: text editor

A video tutorial will be posted on my website as well