# Computer Systems WEB: CS107.STANFORD.EDU

Cynthia Lee

### **Today's Topics**

- 1. Introductions
- 2. What is this class?
- 3. Course components and policies overview
- 4. Diving right into the content:
  - > Your first C program, your first command-line compilation

#### Next lecture:

> More whirlwind tour of C and UNIX

### Meet our TAs

- Aojia Zhao
- Brendan Corcoran
- **David Wang**
- **Devon Warshaw**
- **Jim Andress**
- Joanne Jang
- John Clow
- John Louie
- Matt Volk
- Ran Gross
- Sabelle Smythe
- Sal Valdes
- Stephanie Palocz
- **Travis Geis**











Stanfor



















#### Cynthia Lee



Introductions

## CS107.STANFORD.EDU

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Quick poll: how many of you have been in a class with me before?

# What is CS107 all about?

HAVE YOU EVER NOTICED HOW "HACKER" WORK LOOKS IN OLD MOVIES?...

## Independence Day (1996)



(SO THIS GUY CAN GO DIVEBOMB IT)

## Matrix Reloaded (2003)



(TRINITY SAVING THE WORLD BY HACKING INTO THE POWER GRID)

## The Girl with the Dragon Tattoo (2011)



(LISBETH SALANDER RESEARCHING MURDERS)

# TRON Legacy (2011)

#### https://www.youtube.com/watch?v=yQsaPVfze4s



#### What is CS107 about?

- The CS106 series teaches you how to solve problems as a programmer
- Many times CS106 instructors had to say "just don't worry about that" or "it probably doesn't make sense why that happens, but ignore it for now" or "just type this to fix it"
- CS107 *finally* takes you behind the scenes
- How do things really work in there?
  - It's not quite down to hardware or physics/electromagnetism (those will have to stay even further behind the scenes for now!)
  - It's how things work inside Java/C++ (we will explore from C), and how your programs map onto the components of computer systems
  - > Who doesn't love the idea of having an exclusive backstage pass?
  - > Who doesn't love being in on a secret?
  - > It just feels good to know!

#### Here's another reason why I think you should be excited:

#### This stuff MATTERS!

- Here's a figure that appears twice in your book (it's that important!)
- It takes ~one nanosecond to access data closest to the hardware that actually does calculations (L0 at right)
- It takes ~ten million nanoseconds (10ms) to access data on a hard disk (L5 at right)—ouch!!



• A constant factor of 10 million can throw the "Big-Oh" algorithm comparisons you have studied so far (that ignore constant factors) way off!

#### What are the learning goals for the course?

- The goals for CS107 are for students to gain mastery of
  - > writing C programs with complex use of memory and pointers
  - an accurate model of the address space and compile/runtime behavior of C programs
- to achieve competence in
  - > translating C to/from assembly
  - > writing programs that respect the limitations of computer arithmetic
  - > identifying bottlenecks and improving runtime performance
  - > writing code that correctly ports to other architectures
  - > working effectively in UNIX development environment
- and have exposure to
  - > a working understanding of the basics of computer architecture

# How does CS107 work?

**Course Information Sheet walkthrough** 

### Textbooks

- You'll want to get the Bryant and O'Hallaron book
- 3<sup>rd</sup> edition (for once in a college class, this actually matters)
- The suggested C reference is just one suggestion
  - > You could do just as well with a different C book
  - You could do just as well with Google or websites like <u>http://www.cplusplus.com/reference/clibrary/</u>
  - > Just need somewhere to turn when you have a question about C

# **Getting Started in UNIX**

WELCOME TO THE WORLD OF GREEN AND BLACK!

# TRON Legacy (2011)

https://www.youtube.com/watch?v=yQsaPVfze4s



## TRON Legacy (2011) (screenshot #2)

https://www.youtube.com/watch?v=yQsaPVfze4s

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## TRON Legacy (closeup)



### Navigating directories in UNIX (compared to Mac)

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## Navigating directories in UNIX (compared to Windows)

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