Ops 102: Intro to Computer Operations

Class 01

Ops 102 Checklist

- Join Ops 102 on Canvas
- Get connected in Slack
  - If you haven't received a Slack invite yet, don't worry! We'll connect with you and check during setup time
- Readings
  - Begin your readings assignment in Canvas

Ops 102 Overview

Ops 102 Overview

- **What is a computer?**
- Build a computer
- Startup sequence and BIOS
- Windows OS
- Devices, Drivers, and Software in Windows
- Security Controls
- Network Fundamentals
- Virtualization of Ubuntu Linux
- Command Line Interface

Agenda

1. Welcome to Ops 102
    - Introduce Yourself!
    - Welcome & Growth Mindset
2. What is a Computer?
    - Binary & Data
    - Circuits & Logic
    - Lab assignment
3. Inside a Computer
    - Disassembly
    - Lab assignment
4. Open Lab Time

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Introductions

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Let’s get to know each other!

- How shall we refer to you? Name/pronoun/nickname...
- What’s your background and where are you from?
- What would you like to gain from this course?

How You Will Learn

Let’s take a look a the different learning styles used in this course

Path Learning

- Leads you along
- Students are consumers of information
- Predictable outcomes
- Creates dependency
- The goal: an exchange of information

Sandbox Learning

- Fosters exploration
- Students are co-creators of their own learning experience
- Wide range of outcomes
- Creates autonomy
- The goal: learning and discovery

Skills for Sandbox Learning

- Generating and selecting ideas: what do you want to learn now?
- Planning your learning: managing scope, finding resources
- Experimentation: keeping track of what you've tried, what's worked, and what hasn't
- Reflection: pausing every so often to tally what you've learned, and what new questions you have
- Finding help!

Your Tools

- Your new friends!!!
- Your instructor / TAs for questions
- The internet for researching
- Slack for peer messaging
- Zoom for collaborative screenshares
- Canvas for tracking tasks
- Your curiosity about all things tech!

Online Classroom: Canvas

Course Invitation Inbox ×

Instructure Canvas <notifications@instructure.com>
to me

You've been invited to participate in the course, seattle-102d4: Intro to Software Development. Course role: Teacher

Name: [redacted]
Email: [redacted].com
Username: [redacted]com

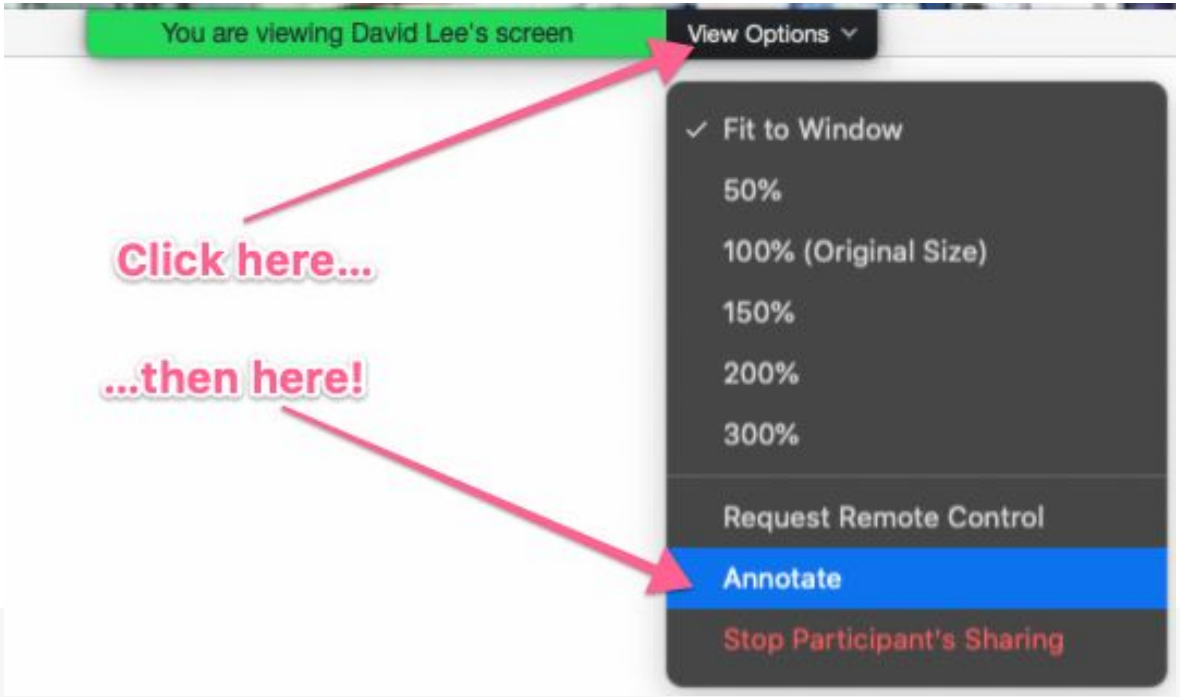
Get Started

CANVAS

Click here to view the course page | Update your notification settings

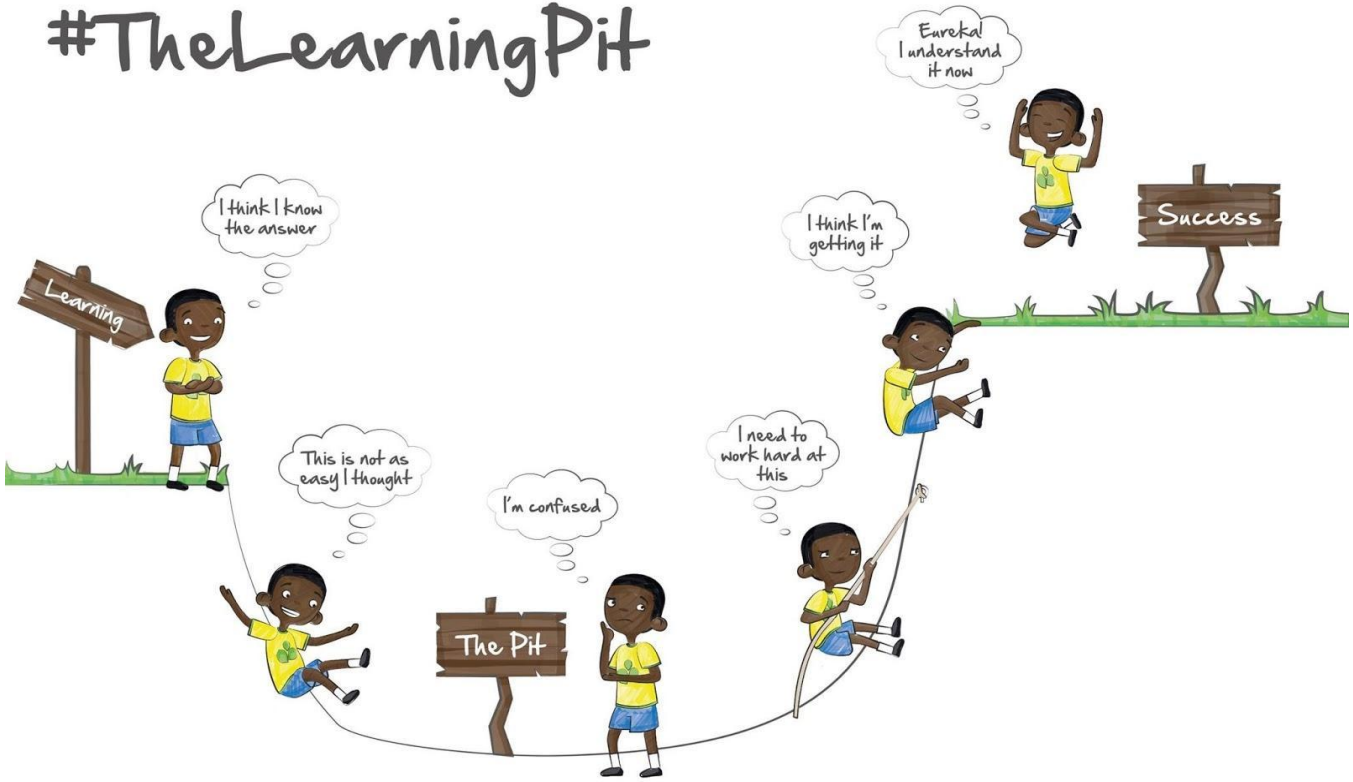
Zoom

Use the tools to interact with the screen!



Slack

#TheLearningPit



The Learning Challenge
by James Nottingham

What is Mindset?

- Mindset: self-perception or “self-theory” that people hold about themselves.
- Fixed mindset: believing basic qualities, like intelligence or talent, are simply fixed traits. Believing that talent alone creates success—without effort.
- Growth mindset: believing that people’s most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point.

Prepare Your Brain

“A few modern philosophers assert that an individual’s intelligence is a fixed quantity, a quantity which cannot be increased. We must protest and react against this brutal pessimism… With practice, training, and above all, method, we manage to increase our attention, our memory, our judgement and literally to become more intelligent than we were before.”

—ALFRED BINET

Inventor of the IQ test

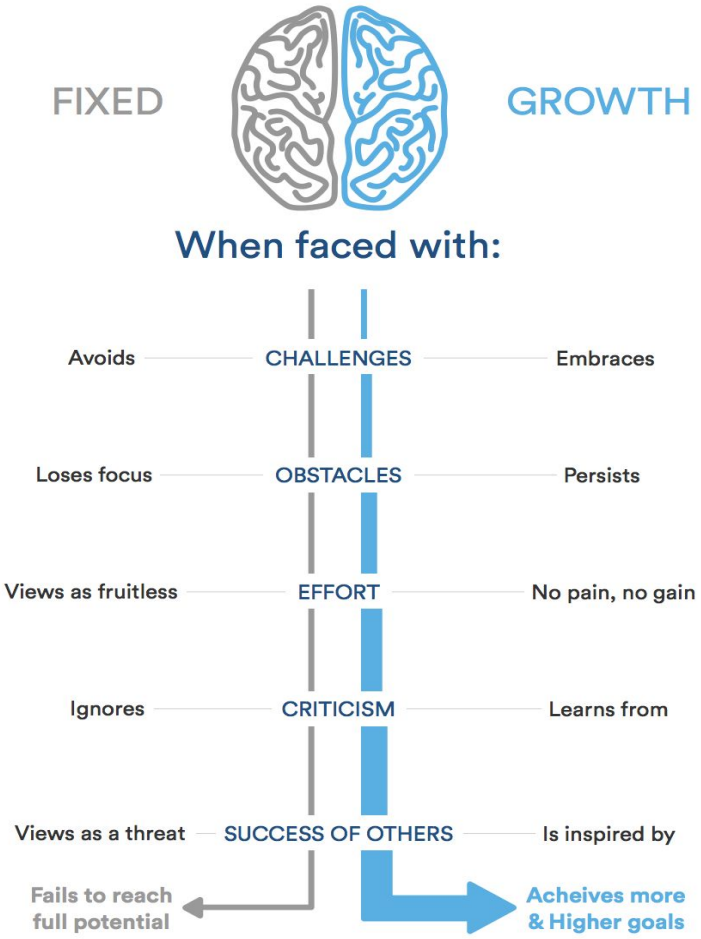


Image: https://www.atlassian.com/blog/inside-atlassian/growth-mindset

Get into a Growth Mindset

When you want to tell yourself...	Remember that…
~~I'm not good at this.~~	
~~I give up.~~	
~~This is too hard.~~	
~~I made a mistake.~~	
~~I'll never be that smart.~~	
~~My classmate can do it, but I can't.~~	
~~It's not easy. . I can't figure it out… I don't know…~~	

Adapted from: https://mindfulbydesign.com/change-mindset-change-words

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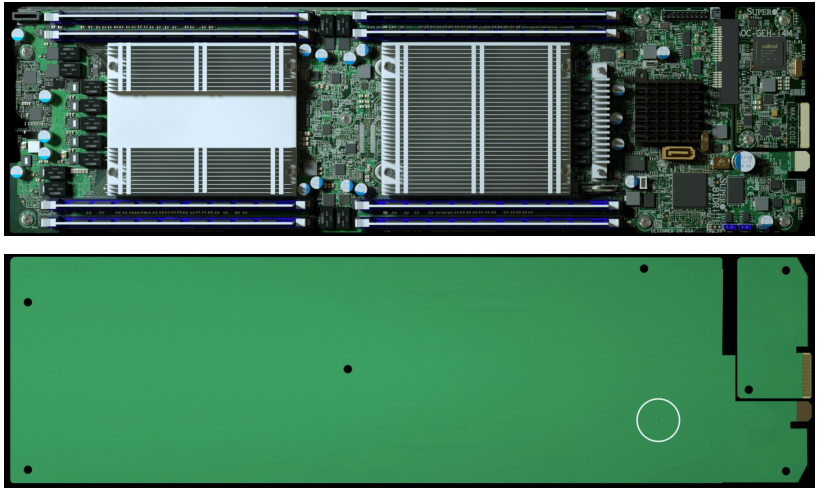
What is a Computer?

Take note!

Why Study Computer Components?

- The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies
  - Levels of computing
  - Low level cyber threats
  - Troubleshooting
  - Provisioning
  - Specs VS Performance



What is a computer to you?

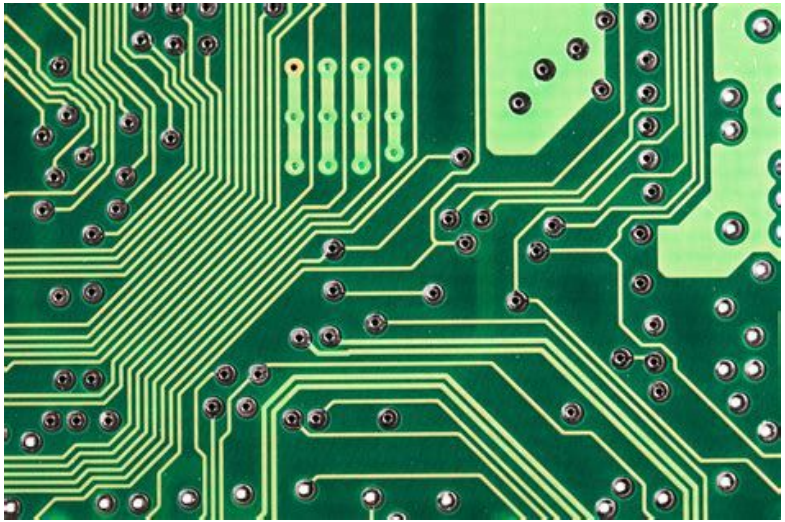
- Whiteboard activity
  - Computer components
  - Processes
- What is the core function of a computer?
  - Input information
  - Store information
  - Process information
  - Output information
- How? Manipulate electricity

Levels of Abstraction in Computing

- Physical (start 102 here - where you are now)
- Electronic transmission of binary signals
- Components in an electronics board
- Connecting hardware components
- Basic input-output system (BIOS)
- Operating system (OS)
- Virtualization (finish 102)
- Server
- Network
- Cloud

Circuits & Logic

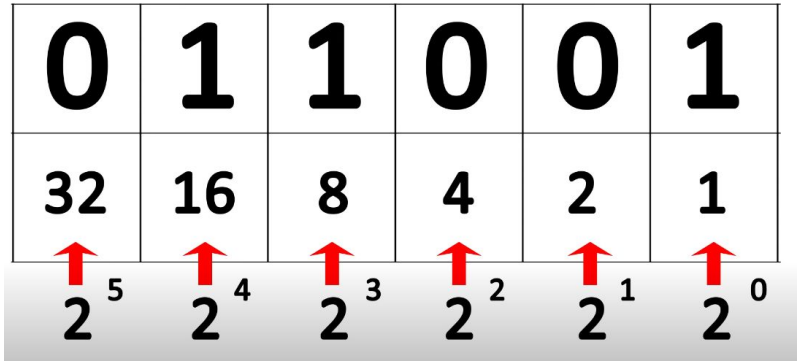
- Circuit boards manipulate electricity into signals
    - Open up your lab computer
    - Identify lines on board components
    - Circuits
        - Change value based on input
        - Use logic gates to perform bitwise calculation



Source: pxhere.com

Binary & Data

- Earliest computers were just calculators.
- Transmitting data in a base 2 system (0s and 1s)
- How does this work?
- Binary uses twos to a power.
- Whiteboard



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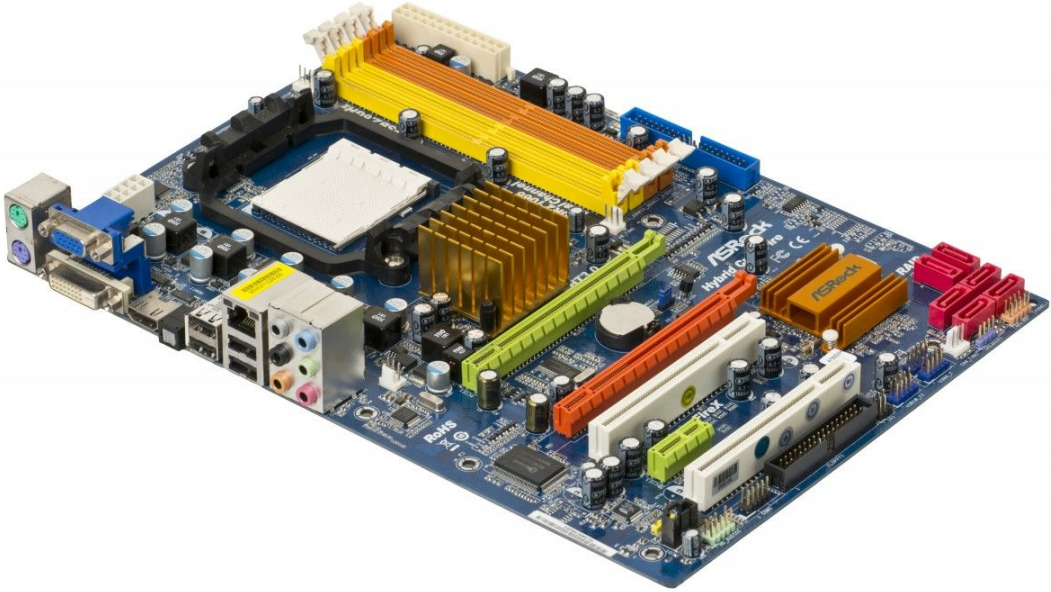
Inside a Computer

Inside a Computer

- Whiteboard activity
    - Identify motherboard components



Demo: Inside a Computer

- Disassemble your lab PC
- Identify components
  - I/O shield
  - PCI/PCI-e Slots
  - CPU
  - RAM
  - HDD
  - Fan

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Lab

Wrap up your submissions!