

# Day 1: Computer Science and Internet Safety

STEM Workshop at ASA Now - D1

# Agenda Overview:

1. Brief History of Computers
2. Staying Safe Online
3. Parts of a Computer
4. Hour of Code



## Time-permitting Activities:

1. Review Quiz
  - a. For Prizes



# What is a Computer?

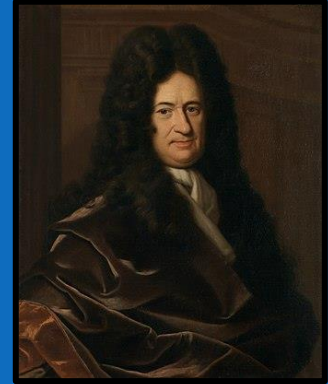
A computer is a machine or device that performs processes, calculations and operations based on instructions provided by a software or hardware program. It has the ability to accept data (input), process it, and then produce outputs. -Technopedia



# *A Brief* History of Computers

# The Beginning

Computer Science has been around and in the making for a fairly long time, historically appearing in other fields such as Physics and Mathematics



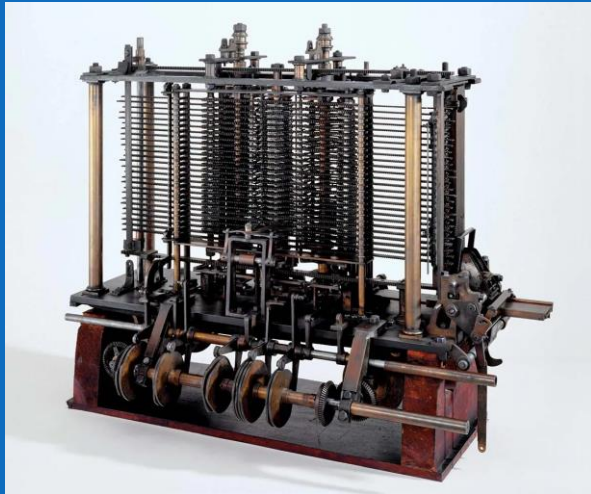
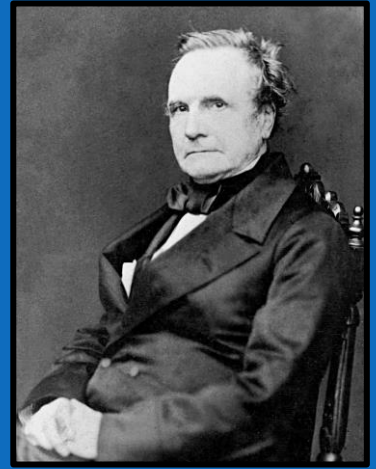
- The earliest known computation tool was the Abacus, invented in Sumer, Mesopotamia circa 2700-2300 BCE
- Another important early innovation for Computer Science was the development of formal, mathematical logic in 1702 by Gottfried Wilhelm Leibniz. This was critical for the creation of the programmatic, logic-driven programs that modern computers rely on.

# Babbage and the Analytical Engine (1800s)

Charles Babbage: English Mathematician who invented the concept of a digital, programmable computer

- Considered by some to be the “Father of Computer Science”

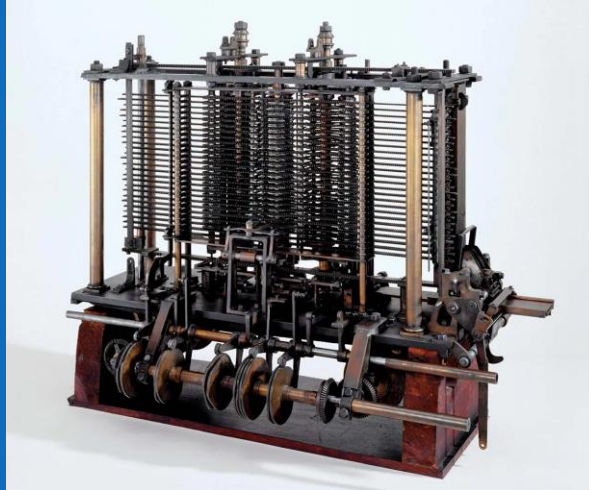
Analytical Engine: First General-purpose programmable computer engine



# Ada Lovelace (1800s)

Ada Lovelace: English programmer and one of the first women in computer science; worked with Babbage to expand the applications of his analytical engine to more general use

- Considered to be one of the first computer programmers



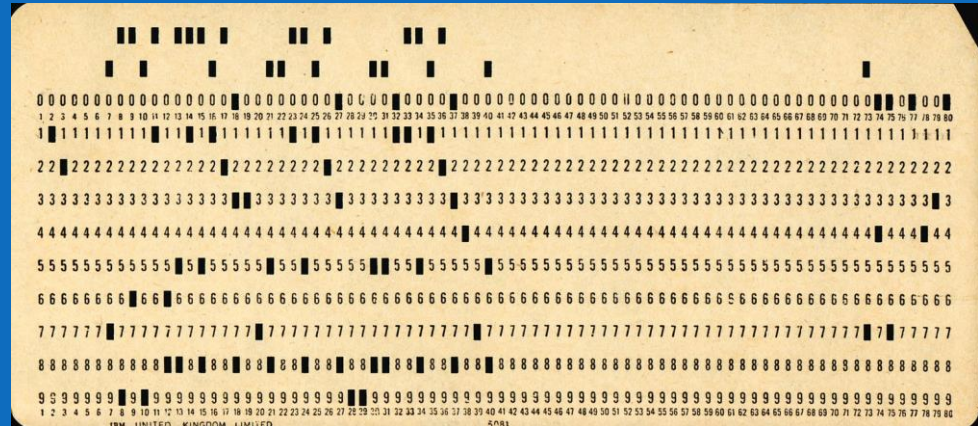
# Punch Card Computers (Mid 1900s)

Giant, Room-sized computers.



Ex: Herman Hollerith's Tabulating Machine

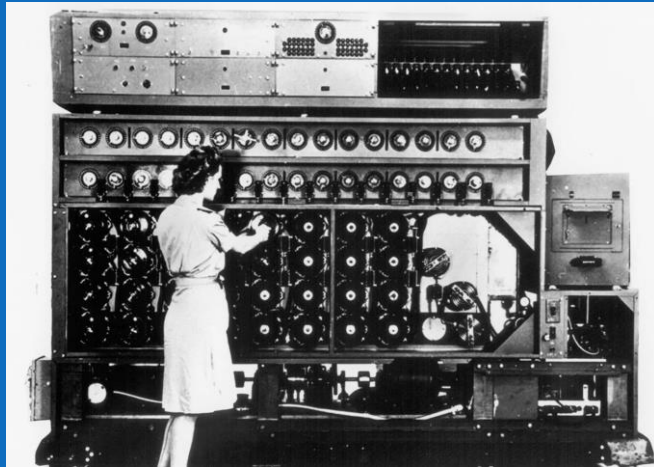
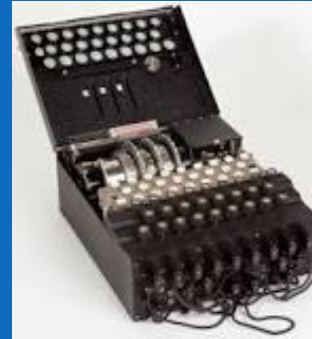
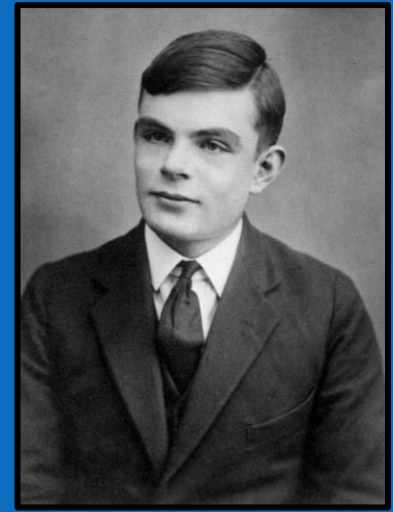
- Used during the 1890 US Census to more efficiently and accurately tabulate census responses.





# Alan Turing and The Bombe (1940)

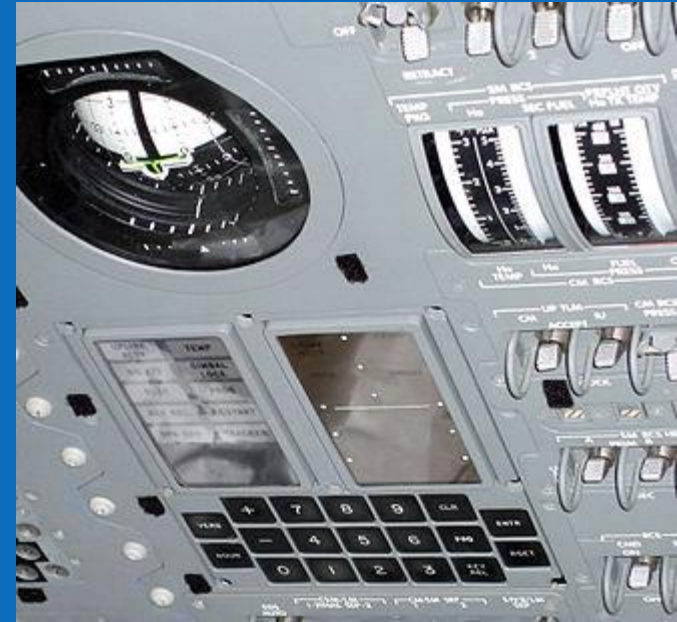
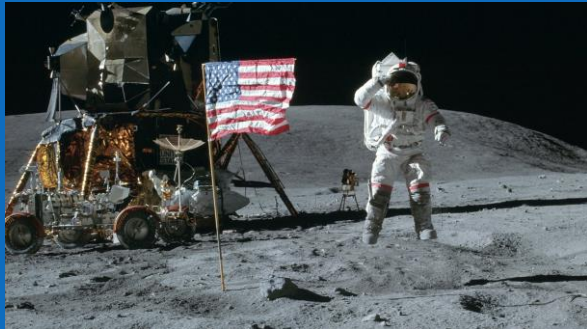
Electromagnetic computer built to decrypt the German Enigma Machine during WWII.



# Apollo Guidance Computer (1966)

## Digital Computer!

- Memory was woven out of wires and magnets
- DSKY (dis-kee) user-interface
- First computer to use silicon chips
- Flew people to the Moon, helping with guidance, engine burns, and calculations.



# The Apple One (1976)

Marked the beginning of the personal computer industry (PC)

- Memory was silicon
- Ran the first iteration of MacOS
- Created by Steve Wozniak and Steve Jobs



APPLE Computer Company • 770 Welch Rd., Palo Alto, CA 94304 • (415) 326-4248

OCTOBER 1976

CIRCLE NO. 7 ON INQUIRY CARD

INTERFACE AGE 11

# Fun Review Quiz :-D

Instructions: Raise your hand if you think you have an answer.  
Be the first to answer correctly to earn a sweet treat!

1. What was the first computing device and where was it invented
2. Who created the Analytical Engine?
3. Who was one of the first women in computer science, and what did she contribute to?
4. What was the Apollo Guidance Computer memory made out of?
5. Who invented the Apple One (both people)?

# Staying Safe Online

# Overview of Online Safety

## Common Dangers

### Common Dangers:

- Social Media Information
- Malware
- Social Engineering
- Cyber Bullying

\*This list is not comprehensive; these are just some of the more common dangers!

# Social Media Information

**Premise: Everything you do online, is stored forever, especially on Social Media Sites.** There is no certain “undo” button- even if you delete a message or post, people who have seen it while it was up could have taken screenshots of them. Furthermore, almost all social media platforms will hold onto that information anyways and may sell it to advertisers and third-parties.

**Significance:** Be wary of posting anything that may come back to hurt you later. Employers, recruiters, colleges, and other similar individuals often will check your social media history while vetting their candidates!





# Malware

What is Malware?

Many Types:

- Viruses / Worms
- Trojan Horses
- Spyware / Keyloggers

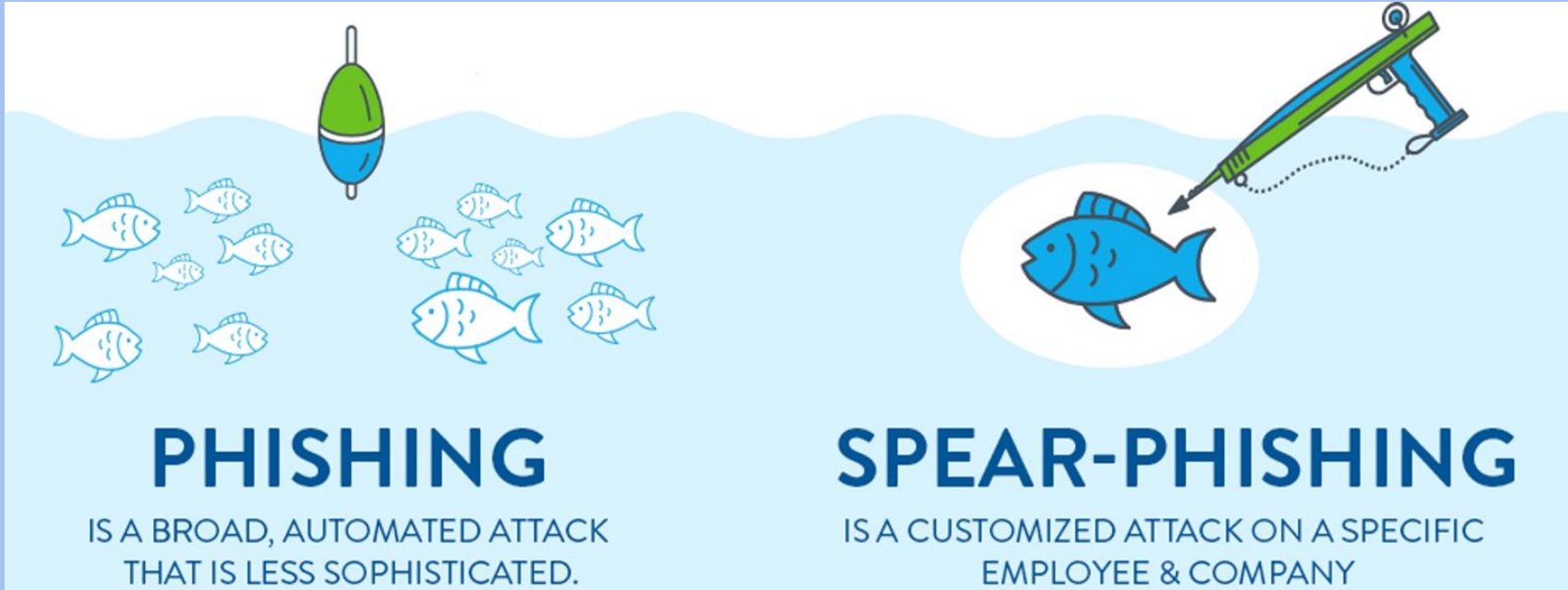
Antivirus programs, such as Malwarebytes and Avast (both free), can stop most of these for you.

Even if the effects of an attack aren't immediately visible, over time, they can cause extreme harm to your computer and your data.



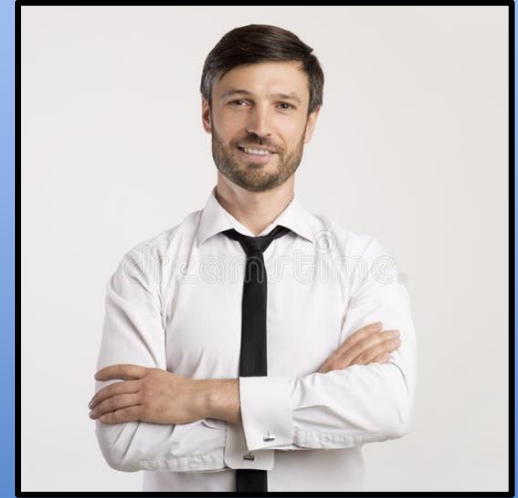


# Social Engineering



# Phishing vs Spear Phishing (Scenario Background)

- This is John Doe
- He is a data analyst at *The Big Numbers Company Inc.*
- His boss is Edna Mode



Let's compare the danger and effectiveness of a generic Phishing Email he receives versus a Spear Phishing one from an attacker who created a targeted bait email tailored to him using publicly available information.

# Phishing vs Spear Phishing (Generic Attacker POV)

This attacker wants John Doe to open a malicious Trojan, posing as a piece of generic work software. However, once the file is run, it unleashes a virus that will secretly install a keylogger on his computer before moving on to infect all other computers on the BNC's network!

This attacker creates a generic email to try and convince his recipient to run the malicious attachment.

Let's take a look at it on the next slide.

# Phishing vs Spear Phishing (Phishing Example)

A Generic Phishing Attacker sends the following email to John:

From: generic\_name@randomdomain.com

To: john.doe@bignumbers.com

Subject: Early Work Software Update

Hello fellow employee,

Our boss has trusted me to hand out early copies of the new update for our work software. Please download and run the attached installer at your earliest convenience.

[GenericSoftware-v5.6.exe](#)



Sincerely, Generic Name

**What parts of this email look suspicious?**

# Phishing vs Spear Phishing (Spear Attacker POV)

This attacker also wants John Doe to open the same malicious file, but decides to do a bit of research into John before he writes his Phishing Email.

He knows that John works at *The Big Numbers Company Inc*, so he decides to Google “John Doe The Big Numbers Company Inc”

- The first result that comes up is an article by the Company’s blog, interviewing him as BNC’s Employee of the Year 2021. In the interview, he describes the wonderful work environment his boss, Edna Mode, creates in order to allow for his unmatched productivity.
- Another result takes the attacker to John’s LinkedIn page, where he describes his expertise in using Data Analyzer Pro for his job at BNC.
  - Another quick search reveals that Data Analyzer Pro is a software made by Software Maker Co.

# Phishing vs Spear Phishing (Spear Phishing Example)

A Spear Phishing Attacker sends the following email to John:

From: edna.mode@bignumbers.com

To: john.doe@bignumbers.com

Subject: Early Beta Update for Data Analyzer Pro.

Hello John,

You have, once again, been performing exceptionally well this quarter! I've reached out to Software Maker Co. and asked them to send me a beta version of the next major update of the software they are developing for us. I would like for you to test it before we hand it out to the rest of our teams.

Sincerely, Edna Mode

DataAnalyzerPro-v5.7-beta.exe



# Phishing vs Spear Phishing (email comparison)

## Regular Phishing Example:

From: generic\_name@randomdomain.com

To: john.doe@bignumbers.com

Subject: Early Work Software Update

Hello fellow employee,

Our boss has trusted me to hand out early copies of our work software. Please download and run the attached installer at your earliest convenience.

Sincerely, Generic Name

## Spear Phishing Example:

From: edna.mode@bignumbers.com

To: john.doe@bignumbers.com

Subject: Early Beta Update for Data Analyzer Pro.

Hello John,

You have, once again, been performing exceptionally well this quarter! I've reached out to Software Maker Co. and asked them to send me a beta version of the next major update of the software they are developing for us. I would like for you to test it before we hand it out to the rest of our teams.

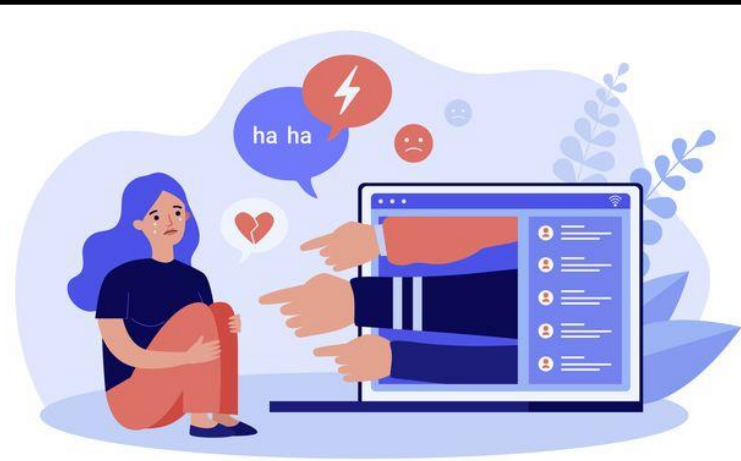
Sincerely, Edna Mode

**Why may this version of the email be more effective at convincing John to download and run the malware?**

# Cyber Bullying



Cyber Bullying: “The use of electronic communication to bully a person, typically by sending messages of an intimidating or threatening nature.”







"NO1  
LIKES U!"

"YOU'RE  
A LOSER!"

"YOU ARE  
UGLY!"

"UR FAT!"

"U HAVE  
NO FRIENDS!"







**I SAY  
NO  
TO CYBER  
BULLIES**

- Why can this be harmful?
- What can you do if you are a victim?
- What should you do if you are a bystander?

# What is Netiquette?

Just like there are appropriate ways to communicate in-person, there are similar guidelines you should follow when communicating online, especially in professional and academic settings.

1. AVOID SENDING MESSAGES IN ALL CAPS!!! THIS TENDS TO BE EXCESSIVE AND ANNOYING TO MOST PEOPLE AND RARELY HELPS YOU BETTER CONVEY YOUR MESSAGE!!!!!!!
2. Think before you type.
3. Check ~~you're~~ your grammar.
4. Avoid flaming (i.e. Strongly worded personal attacks or criticism).
5. Be Kind.

# Why is Netiquette important?

Strong netiquette can get you a long way in terms of building professional relationships and favor. People are much more willing to go out of their way to help a person who has been kind and respectful in their online communication with them than A PERSON WHO REALLY LIKES CONVEYING THEIR MESSAGES IN ALL CAPS.



# Parts of a Computer

# Fun Review Quiz Thingy. Mandatory Funderful Fun lol

Instructions: Raise your hand if you think you have an answer.

Be the first to answer correctly to earn a sweet treat!

- What does RAM stand for and what is its function?
- What are two types of long-term storage in a computer?
- What computer component allows us to see things on a monitor?
- If I notice my PC starting to slow down under larger workloads, what might be the reason? (multiple correct answers)



# Hour of Code

# Hour of Code and Nitro Type:

Start by completing the Maze Hour of Code at <https://studio.code.org/hoc/1>

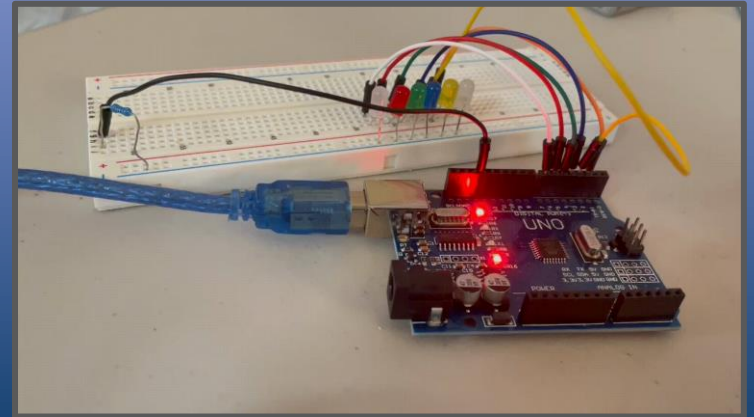
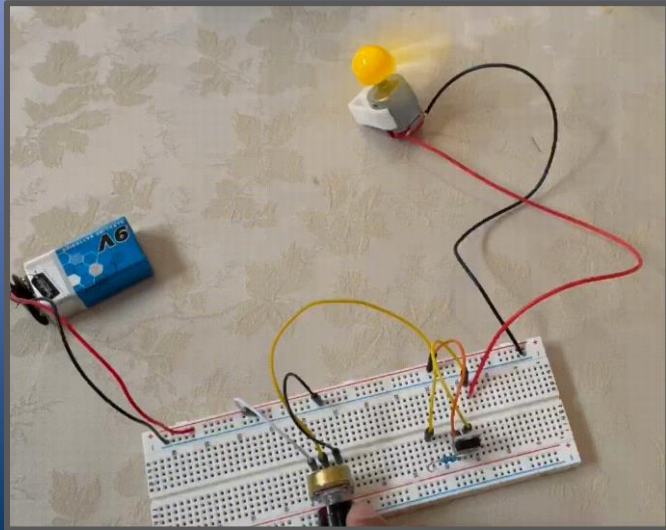
If you finish early, go to <https://www.nitrotype.com/>



# Coming soon™:

Next session we will be working with the Electronics Kits:

- Thursday (Middle School Group): Basic Electronics
- Wednesday (High School Group): Programmable Electronics



# Credits

Thank you to Benjamin Arbit, Abhinav Raghavan, Eric Podol, and Devan Amin for helping with the content and formatting of this slide show.