Technologies that make life better

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Fridays 9:45-11:15 Room

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Victor Rezmovic-My Story

- 1971-While getting my Ph. D in Psychology, took class in Fortran Programming-IBM Mainframe
- 1977- Consultant on Time Sharing systems
- 1983- David Stang (another Ph. D psychologist who became a computer specialist) introduces me to the IBM PC
- 1990- Install Novell and Microsoft Networks
- 2000-Network Consultant-have laptop will travel
- 2010-Tech Trainer at DOJ/FBI
- 2015-OLLI, Montgomery College, Oasis

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Why do I teach this class?

- Teaching OLLI students creates the perfect classroom setting
- I've learned ways to live the digital life. Sharing my knowledge can often make your life easier and more productive.
- If you live in the mountains of WV knowing about cell towers and portable hot spots will make you a happier computer user.
- When S.A. says to me you changed my life it makes it all worth while

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Course Outline

- March 8- Historical background and terminology
- March 15-Connectivity Part 1- Wi-Fi, IOT
- March 22-Connectivity Part 2-Cellular-hot spots, 5G
- March 29-Cloud Computing
- April 5-Streaming
- April 12-Staying safe online, spotting scams
- April 19-AI and Online Learning
- April 26-Becoming Digital
- May 3-Bring your questions to class

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Barack Obama 2016

- "But the next time you're bombarded with over-the-top claims about how our country is doomed or the world is coming apart at the seams, brush off the cynics and fearmongers. Because the truth is, if you had to choose any time in the course of human history to be alive, you'd choose this one. Right here in America, right now."
- If I had to choose a time to be involved in technology, I would choose the present.

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The Raspberry Pi 2023

The IBM PC 1981

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What is a Raspberry Pi?

- Raspberry Pi is a series of small single-board computers developed by the Raspberry Pi Foundation in the United Kingdom in association with Broadcom. These computers are designed to make computing accessible and affordable for everyone, from industries to hobbyists and educators. The Raspberry Pi experience has been redefined with each generation offering improved performance and features like silicon designed in-house. The Raspberry Pi Foundation aims to promote computing education and digital making by providing low-cost, high-performance computers that cater to a wide range of applications
- The Raspberry Pi Foundation not only develops these computers but also works on outreach and education initiatives to empower individuals with computing skills. Through resources like Code Club and various projects aimed at kids, teenagers, and young adults, the foundation strives to make coding and digital making accessible to a broader audience. The Raspberry Pi community is vibrant, offering forums, blogs, tutorials, and learning materials that support users in exploring coding and creating innovative projects

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IBM PC	Raspberry Pi 5
Processor: Intel 8088 running at 4.77 MHz (29,000 tranistors)	2.4GHz quad-core, 64-bit Arm Cortex-A76 CPU, with Crypto Extensions and 512KB L2 caches and a 2MB shared L3 cache, VideoCore VII GPU Approx 1 billion
The base model came with 16 KB of RAM, expandable to 256 KB.	4GB and 8GB
Optional 5.25-inch floppy disk drive with 160 KB capacity.	Micro SD up 128 GB, external USB support, Cloud storage
high resolution (640x200 pixels) with 2 colors	Dual 4K HDMI® display output (3840x2160)
Operating System: Initially came with PC DOS 1.0, a version of MS-DOS licensed to IBM. Character based	Debian Linux Open Source software, Chrome OS/Chromium similar to Chromebook
Expansion 5 slots	USB compatible
Weight:The original IBM PC weighed around 24.5 pounds (11.1 kg).	50 grams
Cost in 2023 $: 4579	$80. (8 GB)

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IBM PC 1981	Raspberry Pi 5
Hayes 2400 baud modem (Dialup)	Gigabit Ethernet
	Bluetooth 5.0
	2.4 GHz and 5.0 GHz 802.11ac Wi-Fi
	Internet/Cloud
No login	Login with multi-factor authentication
Wordstar, Supercalc	Libre Office (Open source(
	Google Suite
Serial and Parallel ports	USB-A, USB-C wireless printing

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Some History
Walter Isaacson The Innovators (2014)

- Lady Lovelace, Charles Babbage, Programming the Jacquard Loom (1850)
- Mainframe Computing (1940s -1980s)
- The Integrated Circuit (1960)
- Intel and the microchip/Silicon Valley/Venture Capital
- PC Computing (1980 +) IBM PC, Bill Gates, Steve Jobs
- The Military and Arpanet/Internet (1990+)
- Networked Computing/Cloud Computing/Google (2010)
- Social Media (not in this class)
- Steve Jobs ACT II-Smart Phones, Tablets, Smart Watches, Chromebooks
- The Internet of Things – Alexa and Amazon
- Artificial Intelligence (AI)

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Programming the Jacquard Loom

https://www.youtube.com/watch?v=OlJns3fPItE

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Lady Lovelace, Charles Babbage (1837)
Difference Engine

- Mechanical method for calculating logarithms
- Even complex mathematical tasks, Babbage realized, could be broken into steps that came down to calculating "finite differences" through simple adding and subtracting (Difference Engine)
- In 1834 Babbage proposed the Analytical Engine which was a general purpose computer

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ENIAC

Centralized
Only accessible to technical users
IBM Punch Cards/Knowledge of computer language

youtube.com/watch?v=bGk9W65vXNA

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ALAN TURING

youtube.com/watch?v=3wLqsRLvV-c

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The Turing Test (Generated by Perplxity)

- The Turing test, proposed by Alan Turing in 1950, is a test of a machine's ability to exhibit intelligent behavior equivalent to that of a human. In the test, a human evaluator engages in natural language conversations with both a human and a machine without seeing them. If the evaluator cannot reliably distinguish between the human and the machine based on their responses, the machine is said to have passed the test
- The original Turing Test involves three participants: a computer, a human respondent, and a human interrogator. The interrogator asks both players questions and tries to determine which is the human and which is the computer. If the interrogator cannot distinguish between them, the computer is considered to have passed the test
- Despite its age, the Turing Test remains relevant today as a foundational concept in AI research. While it has been criticized for its limitations and superficiality, it continues to be used as a benchmark for evaluating AI capabilities

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The First Ever AI Chatbot: ELIZA (1966)

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THE TRANSISTOR

December 16,1947
Bell Labs

-Walter Brattain
-John Bardeen
-William Shockley

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TRANSISTOR RADIOS

- Texas Instruments bought a license from Bell Labs to manufacture transistors
- Cost per transistors was $3.
- Called the Regency Radio it used 4 transistors and sold for $49.95
- It was marketed as a security device in case of enemy attack
- 100,000 sold within first year
- First example of making technology personal
- https://www.npr.org/templates/story/story.php?storyId=4152451

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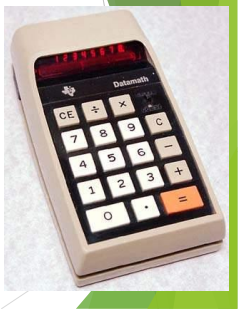
MICROCHIPS BLAST OFF

- Jack Kilby and Robert Noyce are both credited with the invention of the microchip
- First use was by the military for misles and then space program
- First consumer device to use the microchip was the hearing aid
- In 1967 TI developed the 4-function calculator for $150.
- In 2014 a TI pocket calculator sold at Walmart for $3.62



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Intel 1968

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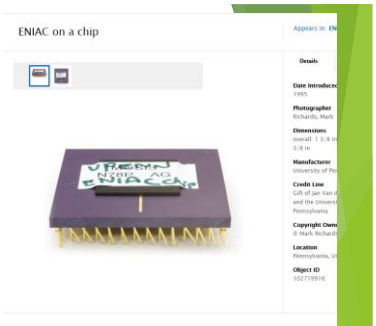
ENIAC on a chip

- In celebration of ENIAC's 50th Anniversary, the machine was reimplemented using modern integrated circuit technology. The room-sized computer could now fit in the palm of your hand.



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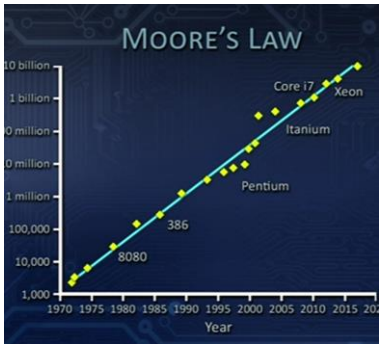
MOORE'S LAW

- Gordon Moore, co-founder of Intel
  - 1965 prediction: Number of transistors on a chip will double every 18 months



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THE MICROPROCESSOR

- Robert Noyce, Gordon Moore and Andy Grove formed Intel (1968)
- Intel was helped by the venture capitalist Arthur Rock
- Intel produced microchips that had specific functions
- In 1971 Intel unveiled the Intel 4004 a computer processor on a chip that could be programmed
  - Intel 8080 (8 bit processor IBM PC)
  - Intel 8086 (16 bit processor PC XT)
  - Intel Pentium (32 bit)
  - Intel Core i7 (64 bit)

Microprocessors are tied to memory where applications and data are executed, and the number of bits available on a processor define the memory size and space, as well as the volume of data that a processor can handle per unit of time.

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"I can't see any reason that anyone would want a computer of his own," DEC president Ken Olsen declared at a May 1974 meeting where his operations committee was debating whether to create a smaller version of its PDP-8 for personal consumers.[2] As a result, the personal computer revolution, when it erupted in the mid-1970s, was led by scruffy entrepreneurs in strip malls and garages who started companies with names like Altair and Apple.

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Altair 8800 (Ed Roberts)

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PC Computing (1980 +) IBM PC, Bill Gates, Steve Jobs

- Decentralized
- Lower cost, Accessible to all users
- User responsible to Manage
- Easy to Use Applications

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The IBM PC

Introduced August 1981

IBM reputation, especially in business community, drove out many competitors

Open standard allowed many competitors to create improvements and created the term IBM Compatible

First model used cassette or floppy disk

First Hard Drive 1983

First PC had 256 Kb

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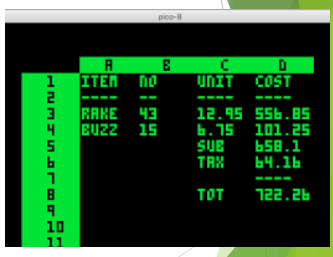
DAN BRICKLIN AND VISICALC



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What is it about the US?

- Most Nobel laureates
- IBM PC developed by IBM in US
- Google, Facebook, Microsoft, Apple are all US companies
- Research-Bell Labs, Xerox PARC
- Universities-Harvard, MIT, Stanford
- Silicon Valley-Venture Capital
- Core Values-Hard work, education, role of science

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https://www.youtube.com/watch?v=36H6z1Uq6gI

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https://www.youtube.com/watch?v=pTG_6ypYSS4

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Vinton Gray Cerf & Robert Kahn: Inventors of Internet Protocol

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Packet Switching **not** Circuit Switching

- Standard at the time was circuit-switching which is the model of the telephone company
  - Phone call requires a dedicated circuit for each call
- Messages broken into small units of same size called packets
- Packets have address headers that determine their destination
- Packets are reassembled at destination
- Packets can travel different routes based on congestion at any time

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The Internet and Networked Computing (1990+)

- Novell, IBM and Microsoft connect business networks
- You can network your home
  - Shared network drive
  - Shared printers
  - Video/Music/Picture servers

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Steve Jobs ACT II-The Apple Ecosystem- Smart Phones, Tablets, Smart Watches

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Cloud Computing (2010)

- Resources (Servers) Centralized
- You are using resources on a computer you don't own
- Software providers can manage software centrally

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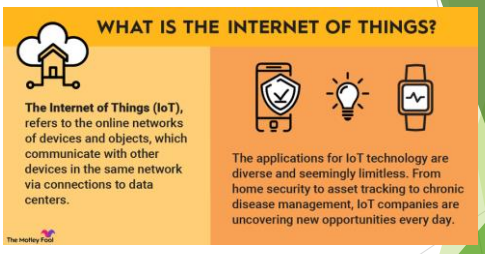

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Artificial Intelligence (AI)

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