Tech Talks
Computers & Operating Systems

Glen Maxson
Center for Learning in Retirement
Spring 2020 – Session 1 of 6
Seniortechadvisor.com

What we'll cover in 6 weeks

1) Computers & Operating Systems
2) Applications & The Cloud
3) The Internet & The Web
4) Social Media
5) Security & Privacy
6) Entertainment & IoT

Let’s talk about the weather…

Weather History Results for Doylestown, PA (18901) February 4th, 1960

« Previous Day - 02/03/1960 •••• 02/05/1960 - Next Day »

On February 4th, 1960, the closest available weather station to Doylestown, PA, reported the following conditions:

High Temp:	51.74°F
High Temp Time:	20:35 GMT
Low Temp:	24.23°F
Low Temp Time:	10:30 GMT
Dewpoint:	21.28°F
Sea Level Pressure:	1028.6 mb
Visibility:	8.88 miles
Wind Speed:	4.7 mph

Politics

Top 5 of Fortune 100 Companies Favored by Liberals

Source: SurveyMonkey

1. Amazon
2. Alphabet (Google)
3. Apple
4. Walt Disney
5. Microsoft

Top 5 Fortune 100 Companies Favored by Conservatives

Source: SurveyMonkey

1. Walt Disney
2. Amazon
3. Apple
4. Microsoft
5. Wal-Mart Stores

Today's Topic

- Computers & Operating Systems

But before we begin, a short history lesson is in order

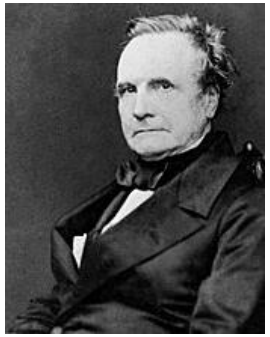
The Internet Age was created in 6 Days…

- Cyber-Genesis 1:1-31

In the Beginning – Day 1

- Someone had to invent the concept of ‘a Computer’
  - Credit goes to Charles Babbage and Ada, Countess of Lovelace

1837



Charles Babbage credited with inventing the first mechanical computer

1843

Ada, Countess of Lovelace, publishes “Notes” on Babbage’s Analytical Engine.

Charles Babbage – mathematician, philosopher, inventor and engineer, he originated the concept of a digital programmable computer. Even though his Difference Engine wasn’t completed in his life time, a finished machine built in 1991 proved it would have worked. Functioning digital computers became operational 100 years later – Babbage’s work (1822-1849), functional computers (1944-1946)

Ada (Countess of Lovelace) – English mathematician and writer, worked with Babbage on the Analytical Engine, regarded as the 1st to recognize the full potential of a computing machine and the 1st computer programmer - 1843

On the Second Day

- We had to figure out how to make computers useful – we needed programmers
  - Grace Hopper and the ‘6 women of ENIAC

1952

Grace Hopper develops first computer compiler.

Dr. Grace Hopper told a reporter, programming was “just like planning a dinner. You have to plan ahead and schedule everything so that it’s ready when you need it…. Women are ‘naturals’ at computer programming.”

Marlyn Meltzer

Ruth Lichterman

Betty Jennings

Kay McNulty

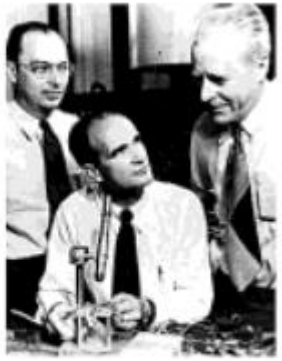
Betty Snyder

Frances Bilas

On the Third Day

- Someone needed to invent the ‘Transistor’
  - A **transistor** is a semiconductor device used to amplify or switch electronic signals and electrical power. Today, transistors are packaged individually, but most are embedded in integrated circuits.

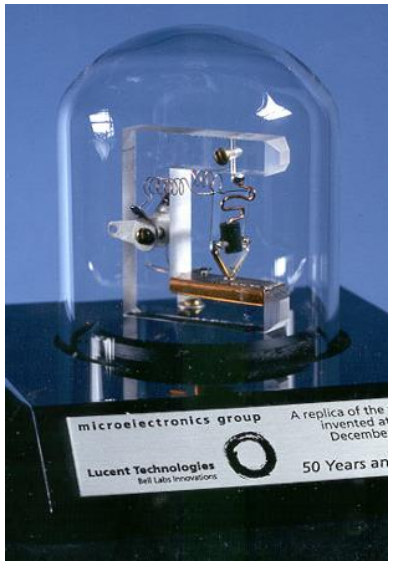
1947



Transistor invented at Bell Labs.

John Bardeen
Walter Brattain
William Shockley

- John Bardeen – quantum theorist, tasked to explain why early experiments failed, then focus on new ‘surface state’ experiments
- Walter Brattain – the ‘lazy physicist’, deft experimentalist, working side-by-side with Bardeen
- December 16, 1947 – Bell Labs – a strip of gold foil, a chip of semiconducting material, and a bent paper clip – a working transistor had been invented by Bardeen and Brattain
- When Bardeen gets home, he tells his wife “We discovered something important today.” – *perhaps the understatement of the century…*



On the Fourth Day

- Someone had to invent the **integrated circuit** (also referred to as an **IC**, a **chip**, or a **microchip**) - a set of electronic circuits on one small flat piece (or "chip") of semiconductor material, normally silicon (video)

1958

Jack Kilby demonstrates integrated circuit, or microchip.

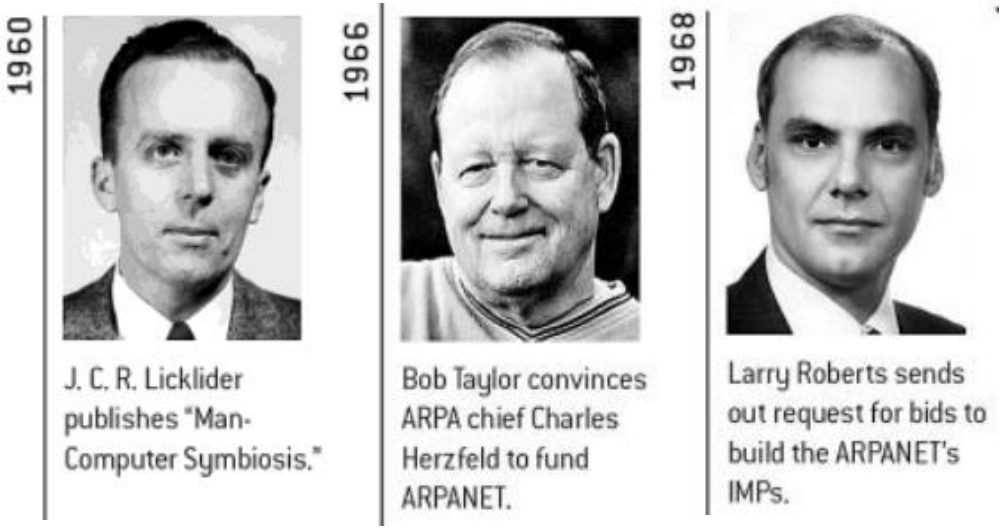
Gordon Moore, C. Sheldon Roberts, Eugene Kleiner, Robert Noyce, Victor Grinich, Julius Blank, Jean Hoerni and Jay Last. (1960)

Texas Instruments – Jack Kilby, September 1958 demonstrates the integrated circuit – "A new era in electronics had begun."

Fairchild Semiconductor (established by the 'Traitorous Eight') funded by Sherman Fairchild – Jean Hoerni, physicist, proposes building up an oxide layer on the surface of the transistor (dubbed 'the planar process'), then engrave tiny windows in the oxide layer to diffuse impurities at precise spots to create desired semiconductor properties

On the Fifth Day

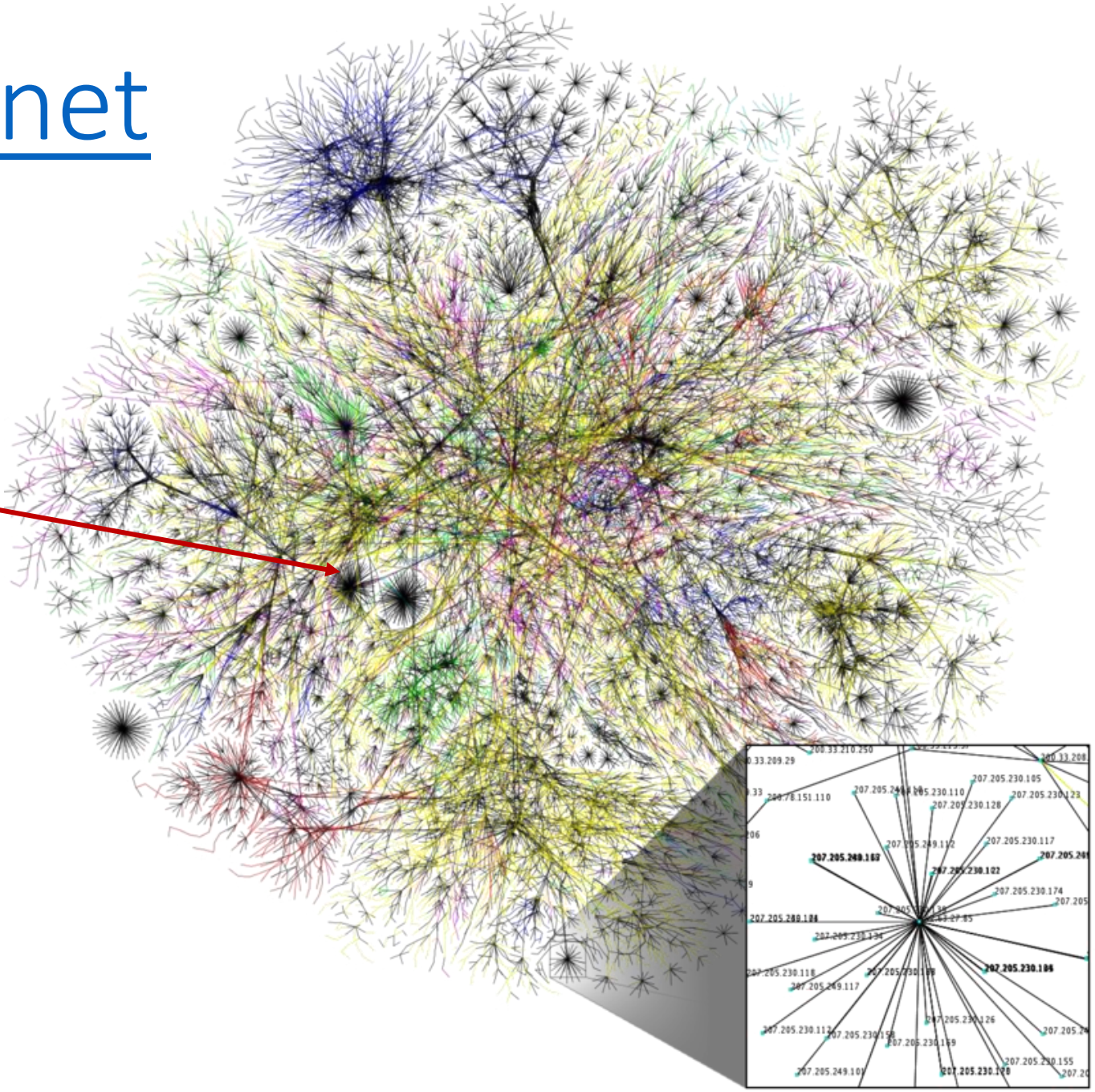
- Someone needed to create the Internet
  - The Internet was built in partnership among the military, universities, and private corporations – the military-industrial-academic complex
  - It is a global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a *network of networks*.



- 1960 - J. C. R. Licklider, America psychologist and computer scientist, known as 'computing's Johnny Appleseed', wrote 'Man-Computer Symbiosis', then 'Intergalactic Computer Network' in 1963
- 1966 - Bob Taylor (American Internet pioneer) and Larry Roberts (American scientist), together created ARPANET, which was the predecessor to the modern Internet

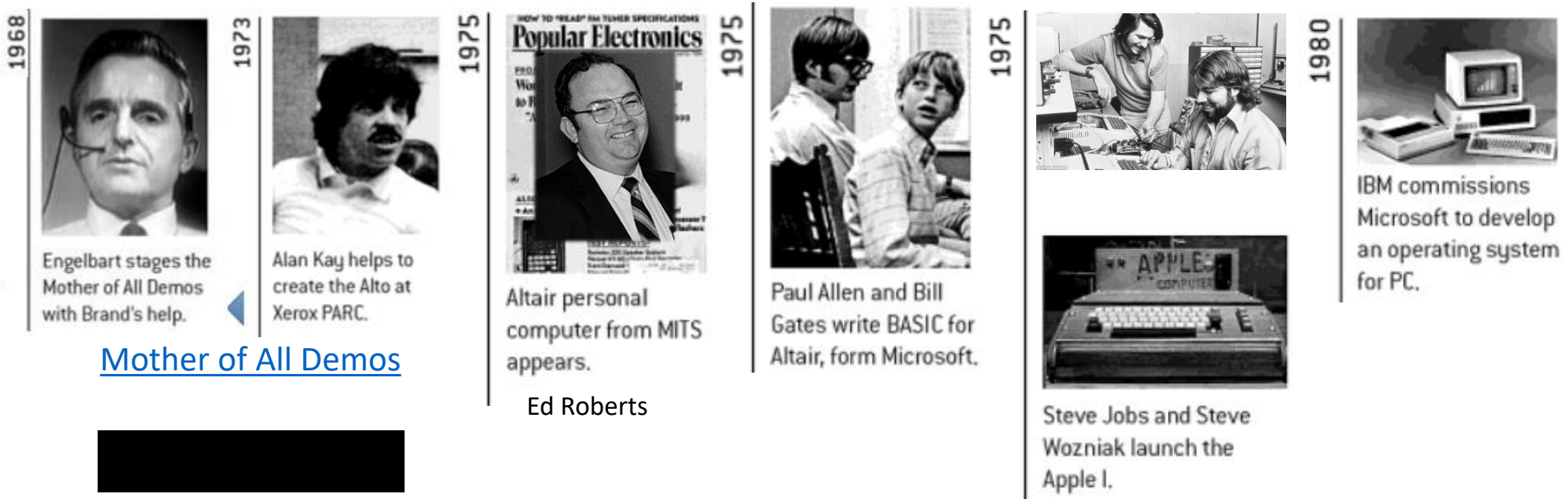
This is the Internet today

You are here



On the Sixth Day

- Someone needed to invent the ‘Personal Computer’
  - Personal computer - a mass-market consumer electronic device starting the microcomputer revolution of the 1980s with the launch of the IBM Personal Computer in 1981



Mother of All Demos

Ed Roberts

[redacted]

On the Sixth Day

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1968

Engelbart stages the Mother of All Demos with Brand's help.

1973

Alan Kay helps to create the Alto at Xerox PARC.

Mother of All Demos

1975

Altair personal computer from MITS appears.

Ed Roberts

1975

Paul Allen and Bill Gates write BASIC for Altair, form Microsoft.

1975

Steve Jobs and Steve Wozniak launch the Apple I.

1980

IBM commissions Microsoft to develop an operating system for PC.

1981 - IBM launched the IBM PC with Microsoft's operating system, which started the PC 'Revolution' and the rest if history

And on the 7th day…

- Cyber-Genesis 2:1-2

Silicon Valley
created the 120-hour work-week

Here begins our lesson…

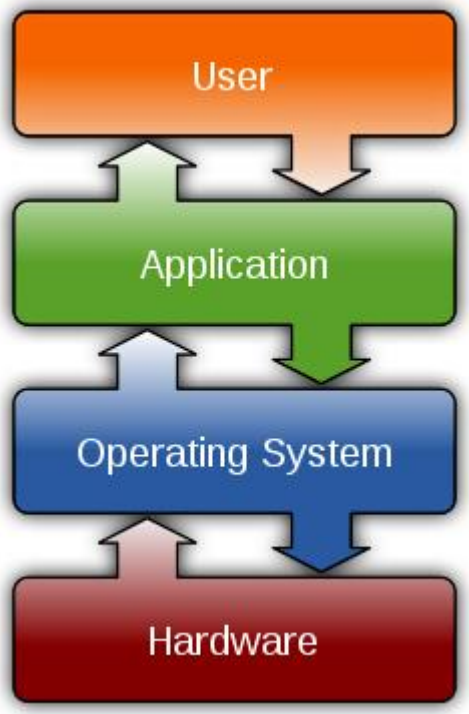
- Computers & Operating Systems

What Are We Talking About?

- A **Computer** (Hardware) is a device that can be instructed to carry out arbitrary sequences of arithmetic or logical operations automatically. It uses *programs* to perform a wide range of tasks.
- An **Operating System** (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.

And later in our series…

- An **Application** program (or **app**) is a computer program designed to perform a group of coordinated functions, tasks, or activities for the benefit of the user (you).



Computers and Operating System Choices

- Common computer ‘form-factors’
  - **Desktop** – traditional ‘tower’ down to PC/104 (3.8” × 3.6” in motherboard)*
  - **Laptop/notebook** – traditional clamshell to ultra-portable, **ChromeBooks***, and ‘**convertibles**’*
  - **Tablet** – typically 7” to 13” touch interface, incl. ‘**phablets**’ and ‘**convertibles**’
  - **Smartphone** – typically 4.3” to 5.5” touch interface, incl. ‘phablets’ (5.5” – 7.9”)

- Operating system choices
  - **Desktop & Laptop** – Microsoft Windows, Apple O SX, Linux, Google Chrome OS, Google Android
  - **Tablet & Smartphone** – Apple iOS, Google Android
    - Video (Apple bashing Microsoft), and Video (Microsoft bashing Apple) – I think they’re even now…

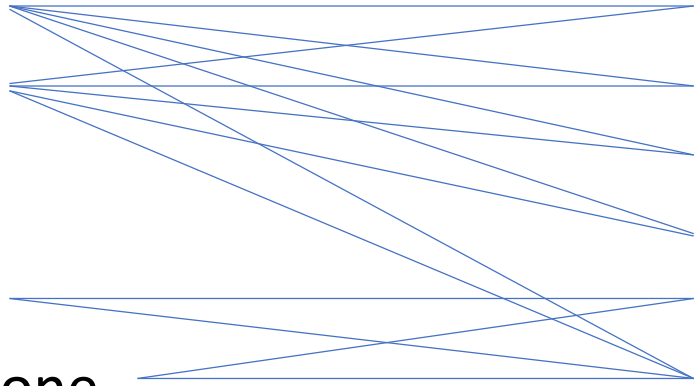
Step 1 – Why Do I Want/Need Technology?

- Stay in touch with children and grand-children
- Find out what's going on in the world
- Check the weather
- Be able to ask questions and find answers
- Connect with my local library to access their resources
- Watch TV programs and movies
- Get access to (e)books or music that I like
- Stay connected while I travel
- Get directions… and a million other reasons!

Step 2 – How Do I Decide What to Buy?

Choices

Form Factor	Operating System
Desktop	Windows
Laptop	MacOS
?	Chrome OS
	Linux
Tablet	Apple iOS
Smartphone	Android



Step 3 – How Much Am I Willing to Spend?

PC/laptop = more complex/expensive ←→ less expensive/simpler = **tablet**
PC/laptop = more functionality ←→ less functionality = **tablet/smartphone**

- Greater functionality (and performance) usually means greater cost
- But complexity (how much effort you invest in care and feeding your device) has little or no relationship to cost

You can't buy your way out of having to take care of your stuff,
but I have some ideas that might help…

Step 4 – It's Time to Pay the Piper?

- Desktop, including All-In-1s
  - Windows – Dell Deals
  - iMac or Mac mini– Apple Store
    - Remember with desktop computers you still need a monitor, keyboard and mouse, also 8gb of memory and 1tb hard drive

- Laptop, including Chromebooks
  - Windows - Dell Deals
  - MacBook – Apple Store
  - Chromebook - Amazon
    - Screen size and weight are important considerations, plus memory and storage* (what's the difference you might ask)

Step 4 – It's Time to Pay the Piper? (continued)

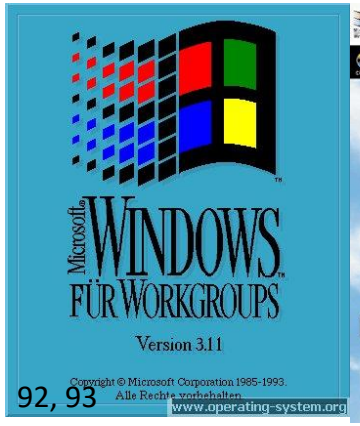
- Tablet
  - Android – trust the experts, Samsung consistently rated high
  - Apple (iOS) – various iPad configurations (best in class!)
    - Screen size is important, and minimum 32gb internal storage – SD card slot is a plus (not available on Apple tablets)

- Smartphone*
  - Android – trust the experts, Motorola Moto series is my favorite
  - Apple (iOS) – the iPhone keeps getting better, and more expensive!
    - Screen size is important, and minimum 32gb internal storage – SD card slot is a plus (not available on Apple smartphones)

More about operating systems

Microsoft Windows

The first independent version of Microsoft Windows, version 1.0, released on November 20, 1985, achieved little popularity. The project was codenamed "Interface Manager" before the windowing system was developed - Rowland Hanson, the head of marketing at Microsoft, convinced the company that the name *Windows* would be more appealing to customers.
Windows 1.0 was not a complete operating system, but rather an "operating environment" that extended MS-DOS, and shared the latter's inherent flaws and problems.



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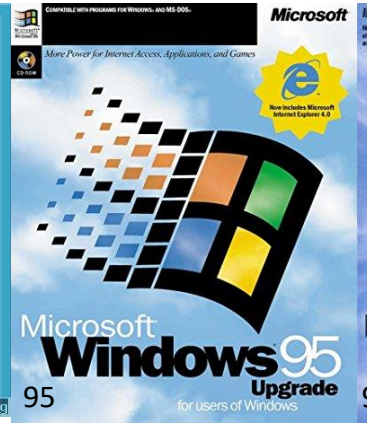

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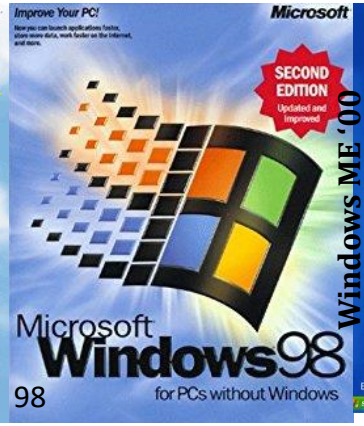

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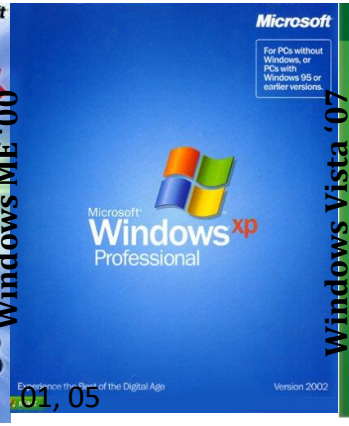
Windows ME '00

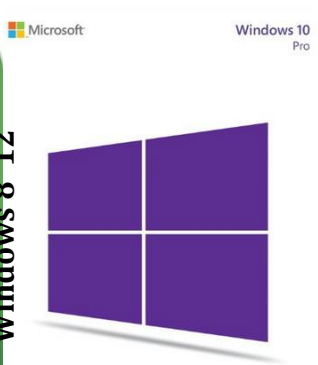


01, 05

Windows Vista '07

09

Windows 8 '12



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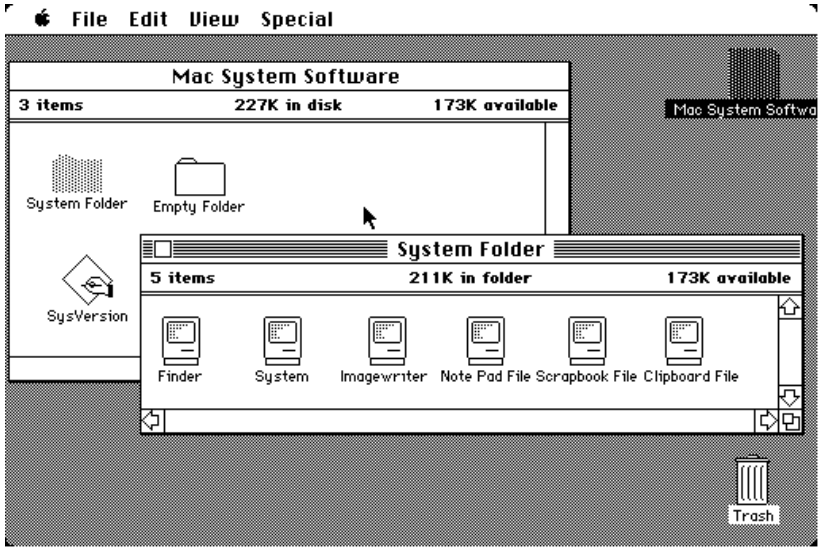
[Windows 10 Takes Its Place as Microsoft's 'Forever OS']

Apple MacOS



1984

Apple released the original Macintosh on January 24, 1984; its early system software was partially based on the Lisa OS and the Xerox PARC Alto computer, which former Apple CEO Steve Jobs 'previewed'. It was originally named "System Software", or simply "System"; Apple rebranded it as "Mac OS" in 1996.

macOS (originally named "Mac OS X" until 2012 and then "OS X" until 2016) is the current Mac operating system that officially succeeded the classic Mac OS in 2001. It is a Unix-based operating system built on NeXTSTEP and other technology developed at NeXT from the late 1980s until early 1997, when Apple purchased the company and its CEO Steve Jobs returned to Apple.

2019

macOS 10.15 Catalina

What's the Difference Between Windows & Mac OS?

- Windows (aka PC)
  - Runs on many different hardware 'platforms'
  - In comparison to a Mac, tends to be less expensive but slightly more difficult to use and maintain, and in some cases, less reliable and less secure
  - PCs can often be 'upgraded' to improve performance over time

- Mac OS
  - Runs (only) on computers designed and built by Apple
  - In comparison to PCs, tends to be more expensive, more stable, more secure, and easier to use and maintain
  - Macs are more difficult and expensive to upgrade – Apple would prefer you don't upgrade at all but buy new every few years

More reading: **Mac vs PC: Which should I buy?**

Tablets and Smartphones

- Operating Systems
  - Two choices: Android or Apple (iOS)

  Android vs. iOS - Differences That Matter

- Devices
  - Some sites to help you choose:

  Best Smartphones 2019 – Toms Guide

  + Cheap Smartphones (Under $300)

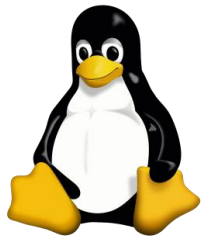
  The Best Phones of 2019 – PCMag.com

  The Best Tablets of 2019 – Pcmag.com

Video

$599 to repair my iPhone! Really? (source)

Linux (source)



Linux is an operating system within the free and open-source software development and distribution model. Linux was first released in 1991 by Linus Torvalds as a free operating system for personal computers based on the Intel x86 architecture, but has since been ported to more platforms than any other operating system. Because of the dominance of Android on smartphones, Linux has the largest installed base of all general-purpose operating systems, including Chrome OS.

The development of Linux is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified and distributed—commercially or non-commercially—by anyone under the terms of its respective licenses. Linux is packaged in a form known as a *Linux distribution* (or *distro* for short) for both desktop and server use. Some of the most popular Linux distributions include CentOS, Debian, Fedora, Linux Mint, openSUSE and Ubuntu.

And we care because? Linux is ‘free’ and runs on most older hardware that no longer supports Windows (bloatware). With the low cost of building a Linux system comes somewhat higher complexity and a steeper learning curve.

Chrome OS (source)

Chrome OS is an operating system designed by Google that is based on the Linux kernel and uses the Google Chrome web browser as its principal user interface. As a result, Chrome OS primarily supports web applications.

Google announced Chrome OS on July 7, 2009, describing it as an operating system in which both applications and user data reside in the cloud.

And why do we care? Lower cost, less complex, medium functionality, good portability & battery life, nice keyboard, larger screen size than tablets.