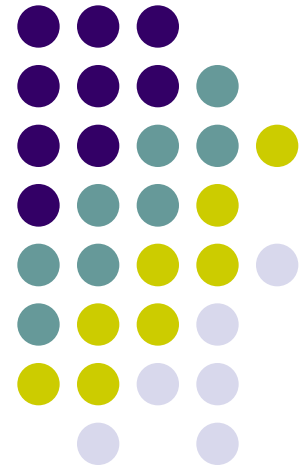
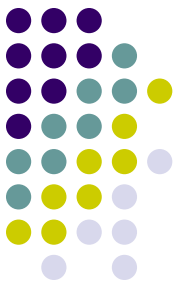


CSE 301

History of Computing

The microprocessor and
the personal computer



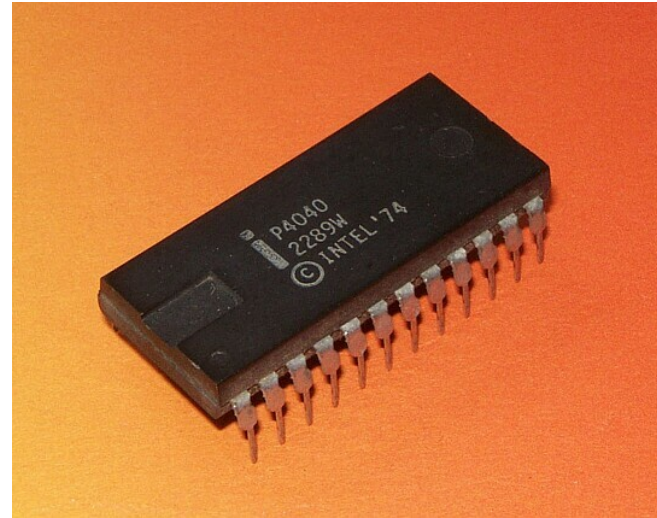


What's a microprocessor?

- A computer on a chip
- All logical circuits of Central Processing Unit placed onto a single Integrated Circuit
- Why was it an important development?
 - allowed for easier & cheaper construction of smaller computers
- Idea floated around for a while
 - Ex: proposed by Wayne Pickett in job interview with Intel

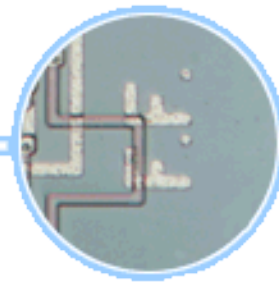
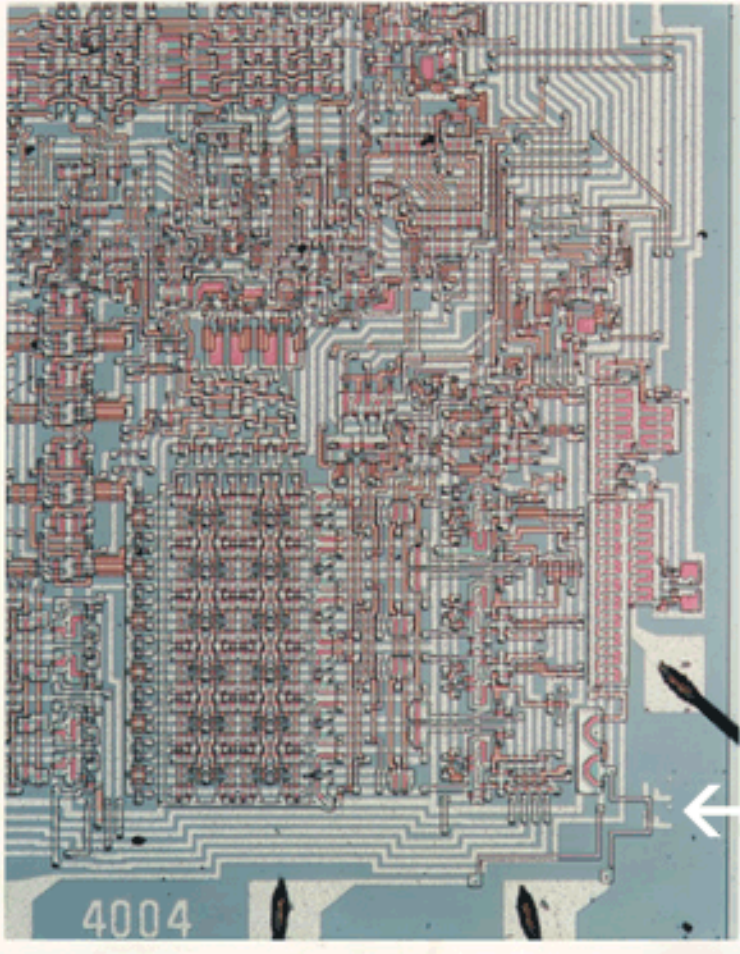
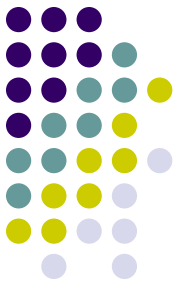
Intel 4004

- Considered the world's first microprocessor.
 - 4-bit CPU.
 - It was released November 15th, 1971.
 - The 4004 circuit was built of 2,300 transistors.
 - Originally designed for the Japanese company Busicom to be used in their line of calculators.
- The chief designers of the chip were Stan Mazor, Federico Faggin and Marcian “Ted” Hoff of Intel and Masatoshi Shima of Busicom.



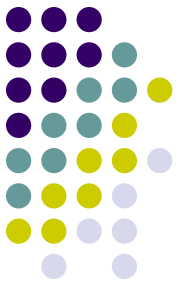
(L to R) Mazor, Faggin, Hoff, Shima

Intel 4004



- **Federico Faggin leaves Intel in 1974 to start Zilog, a rival company (maker of the Z80 microprocessor).**
- **Intel “disowns” his contribution to the invention of the microprocessor in patents and advertising.**

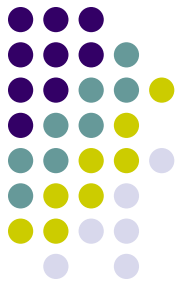
The first 8-bit microprocessors



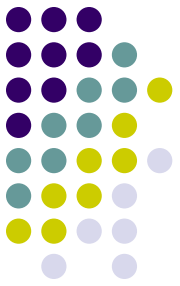
- The **8008** was an early CPU designed and manufactured by Intel, introduced in April 1972.
- The **8080** was designed and manufactured by Intel, released in April 1974 and sold for \$360.
- The **6800** was produced by Motorola and released shortly after the Intel 8080 in 1975.
- The **6502** was designed by MOS Technologies and introduced in September 1975.
- The **Z80** was designed and manufactured by Zilog from 1976 onwards. It was widely used both in desktop and embedded computer designs and is one of the most popular CPU's of all time

Altair 8800

- A microcomputer design announced in January 1975, based on the Intel 8080 CPU.
- Sold as a kit through *Popular Electronics*
- Manufactured by Micro Instrumentation Telemetry Systems (MITS) in Albuquerque, NM by Ed Roberts and others.
- In 1976, the competing IMSAI 8080 was released

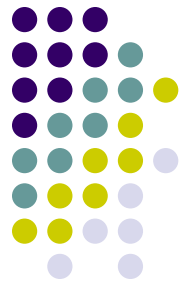


William Henry Gates III



- Bill Gates was born on October 28, 1955 in Seattle, WA
- His father was a corporate lawyer and his mother was a board member of First Interstate Bank, Pacific Northwest Bell and the national board of United Way.
- Gates went to Lakeside School (with Microsoft co-founder Paul Allen), Seattle's most exclusive prep school,
- Later he went to study at Harvard University, but dropped out without graduating.
- World's richest person?
 - Some days yes, some days it's Ingvar Kamprad
 - Paul Allen is usually in the top 5 as well

Paul G. Allen



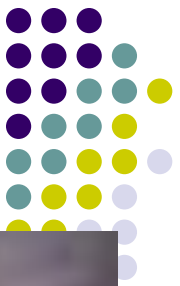
- Born January 21, 1953 in Seattle, WA
- A co-founder of Microsoft Corporation (together with Bill Gates).
- Allen went on to attend Washington State University, though he dropped out after two years.
- He was forced to resign from Microsoft after being diagnosed with Hodgkin's disease.
- He is a major philanthropist and also one of the principal financiers behind the SETI (Search for Extra-Terrestrial Intelligence) project.



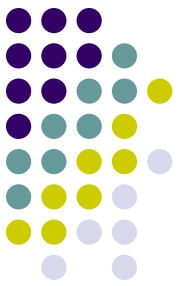
The start of Microsoft

- Founded in Albuquerque, New Mexico in 1975 by Bill Gates and Paul Allen
- Originally, they developed and sold BASIC interpreters under the company name Micro-soft.
 - First successful interpreter used by Ed Roberts for the Altair 8800.
 - Retained the rights to market their BASIC interpreter to other companies.
- Bill Gates vs. the software pirates

Micro-Soft, 1978



Steve Jobs



- Steven Paul Jobs was born February 24, 1955, and was adopted soon after birth.
- In 1972, Jobs graduated from Homestead High School in Cupertino, California and enrolled in Reed College in Portland, Oregon, but he dropped out after one semester.
- Worked making video games for Atari
- In 1976, Jobs and his friend Steve Wozniak founded Apple Computer.
- In 1985, Jobs left Apple and founded NeXT Computer.
- In 1997, Jobs returned to Apple, which was in a failing condition, and turned the fortune of the company around with the introduction of the iMac.

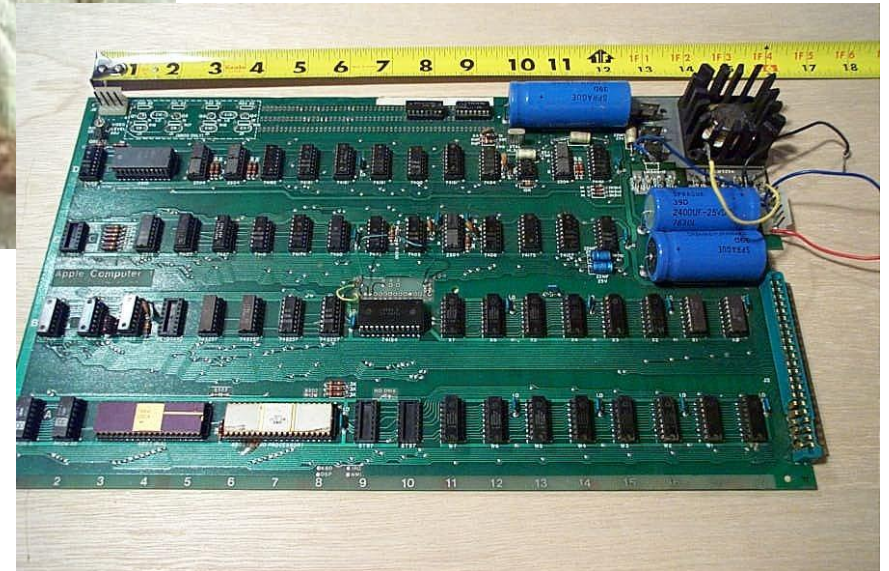
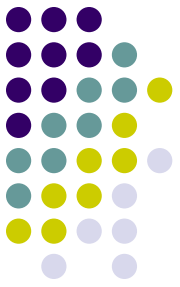
Steve Wozniak (“Woz”)



- Born August 11, 1950 in San Jose, CA
- Worked with Jobs in Homebrew Computer Club.
- In 1976, Jobs and Wozniak formed Apple Computer Company.
 - Apple’s first product was the Apple I, priced at \$666.66.
 - Apple I earned the company close to one million dollars.
- Went back to get BS degree from UC Berkeley, 1982.
- He left Apple for good in February 1985.
- In September 2000, Steve Wozniak was inducted into the National Inventors Hall of Fame.

Wozniak & Jobs

with the Apple I motherboard



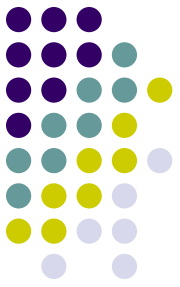
The Apple II



- The Apple II family was the first series of microcomputers made by Apple Computer, in the late 1970s and early-to-mid 1980s.
- The first Apple II came with:
 - a Mostek 6502 microprocessor running at 1 MHz
 - 4 KB of RAM
 - an audio cassette interface
 - and the Integer BASIC programming language built into ROM
- Introduced shortly thereafter, an external 5¼" floppy disk drive with controller card that plugged into one of the computer's slots, enabled much more convenient data storage and retrieval.

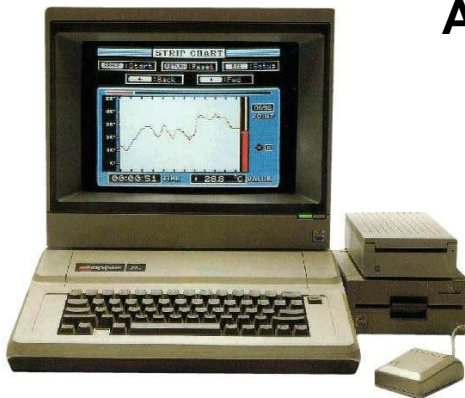
The Apple II

<http://apple2history.org/>

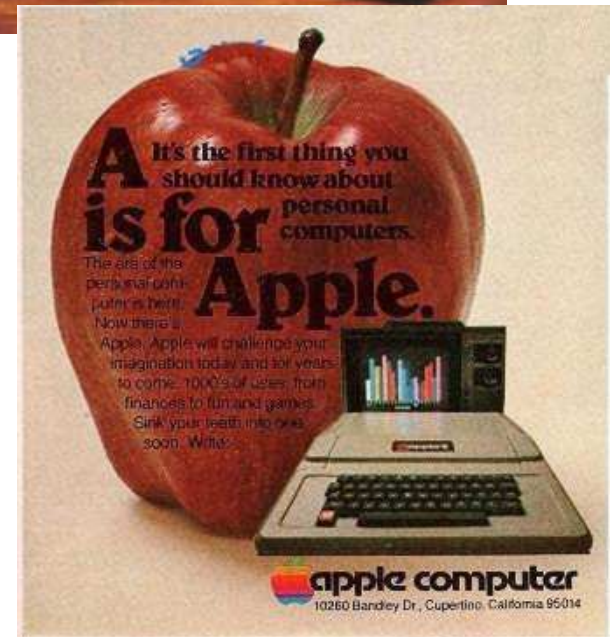


Apple IIc

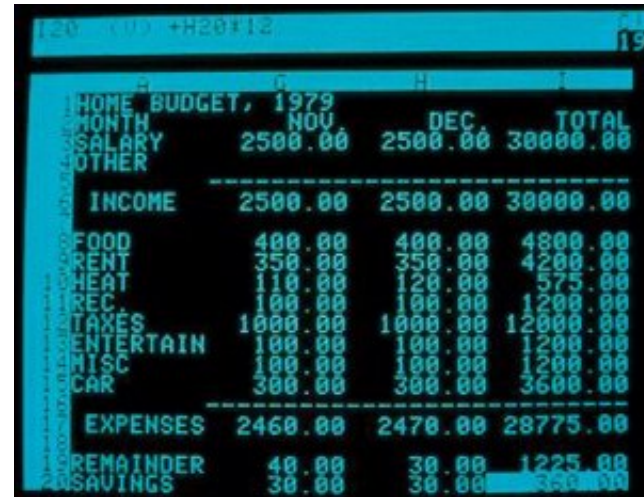
Apple II Plus



Apple IIe

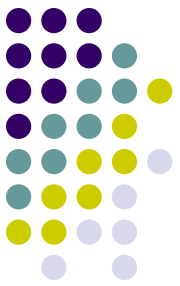


VisiCalc

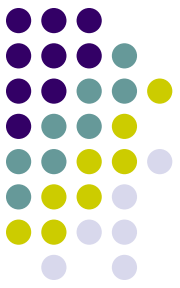


The screenshot shows a spreadsheet titled "HOME BUDGET, 1979" with columns for "MONTH", "NOV", "DEC", and "TOTAL". The data is organized into sections for INCOME and EXPENSES.

MONTH	NOV	DEC	TOTAL
SALARY	2500.00	2500.00	30000.00
OTHER			
INCOME			
	2500.00	2500.00	30000.00
EXPENSES			
FOOD	400.00	400.00	4800.00
RENT	350.00	350.00	4200.00
HEAT	110.00	120.00	575.00
REC.	100.00	100.00	1200.00
TAXES	1000.00	1000.00	12000.00
ENTERTAIN	100.00	100.00	1200.00
MISC	100.00	100.00	1200.00
CAR	300.00	300.00	3600.00
EXPENSES			
	2460.00	2470.00	28775.00
REMAINDER	40.00	30.00	1225.00
SAVINGS	30.00	30.00	3600.00



- The first spreadsheet program available for personal computers.
 - It was the "killer app" that turned the microcomputer from a hobby for computer enthusiasts into a business tool.
- Conceived by Dan Bricklin, refined by Bob Frankston and distributed by Personal Software Inc. in 1979 (later VisiCorp) for the Apple II computer,
 - This likely motivated IBM to enter the PC market which they had been ignoring until then.

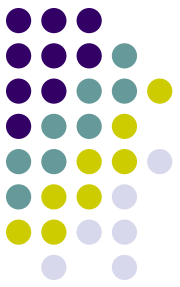


Commodore PET

- The **PET** (***P**ersonal **E**lectronic **T**ransactor*) was a home-/personal computer produced by Commodore Business Machines starting in the late 1970s.
- Top seller in the US and UK educational market



TRS-80



- The designation for several lines of computer systems produced by the Tandy Corporation and sold through its Radio Shack stores in the late-1970s and 1980s.
 - Affectionately known as the "Trash-80"



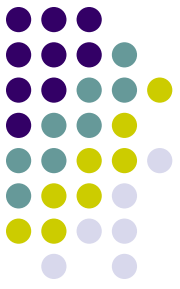
Cheap Computers



- **British inventor Sir Clive Sinclair introduced the ZX80 in 1980, an inexpensive computer designed to bring computing to the masses.**
 - The first fully assembled computer for less than \$100.
- **The Commodore 64 (in 1982) was the first cheap computer to have a whopping 64 KB of RAM**
 - A decade later it still held the record as the best-selling single computer model of all time selling an estimated *22 million* units.



IBM PC (“Project Chess”)



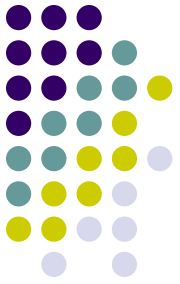
- IBM enters the personal computer market as a response to the success of Apple
- Departure from standard IBM practices
 - Use off-the-shelf components from various OEMs
 - Design an open architecture so other companies could produce and sell compatible machines
- Hoped to get royalties from licensing of BIOS
- Led by William C. Lowe & later Don Estridge
- The first IBM PC was released on August 12, 1981, at a base price of \$1,565.

IBM 5100



IBM 5100 released in 1975 was IBM's first attempt at the PC market, but it failed.

IBM PC



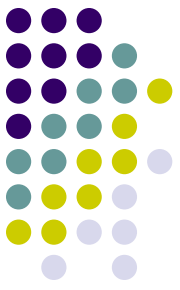
IBM PC – model 5150



IBM PC AT



IBM PC XT– model 5160



IBM PC needs an OS

- **Gary Kildall** (1942-1994) was the creator of the CP/M operating system & founder of Digital Research Corp.
- IBM approaches Kildall for an OS for the IBM PC, but he loses the contract
 - Lost contract because he decided to go flying and keep IBM waiting, OR
 - His wife (and business manager) refused to sign IBM's non-disclosure agreement
- Microsoft sells DOS to IBM as PC-DOS.
 - Original version purchased from Seattle Computer Systems.
 - Called QDOS (Quick and Dirty Operating System) as a clone of the popular CP/M OS.
 - Microsoft retains rights to MS-DOS

PCs in the media



How to tame your data.

To soothe the savage information beast, a businessperson could use the IBM Personal Computer XT.

Because with XT's 10-million-character fixed disk drive and IBM data management software *specifically designed to complement the hardware*, you can wad thousands of names and numbers into more-manageable shape. (Helping you get a better shot at the lion's share.)

Use IBM PES.PLE* generates a "form" on the screen. Customize it by putting pertinent data in the blank spaces provided.

Then use IBM PES.REPOR to sort, organize, search, update, score and print the facts with ease.

To learn more about how the IBM Personal Computer XT can help you more efficiently handle your high-volume applications, visit your authorized IBM Personal Computer retail dealer.



IBM

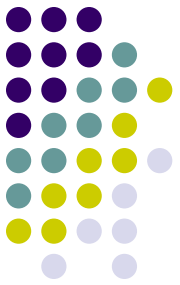
The IBM Personal Computer

A tool for modern times

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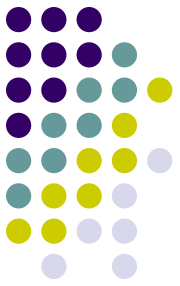


IBM Clones

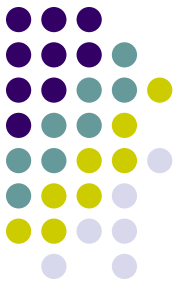


- Due to the open architecture of the IBM PC, many PC “clones” soon followed that ate into IBM’s profits.
- Compaq Computer Corporation was founded in February 1982 by Rod Canion, Jim Harris and Bill Murto, three senior managers from semiconductor manufacturer Texas Instruments.
- Compaq's efforts were possible because
 - IBM had used mostly "off the shelf" parts for their PC
 - Microsoft had kept the right to license the operating system to other computer manufacturers.
 - The only part which had to be copied was the BIOS
 - Compaq did this legally by reverse-engineering it at a cost of \$1 million.
 - Numerous other companies soon followed their lead.

Compaq Portable (1982)



Advent of Word Processing



- An Wang starts Wang Laboratories in 1951
- Wang's word processing machine, WPS, was introduced in June 1976 and was an instant success.
- WordStar was a word processor application, originally written for the CP/M OS (but later ported to MSDOS) that enjoyed a massive market share during the early-to-mid-1980s.
- WordStar lost considerable market share in the late 1980s to WordPerfect.
- WordStar released a version for Windows but was late in doing so, and Microsoft Word was already the popular choice for word processing by the early 1990s

WordStar



Seymour Rubenstein,
MicroPro



```
MS-DOS Prompt - WS
F:\TXT2HTML.TXT      L00001  C01 Insert
=====NON-DOCUMENT EDIT MENU=====
CURSOR      SCROLL      ERASE      OTHER      MENUS
^E up        ^W up          ^G char     ^J help     ^K block & save
^X down      ^Z down       ^T word     ^I tab      ^P print controls
^S left      ^R up screen  ^Y line     ^U turn insert off ^Q quick functions
^D right     ^C down       Del char    ^O set tab width  Esc shorthand
^A word left screen      ^U unerase  ^N split the line
^F word right ^B top bit    ^L find/replace again

TXT2HTML 1.02 04/10/97
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TXT2HTML is an MSDOS program that converts ASCII text files to HTML files.
Files to be converted are typically documentation files with paragraphs
separated by blank lines (like this file).

TXT2HTML's conversion is modeled on the characteristics of typical
documentation files. It is designed to convert paragraphs of text.
If your text file contains program source code or tabular data, you will
need to do some additional manual editing of the HTML file. Tabular
data's formatting can be maintained by either delimiting the data with
<PRE> </PRE>, or by using the HTML 3 table features.

TXT2HTML will convert the special characters ", &, <, and > into valid
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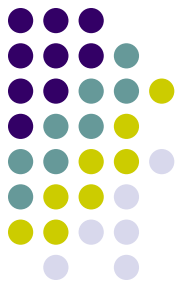
Xerox PARC



- Xerox PARC (Palo Alto Research Center) was the birthplace of many foundations of modern computing
 - the mouse
 - the laser printer
 - the Smalltalk programming language
 - Interpress (a precursor to PostScript)
 - the Ethernet
- Xerox PARC invents prototype of the world's first personal computer: the Alto
 - the first WYSIWYG editor, first commercial use of a mouse, graphical user interface, bit-mapped display



Mouse

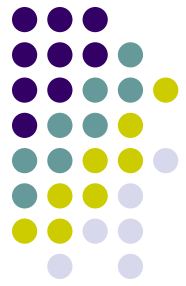


- The mouse was invented by Douglas Engelbart of Stanford Research Institute in 1963 after extensive usability testing.
 - He received a patent in Nov. 1970 for a "X-Y Position Indicator For A Display System".
 - He was the recipient of the 1997 ACM Turing Award.
- A later variation, invented in the early 1970s by Bill English at Xerox PARC, replaced the external wheels with a single ball which could rotate in any direction.

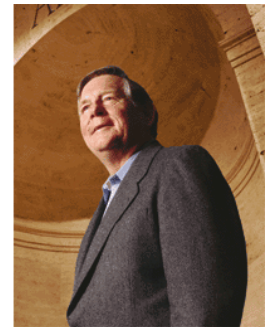


Engelbart

Laser Printer



- In 1938, Chester Carlson invented a dry printing process called xerography, commonly called a Xerox, the foundation technology for laser printers to come.
- The original laser printer called EARS was developed at the Xerox Palo Alto Research Center beginning in 1969 and completed in November, 1971.
- Xerox Engineer, Gary Starkweather adapted Xerox copier technology adding a laser beam to it to come up with the laser printer.
- The Xerox 9700, the first xerographic laser printer product, was released in 1977.



Starkweather

Ethernet



- Ethernet was originally developed as one of the many pioneering projects at Xerox PARC.
- Invented between 1973-1976 by Robert Metcalfe and David Boggs
- Metcalfe left Xerox in 1979 to promote the use of personal computers and local area networks (LANs), forming 3Com.
- He successfully convinced DEC, Intel, and Xerox to work together to promote Ethernet as a standard, which was first published in 1980.



Metcalfe