# Technology Companies

Hardware houses of the microcomputer age (exert of the lectures from a computer history course).
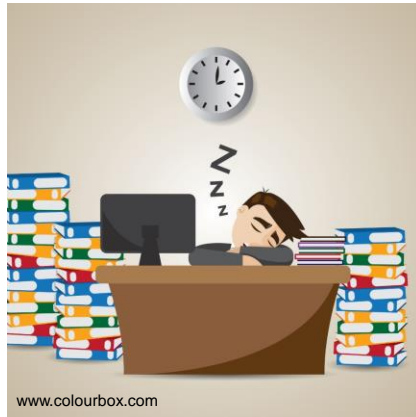
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Microsoft: Beginnings

- *Micro*computer-<u>soft</u>ware.
- Because Gates completed most of the work on BASIC there was a 64/36 split in ownership of the new company.
- Initial funds: royalties from the use of their version of BASIC (included with each Altair computer).
  - $30/computer (4 KB)
  - $35/computer (8 KB)
  - $60/computer (extended version of BASIC, required external storage)
- Also funds came from licensing of the BASIC source code.
  - Developers could modify the translator as they saw fit (!!!)
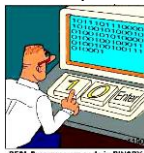
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Microsoft: Beginnings (2)

- The company had humble beginnings: a section of the office was given to Microsoft by MITS (manufacturer of the Altair).
  - Gates still continued his workaholic coding schedule.

www.colourbox.com

Microsoft: Beginnings (4)

- To help promote the Altair (and the BASIC that came with it) Gates toured with MITS to meet with computer clubs which included: engineers, technicians, hobbyists, hackers, electronicphilles etc.
  - Eventually BASIC became the standard for computers.

Microsoft: Beginnings (5)

- One of these computer clubs ("Homebrew") started in garage in Menlo Park (next to Palo Alto and Stanford university).
- More than 30 people came out for the first meeting including Steve Wozniak (who was then working in the calculator division of Hewlett-Packard).
  - Within a year of this first meeting: Wozniak along with Steve Jobs would build a personal computer of their own: Apple I.
- Although Microsoft got its start through its relationship with MITS it eventually was hobbled by it.
  - Microsoft could not license BASIC to MITS competitors.
  - At first there were no competitors (no problem).
  - In a few years dozens of other companies manufactured their own microcomputers: Commodore (PET), Radio Shack (TRS-80), Apple (Apple I).

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Microsoft: Beginnings (6)

- After a long and complex legal proceedings Microsoft won the rights to sell BASIC as they saw fit.
- BASIC was licensed to many other computer manufacturers: Radio Shack (TRS-80), Apple (Apple II)
- But throughout the legal battle the company still worked on other programming languages: COBOL, FORTRAN as well as developing BASIC for chips other than the 8080.
- Gates and Ballmer were frequently underestimated by their business rivals ("who are these kids?")

http://www.syllablesoup.com/

  - But they were more than able to hold their own.

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Microsoft: Beginnings (7)

- However Gates still made time for programming:
  - Competitions were held with employees to see who write a program in the fewest lines of code.
  - In the early years Gates himself indicates that he was heavily involved in all projects and there wasn't a line of code that he didn't personally look over (or even recode).

Birth Of The Microsoft OS

IBM OS???
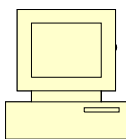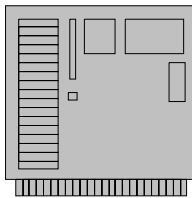
Clipart: Microsoft

Birth Of The Microsoft OS (2)

- IBM approached two companies as possible vendors of an operating system to run it's computers:
  - Digital Research (CP/M operating system was standard for Intel 8080 based systems)
    - (There soon to be a 16 bit extension coming but not far enough in development).
  - Microsoft (never wrote operating system software just a BASIC interpreter).
    - Microsoft: 7 million in annual sales
    - IBM: 30 billion in yearly revenues.
- IBM and Microsoft worked out an arrangement to have a version of Microsoft's DOS (*D*isk *O*perating *S*ystem) run IBM computers: PC-DOS.
- MS-DOS was based on 86-DOS an OS written by Tim Paterson of Seattle Computer products (later Q-DOS)

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Birth Of The Microsoft OS (3)

- The interface of PC/MS-DOS has been criticized as being user-unfriendly.

Command

Effect of the command

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Birth Of The Microsoft OS (4)

- However the interface of PC/MS-DOS was a significant improvement over other operating systems.

CP/M operating system

Reboot computer

Wrong disk!!!
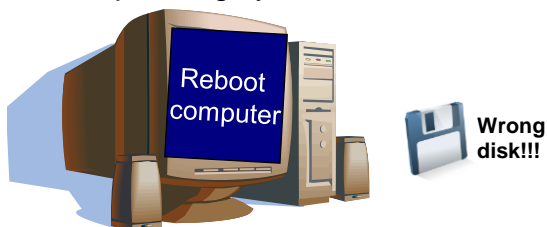
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Birth Of The Microsoft OS (5)

- However the interface of PC/MS-DOS was a significant improvement over other operating systems.

PC/MS-DOS operating system

Wrong disk!!!

Correct disk
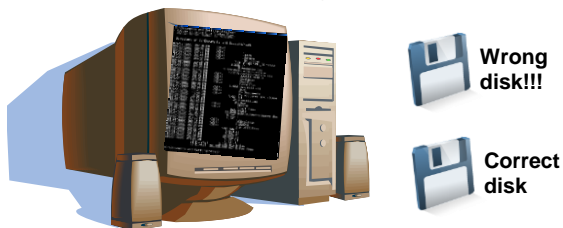
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The IBM PC (Personal Computer: 1981)

www.computerhistory.org

- IBM was a large company but a late comer into the microcomputer market.
- As mentioned its machines used an operating system produced by Microsoft.

The IBM PC (Personal Computer: 1981): 2

- With the entry of IBM in the microcomputer market, many developers produced a plethora of software.

IBM PC

- Word processing

- Accounting software

- Games

- Spreadsheets

The IBM PC (Personal Computer: 1981): 3

- Apple entered the microcomputer market sooner and already had an established market when IBM began to first market the PC.

Apple sales   **IBM sales**

- Because of the prevalence of so much software the IBM-PC soon overtook Apple (and other vendors) in sales.

Apple sales   **IBM sales**
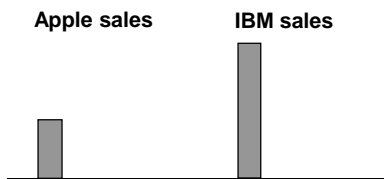
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The History Of Apple Computers: Steve And Steve

- Apple was founded by Steven Jobs and Steve Wozniac in a Silicon Valley garage.

Steven Jobs
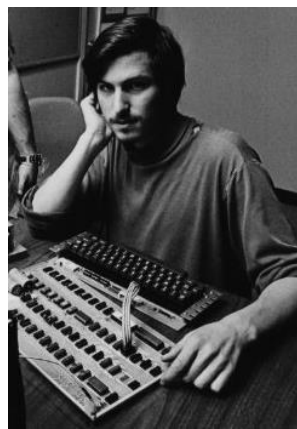
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Steve Wozniac   Images © Apple Computer, Inc. from www.computerhistory.org

Apple: Steve And Steve

- Bill Fernandez (Wozniak's neighbour in Santa Clara California) introduced the 'Steves'.[1]
  - Stephen Gary Wozniak (16)
  - Steven Paul Jobs (21)
- They built their first computer out of parts that were discarded (for 'cosmetic' reasons) by computer manufacturers.
  - Named after their favourite drink: "The Cream Soda computer".
  - Jobs was marketing, Wozniak was the Engineer,

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1 "Corporations that changed the World: Apple Inc." (Jason D. O'Grady: Greenwood Press 2009)

Steve Jobs

- Born Feb 24, 1955 in San Francisco.
- Age 23: Made his first million
- Age 25 (1980): Worth approximately 100 million
- 2009: Worth approximately 6 billion
- Even at an early age he showed an aptitude for business and people over engineering.
  - "...he wasn't interested in getting his hands dirty", "...he was more interested in wondering about the people that owned the cars."[1]

James Tam

1"The little kingdom: The private story of Apple Computer" (Michael Moritz: William Morrow p. 38)

Steve Wozniak

- Born August 11 1950
- Commonly known by an abbreviation of his surname "The Woz"
- "Prolific tinkerer"[1]
- "From a technical standpoint, Woz was literally Apple Computer"[2]

1 "Corporations that changed the World: Apple Inc." (Jason D. O'Grady: Greenwood Press 2009)

2 "iWoz: From Computer Geek to Cult Icon: How I Invented the personal computer, Co-founded Apple, and had Fun Doing It" (Steve Wozniak with G. Smith: W.W. Norton 2006)
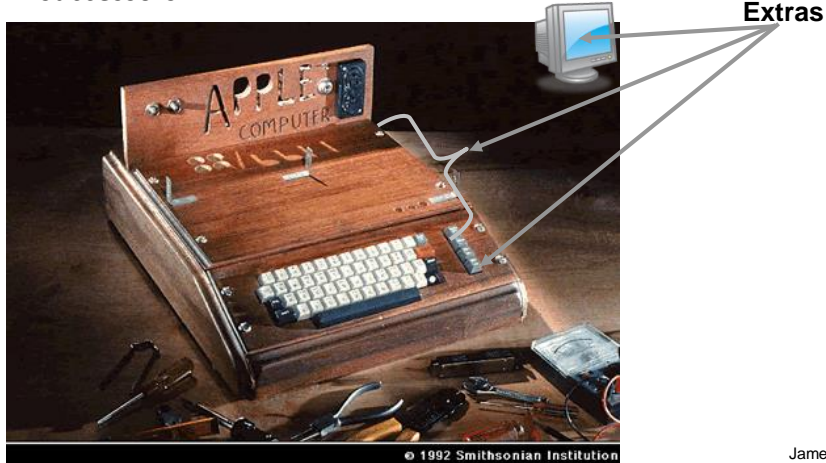
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Apple I

- 1976: Wozniak completed a prototype and took it the Homebrew Computer club.
- Jobs saw its immediate potential.
- It used a standard TV as a monitor.
- Due to Wozniak's design genius it used a minimal number of chips (to keep costs and complexity down).
- Boot code was in ROM.
- Data was saved on cassette tapes.

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Apple I (2)

- The first Apple computer: significantly different from it's successors.

Extras

© 1992 Smithsonian Institution

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Clipart: Microsoft

Apple I: Marketing

- A local electronic shop owner immediately put in for an order of 50 computers.
- Cash was so tight for `Apple` that payment for the parts had to made on credit.
  - Even then personal sacrifices had to be made.

  - Wozniak`s friend: Ronald Wayne helped him assemble the computers in Wozniak`s living room.
    - Even this preassembly process the machine still required some assembly by the end customers.

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Clipart:www.colourbox.com

Apple II

- Proceeds from the sale of the predecessor machine financed the construction of its successor.
- At this point Wayne sold his stake in company.
- The 'Steves' had trouble raising money.
  - Banks would not grant loans because they were skeptical of the marketability of a computer for the average person.
  - Finally after another person agreed to co-sign the bank loan ($250,000) there was enough capital to fund production of the Apple II and Apple Computer was formed April 1, 1976.
- Released in 1977.
- Initially it ran a version of BASIC written by Wozniak.
- Later it used a licensed version of Microsoft BASIC.
  - The $10,000 fee was said to have saved Microsoft from insolvency.[1]

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1 "A History of Modern Computing" (Paul Ceruzzi: MIT Press 2003)

The Apple II (2)

Images
Apple II:
www.computerhistory.org

Donkey Kong:
www.donkeykong.gamebub.com

- It was a simpler and more powerful design than the Altair
- The color graphics were superior to larger and more expensive computers
- Strong selling points
  - Name
  - Appearance

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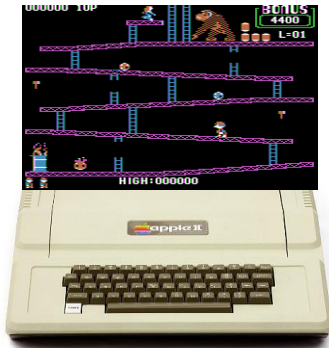## Side Note: VisiCalc

- *Visi*ble *Calc*ulator was the first electronic spreadsheet.
- Dan Bricking conceived of the idea while he was a first year student at Harvard Business school.
- Enlisted the aid of a Harvard graduate and using a borrowed Apple II computer a working version was produced in 1978.

The Apple II & VisiCalc

- VisiCalc: "*It was the software tail that wagged the hardware dog*"

Apple Goes Public

- IPO: December 12, 1980 (Open $22 per share, close at $29)
  - Apple raised more money that day than any company except for Ford.

Apple III

- Customers flocked to (the IBM PC):
  - Apple became known for poor reliability.
- The Apple III failed as a product:
  - IBM 'smelled blood' and quickly released the IBM PC (Personal Computer).
  - The PC design opened up the market for clones (more later).
- Wozniak claimed it was a failure because marketing rather than engineering had designed it.

Jacky Scully

- Recruited from Pepsi to work as CEO for Apple in 1983 by Steve Jobs.
  - At Pepsi he spearheaded a successful marketing campaign to challenge Coke: the "Pepsi challenge"
    - It was reputed however that Scully picked Coke over Pepsi in the challenge.
    - What finally motivated the transfer was a plea by Jobs.
    - "Do you want to sell sugared water for the rest of your life? Or do you want to come with me and change the world?[1]
- He was responsible for many changes:
  - A decision to compete directly against IBM in the business computer market (Apple III)
  - Removing Steve Jobs from development of an Apple microcomputer project.

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1 Triumph of the Nerds: The Transcripts, Part III

Lisa

Image © Mark Richards from www.computerhistory.org

- (1983).
  - 5 MHz 68000 processor
  - 1 MB RAM
- Unlike other Apple computers which were text-based, this one would employ a GUI.
  - It was inspired by a tour of the Xerox PARC (Palo Alto Research Center) laboratories.
    - It cost $1 million in Apple stock for a 3 day tour of Xerox.
    - It was a failure but laid the ground work for the successful Macintosh.
      - The Lisa (1983) incorporated many of the features of the Xerox Star.
      - Like the Star it was expensive ($10K) and sales were weak

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The Apple Macintosh (1984)

Image © Mark Richards from www.computerhistory.org

- Apple's next computer was the Macintosh
- It incorporated many of the best features of the Lisa but was sold at a substantially lower price.
- Also features not present in the Lisa were added to the Macintosh
- Compared to the IBM-PC it was a speed vs. ease of use tradeoff

James Tam

Macintosh

- To prevent a repeat of the failures with the Apple III Jobs was diplomatically removed from this project.[1]
  - He eventually resigned and formed his own computer company NeXT
- Goal: produce an easy to use, inexpensive computer with all the features could need all in one package.
- Specifications:
  - Processor: ~7 MHz 68000 Motorola
  - Memory: 128 KB (upgradable – with some difficulty - to 512 KB)

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1 "Corporations that changed the World: Apple Inc." (Jason D. O'Grady: Greenwood Press 2009)
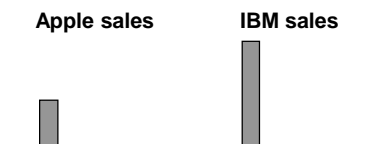
Macintosh (2)

- It incorporated the best features of the Lisa but was sold at a substantially lower price.
- Also features not present in the Lisa were added to the Macintosh
- Compared to the IBM-PC it was a speed vs. ease of use tradeoff

The Attack Of The Clones

- Although it was a late entry into the microcomputer market IBM eventually dominated.
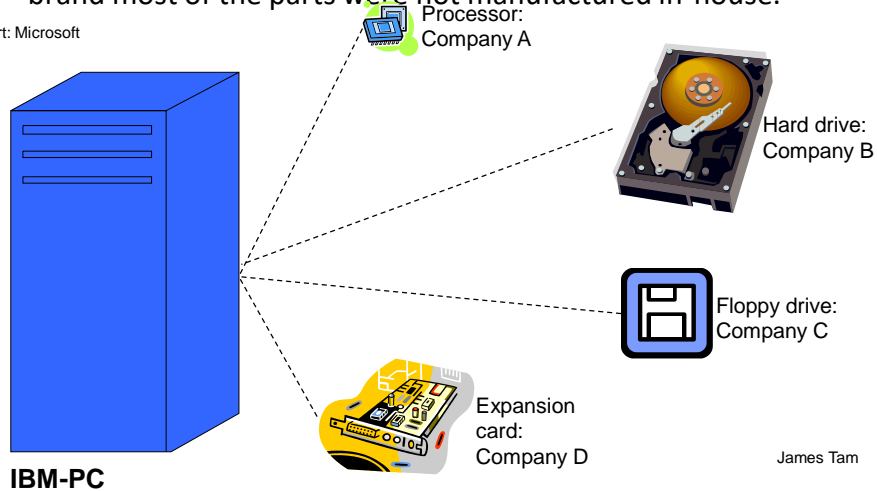
Apple sales   **IBM sales**

The Attack Of The Clones (2)

- Although the IBM-PC was marketed and sold under the IBM brand most of the parts were not manufactured in-house.

Clipart: Microsoft

Processor:
Company A

Hard drive:
Company B

Floppy drive:
Company C

Expansion card:
Company D

IBM-PC

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The Attack Of The Clones (3)

- The parts manufacturers were free to sell their components to other companies.
- About the same time that the IBM-PC was sold, three ex-employees of Texas Instruments founded their own company: Compaq.
  - They conceived of producing their own copy of the IBM-PC under their own brand name.
  - It would run under MS-DOS and be 100% compatible with other software
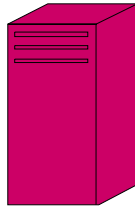 - The first IBM-PC clone was delivered by Compaq in 1983.

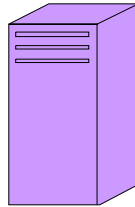**IBM-PC**

Compaq clone

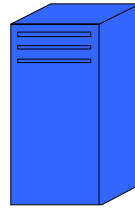James Tam

The Attack Of The Clones (4)

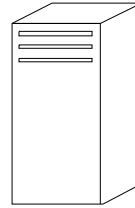- This opened the flood gates for other computer manufacturers to produce their own clone computers.

Compaq clone

Dell clone

IBM-PC
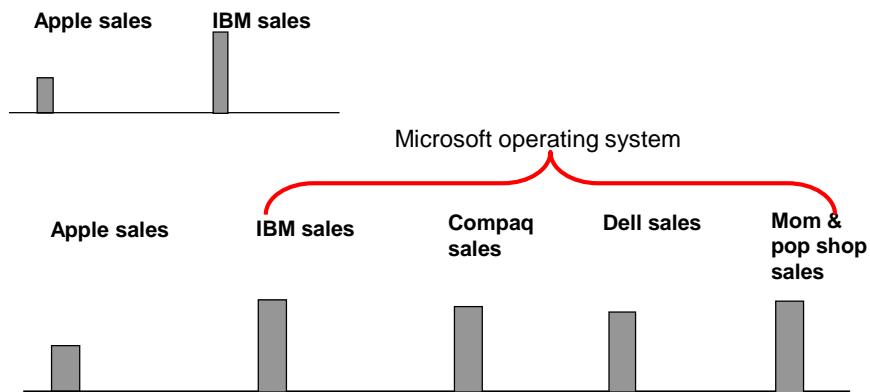
Mom and pop shop clone

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The Attack Of The Clones (5)

- The result was that IBM eventually lost control over the computer architecture that it developed and marketed.

Apple sales   **IBM sales**

Microsoft operating system

Apple sales   **IBM sales**   **Compaq sales**   **Dell sales**   **Mom & pop shop sales**

James Tam

CPSC 409: The Microcomputer era

The Attack Of The Clones: The Rise Of Microsoft

- The loser of the clone war was IBM.
- The real winner of the clone war was Microsoft.
- By the 1990s Microsoft developed an interface for MS-DOS that incorporated some of the features of the MAC GUI.

Windows 3 image from www.microsoft.com
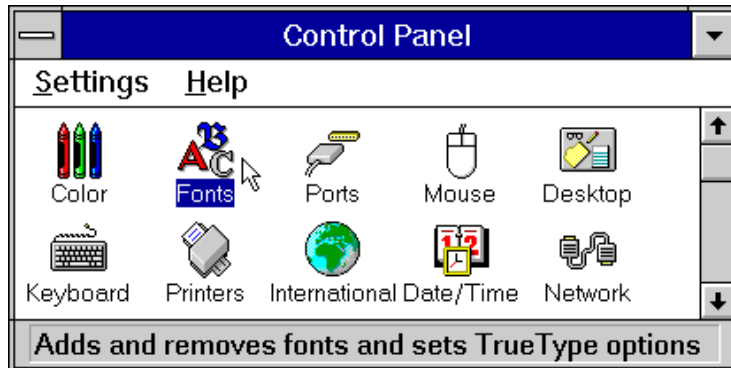
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- "The little kingdom: The private story of Apple Computer" (Michael Moritz: William Morrow p. 38)
- "iWoz: From Computer Geek to Cult Icon: How I Invented the personal computer, Co-founded Apple, and had Fun Doing It" (Steve Wozniak with G. Smith: W.W. Norton 2006)

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References (2)

• Triumph of the Nerds: The Transcripts, Part III

After This Section You Should Now Know

• General knowledge
  – The general time that significant events (such as the creation of different computer models or technologies) occurred
  – The people and organizations/companies behind these events/technologies and their background
  – What companies produced which computers
  – The names, general appearance and basic technical specifications of the computers of this time
  – What were the specifications of the technologies of the day (such as the number of colors available with different graphical modes)
  – What (if any) were the distinguishing feature or features of a computer
  – How were these technologies or computers used

After This Section You Should Now Know (2)

- How the invention of the microprocessor revolutionized computing
- What was the first computer that was targeted specifically for the home user
- What was the influence of Microsoft on microcomputers
- The history of the IBM-PC
- The foundation of Apple Computers
- The history of some of Apple's early computers: Apple I, Apple II, Lisa, Macintosh
- How IBM lost control over a computer architecture that it developed through the rise of clone computers

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After This Section You Should Now Know (3)

- How the rise of clone computers lead to the market dominance of Microsoft in the microcomputer market
- When the Xerox Star was made available as well it's influence on microcomputers

James Tam