

Computer Science E-1



Understanding Computers and the Internet

Lecture 2: Hardware, Continued

Wednesday, 27 September 2006

David J. Malan
`malan@post.harvard.edu`

Agenda



- Secondary Storage
 - Floppy Disks
 - Hard Disks (PATA and SATA)
 - CDs
 - DVDs
- Virtual Memory
- Expansion Buses and Cards
 - AGP
 - ISA
 - PCI
 - PCI Express
 - SCSI
- Ports
- I/O Devices
- Peripherals
- How to Shop for a Computer
- History

Secondary Storage

Floppy Disks

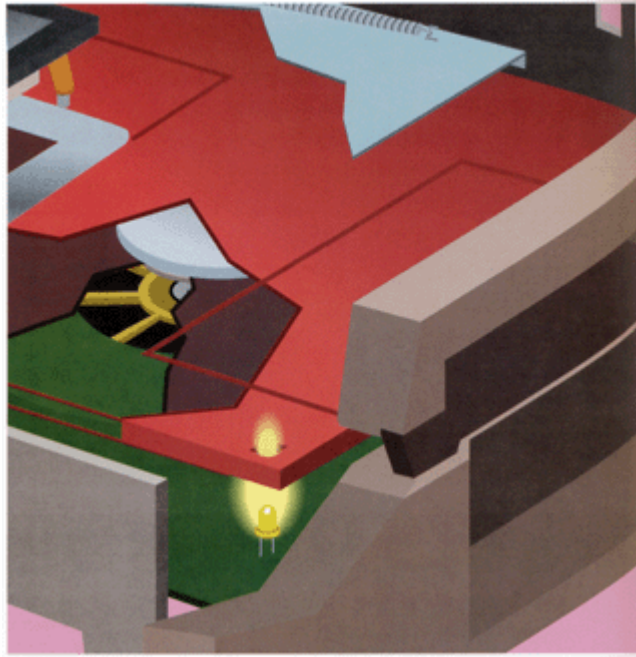


Image from *How Computers Work*, copyright © Que Corporation.

Secondary Storage

Hard Disks

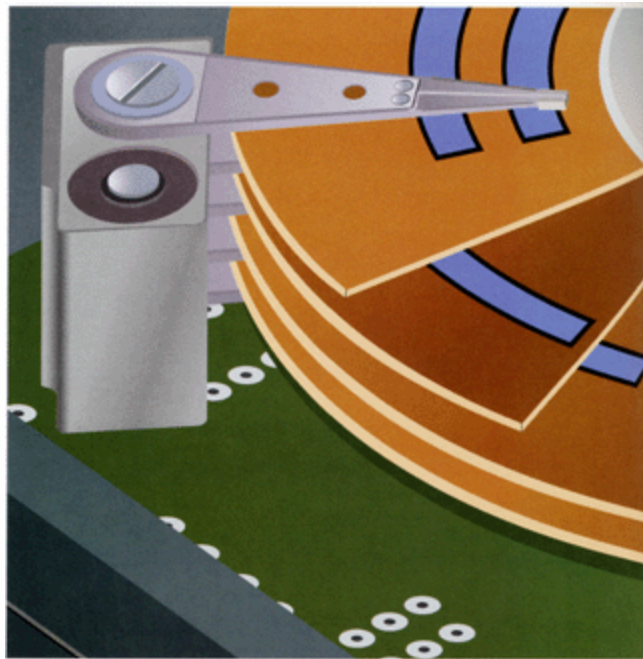


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Secondary Storage

Hard Disks

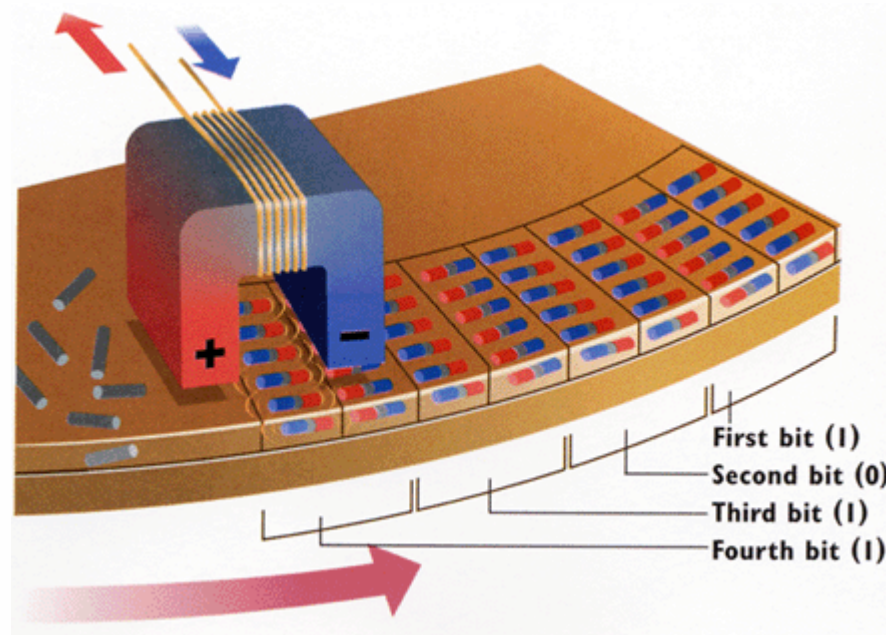


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Secondary Storage

Hard Disks

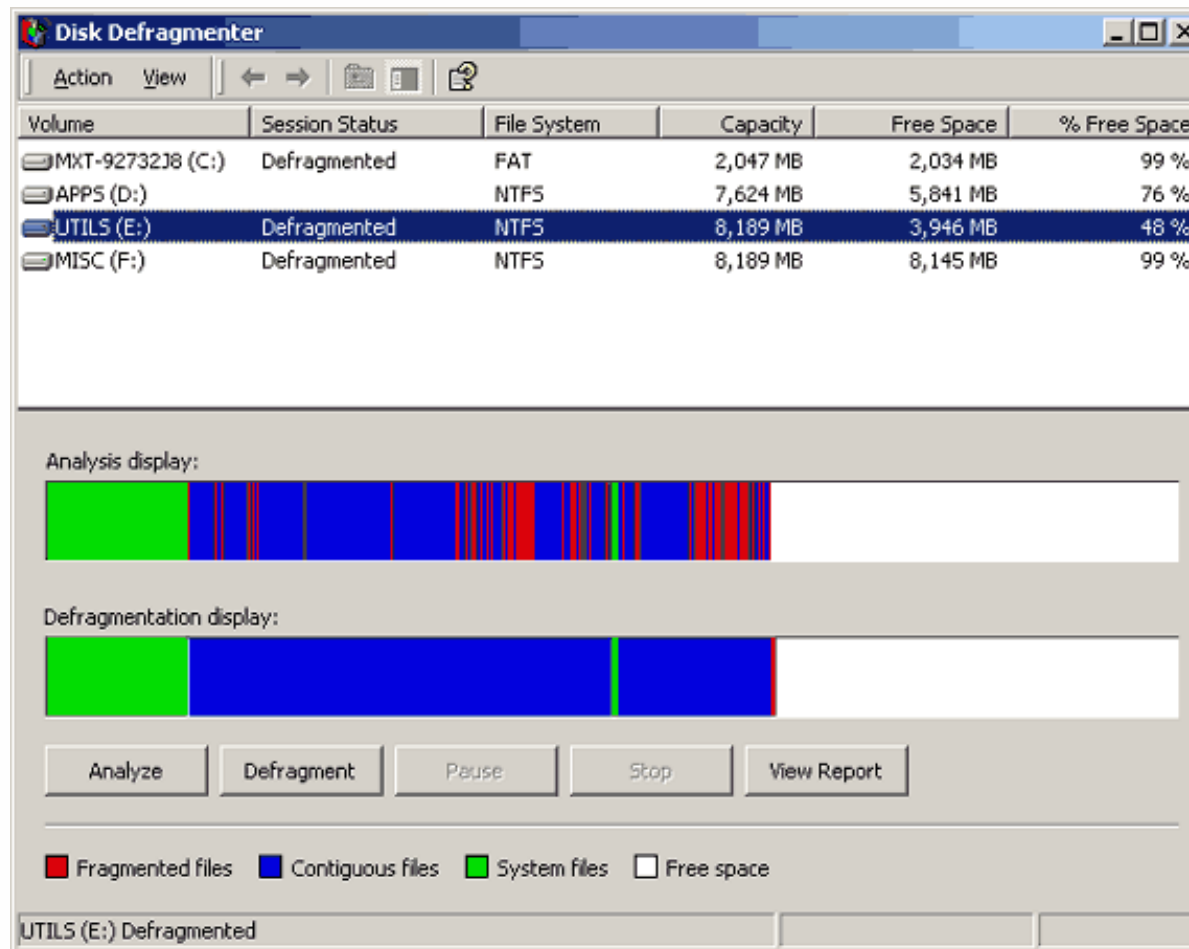
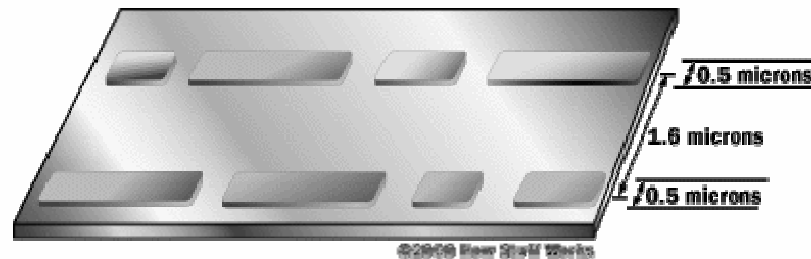
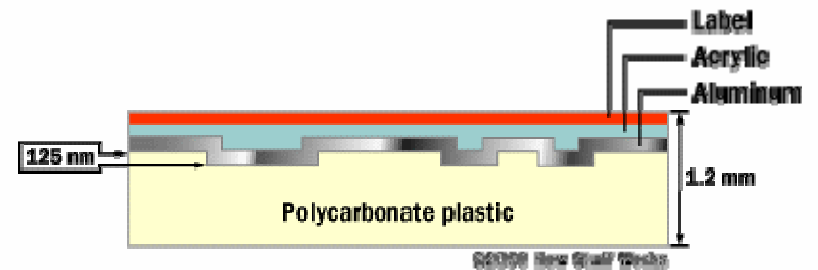
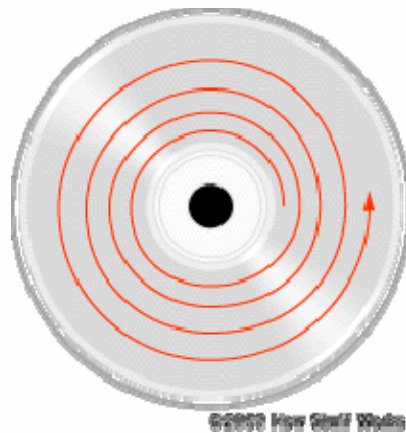


Image from <http://www.winntmag.com/Articles/Index.cfm?ArticleID=8276>.

Secondary Storage

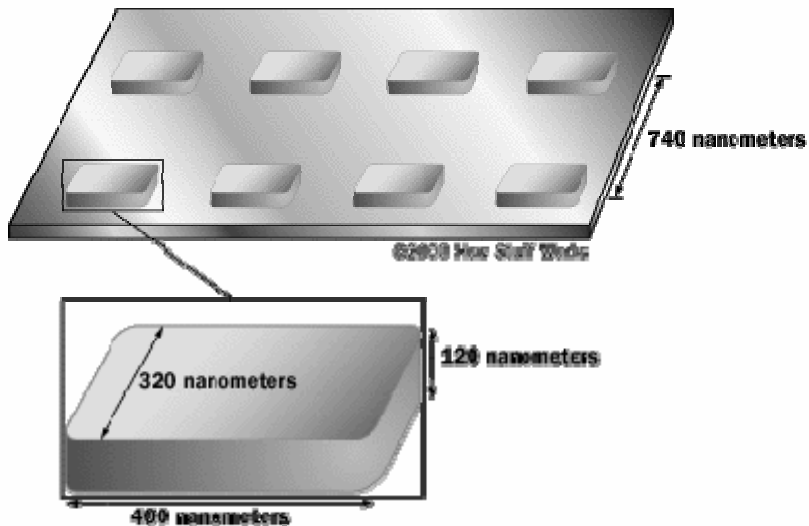
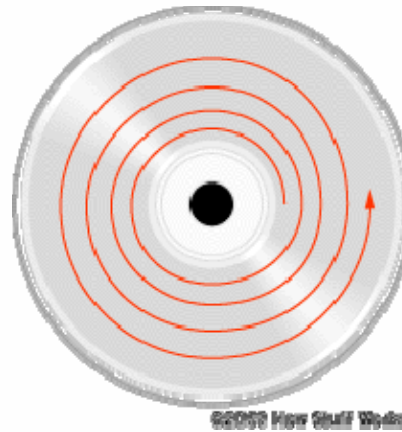
CD-ROM Discs



Images from <http://www.howstuffworks.com/cd1.htm>, copyright © How Stuff Works.

Secondary Storage

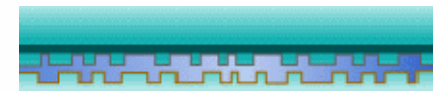
DVD-ROM Discs



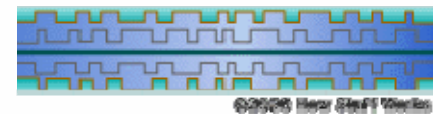
Single-sided, single layer (4.7GB)



Single-sided, double layer (8.5GB)



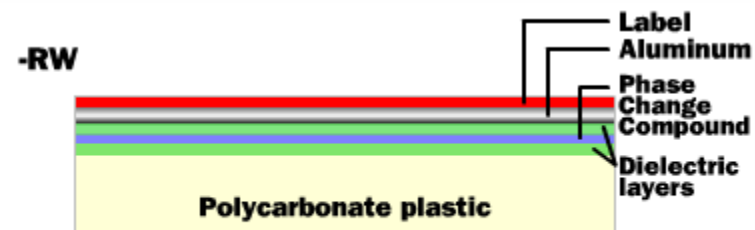
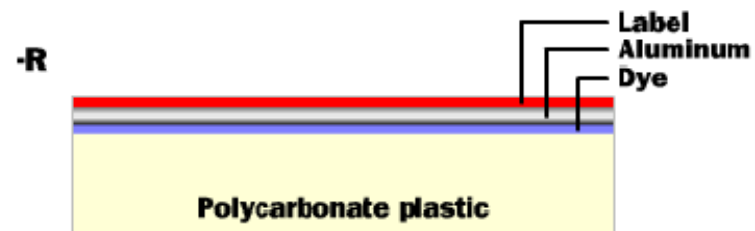
Double-sided, double layer (17GB)



Images from <http://www.howstuffworks.com/dvd2.htm>, copyright © How Stuff Works.

Secondary Storage

Recordable and Rewriteable Discs



Images adapted from <http://howstuffworks.lycoszone.com/cd-burner2.htm> and <http://howstuffworks.lycoszone.com/cd-burner4.htm>,
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Expansion Buses and Cards

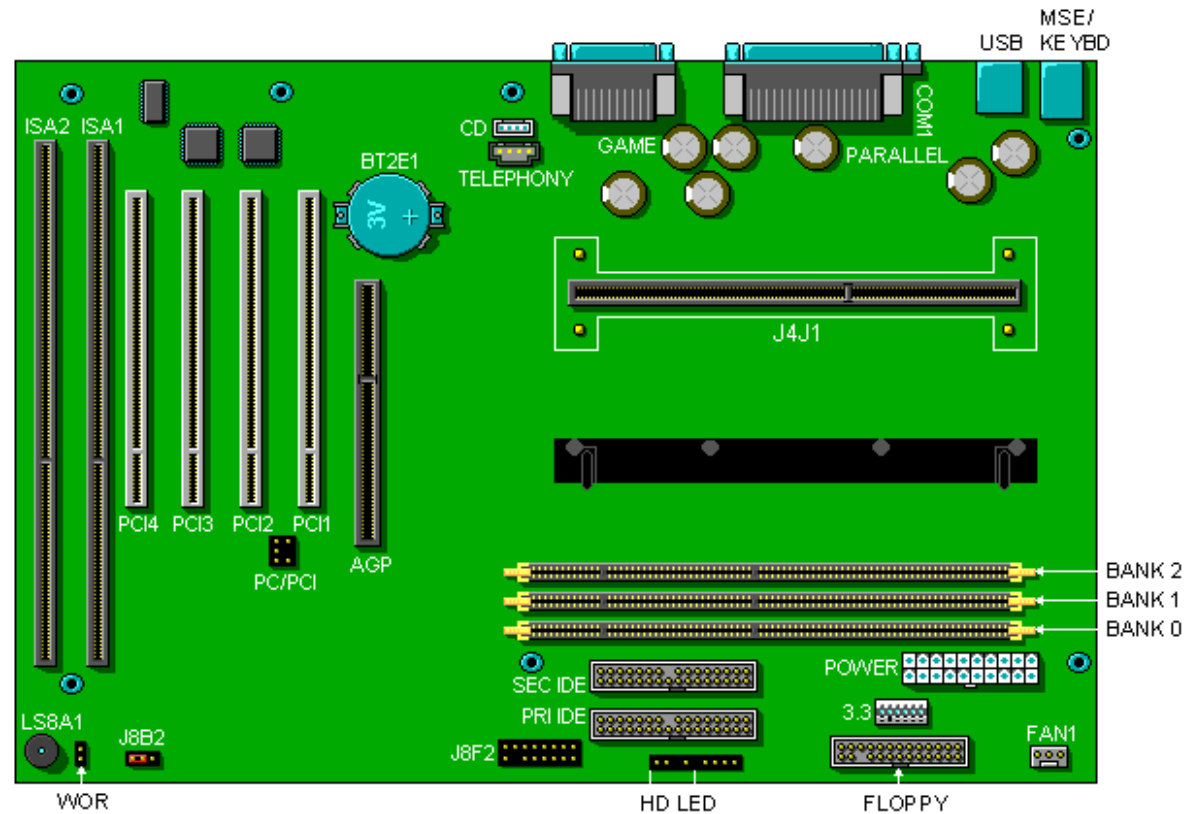
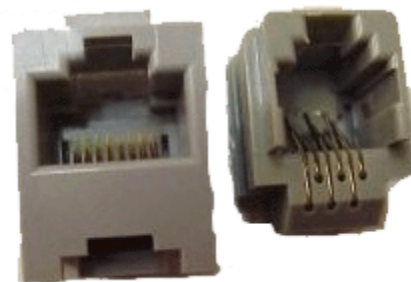
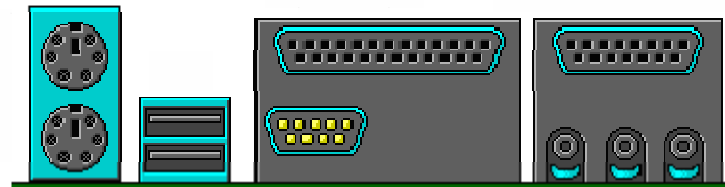
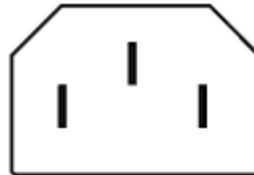


Image from <http://docs.us.dell.com/docs/systems/dalex/board.htm>, copyright © Dell Computer Corporation.

Ports



Images adapted from <http://www.masterflex.com/reference/pwrcords.asp>;
<http://docs.us.dell.com/docs/systems/daalex/board.htm>, copyright © Dell Computer Corporation;
and http://www.elect-spec.com/phone_v.htm, copyright © Electronic Specialists, Inc.

I/O Devices



How to Shop for a Computer



History



1943



"When the Mark I was completed in 1943, it had a number of specific functions: addition, subtraction, multiplication and division plus logarithms and trigonometric functions and had an accuracy of 23 decimal place numbers. It measured 51 feet long, 8 feet high and 2 feet wide and weighed over 5 tons. It was a relay computer, like Zuse's, with output on an electric typewriter. Speed was about three calculations per second. The Mark I was used for both industrial and military purposes. It was even used in a Concordance program: providing an alphabetical list of all words of the Bible plus a statement of places and citation of the texts. That program did not work.

Mark I served until 1959! Today, the Mark I has been split up and was divided between Harvard (Science Center), the Smithsonian Institute and IBM (Historical Collection)." Image and text from http://www.digidome.nl/howard_h_aiken.htm, copyright © DIGIDOME.

History

92:

9/9

0800 Antan started

1000 stopped - antan ✓

1300 1030 MP-MC { 1.2700 9.032 847 025
 1.504776415 (-2) 9.037 846 995 correct
 033 PRO-2 2.130476415
 correct 2.130676415

Relays 6-2 in 033 failed special speed test
 in relay 11,000 test.

Relays changed

1100 Started Cosine Tape (Sine check)

1525 Started Multi-Adder Test.

1545

Relay #70 Panel F
 (moth) in relay.

First actual case of bug being found.

1650 Antan started

1700 closed down.

"Grace Murray Hopper, working in a temporary World War I building at Harvard University on the Mark II computer, found the first computer bug beaten to death in the jaws of a relay. She glued it into the logbook of the computer and thereafter when the machine stops (frequently) they tell Howard Aiken that they are "debugging" the computer. The very first bug still exists in the National Museum of American History of the Smithsonian Institution. Edison had used the word bug and the concept of debugging previously but this was probably the first verification that the concept applied to computers." Image and text from

<http://www.lewhill.com/firstcomputerbug.html>, copyright © IEEE, Inc.

History

1975



Image from <http://www.computermuseum.20m.com/popelectronics.htm>.

History

1975

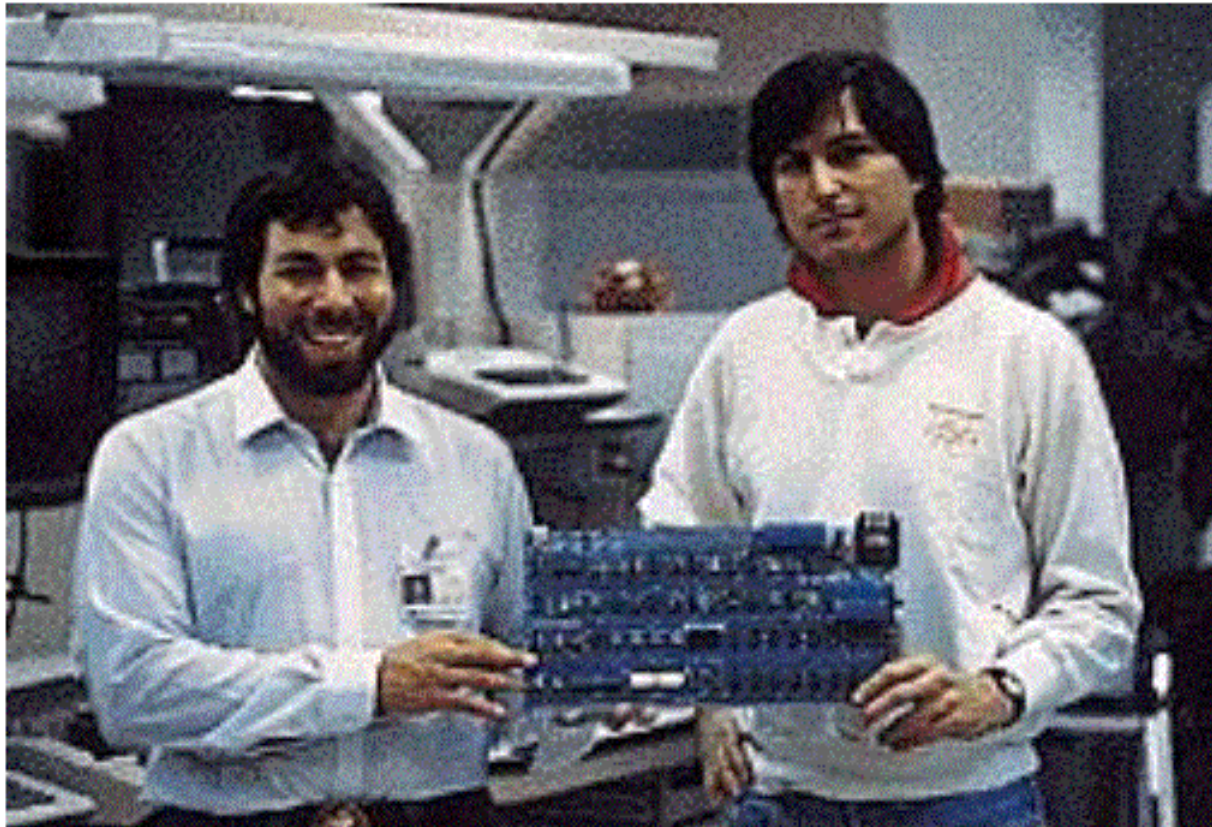


Photo courtesy of Microsoft Archives.

Image from http://www.microsoft.com/italy/stampa/articolo_sez60info704.htm.

History

1977



Steve Wozniak e Steve Jobs con la scheda dell'Apple I

Image from <http://www2.polito.it/didattica/polymath/ICT/Htmls/Studenti/Universita/Tesi-DAlessandro/Cap2.htm>.

History

1977



Image from <http://www.spiegel.de/wissenschaft/mensch/0,1518,grossbild-141673-164435,00.html>.

History

1979

| F3 /FR (L) Total | | | | | | |
|------------------|---|-----------|-------|-------|-------|-------|
| | A | B | C | D | E | F |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | Total |
| 4 | | | Jan | Feb | Mar | Q1 |
| 5 | | | | | | |
| 6 | | Revenues | 10000 | 11000 | 12100 | 33100 |
| 7 | | Cos | 9000 | 9900 | 10890 | 29790 |
| 8 | | | | | | |
| 9 | | Gross | 1000 | 1100 | 1210 | 3310 |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | G&A | 500 | 550 | 600 | 1650 |
| 13 | | | | | | |
| 14 | | Net Incom | 500 | 550 | 610 | 1660 |
| 15 | | | | | | |
| 16 | | Taxes | 200 | 220 | 244 | 1328 |
| 17 | | | | | | |
| 18 | | After Tax | | | | |
| 19 | | Income | 300 | 330 | 366 | 996 |
| 20 | | | | | | |

Image from http://www.hodgy.net/computer_history/page_2/page_2%20spreadsheets.htm.

History

1981



Image from <http://www.tprthai.net/goldold.htm>.

History

1984



Introducing Macintosh. For the rest of us.

In the olden days, before 1984,
not very many people used computers.
For a very good reason.



Not very many people knew how.
And not very many people wanted
to learn.

After all, in those days, it meant
listening to your stomach growl through
computer seminars. Falling asleep over
computer manuals. And staying awake
nights to memorize commands so

complicated you'd have to be a computer
to understand them.

Then, on a particularly bright day
in Cupertino, California, some
particularly bright engineers
had a particularly bright idea:
since computers are so smart,
wouldn't it make more sense
to teach computers about
people, instead of teaching people about
computers?

So it was that those very engineers
worked long days and late nights and
a few legal holidays, teaching tiny
silicon chips all about people. How they
make mistakes and change their minds.
How they refer to file folders and save
old phone numbers. How they labor for
their livelihoods, and doodle in their
spare time.

For the first time in recorded
computer history, hardware engineers

actually talked to software engineers
in moderate tones of voice, and both
were united by a common goal: to build
the most powerful, most portable, most
flexible, most versatile computer not-very-
much-money could buy.

And when the engineers were
finally finished, they introduced us to
a personal computer so personable,
it can practically shake hands.

And so easy to use, most people
already know how.

They didn't call it the QZ890, or
the Zipchip 5000.

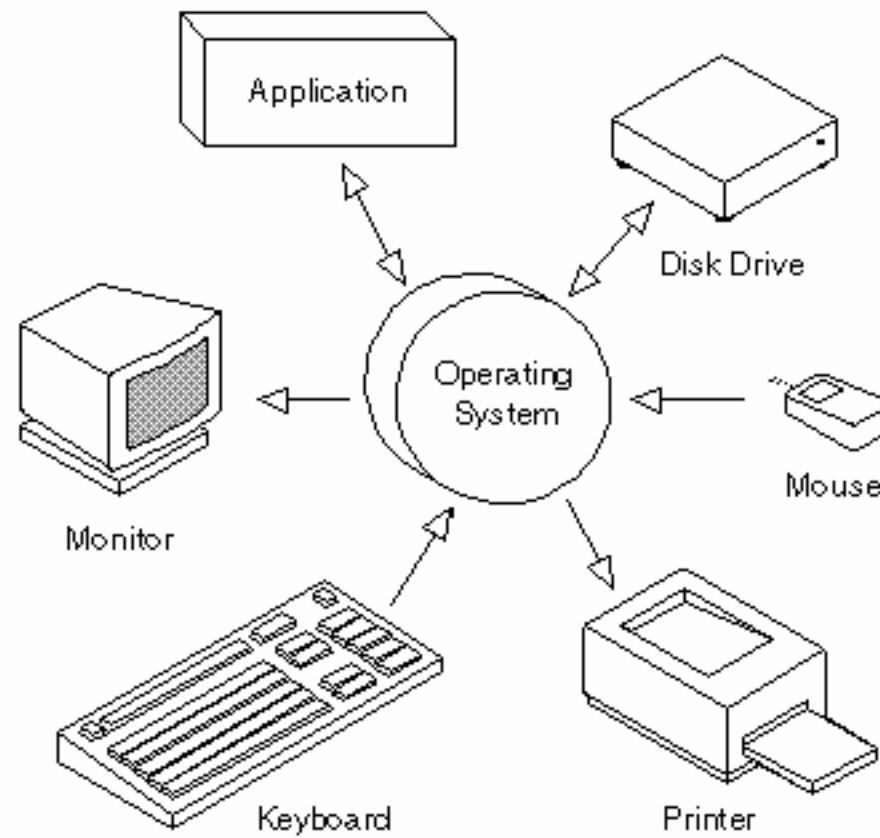
They called it Macintosh™.

And now we'd like to introduce
it to you.

Image from <http://www.my-two-cents.de/mac>.

History

Operating Systems



Source of image unknown.

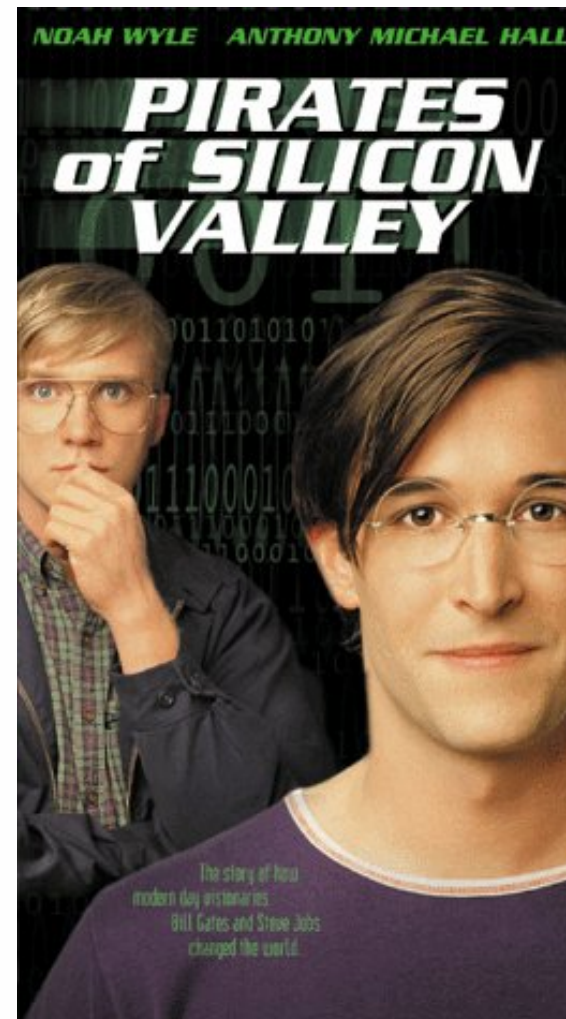
History



Pirates of Silicon Valley

"The revolution came when we weren't looking. It happened in a garage. In a dorm room. In countless hours of effort, imagining and intrigue. Apple® co-founder Steve Jobs and Microsoft® co-founder Bill Gates were changing the way the world works, lives and communicates.

The event-packed saga of the quirky visionaries who jump-started the future unfolds with exhilarating, cutting-edge style in *Pirates of Silicon Valley*. Noah Wyle (*ER*) portrays Jobs and Anthony Michael Hall (*The Breakfast Club*) portrays Gates in this chronicle of the fierce and often personal computer empire. 'The story is almost Shakespearean—it's a tale of lust, greed, ambition, love and hate,' writer/director Martyn Burke reflects. And it's a success story unlike any other."



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