

The History Of Computers: **Part III**

**You will learn about the history of the
microcomputer and of the Internet**

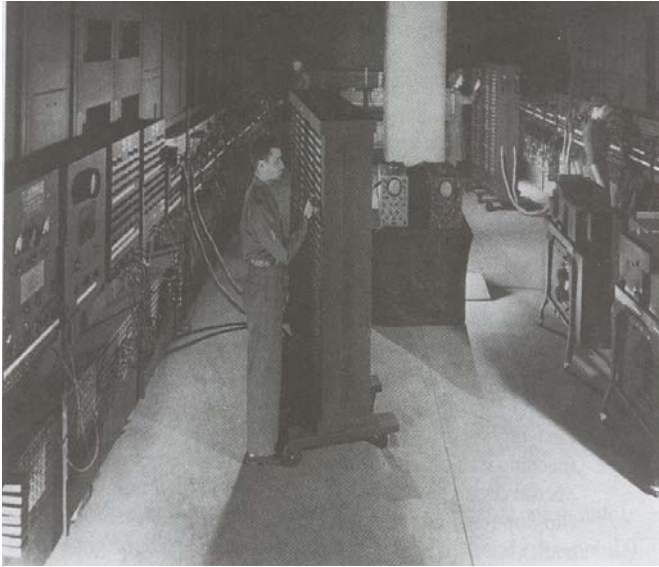
James Tam

History Of The Microcomputer

- The microprocessor
- The first home computer: Altair
- Microsoft and it's influence on Microcomputers
- The IBM-PC
- History of Apple computers
- The attack of the clones and the rise of Microsoft
- Intel Microprocessors
- The history of the Internet

James Tam

Computers: Before The Microprocessor



James Tam

The First Microprocessor

- Produced by Intel in the early 1970's
- It's development revolutionized computers by allowing computers to be more widely used.



The 4004 processor

James Tam

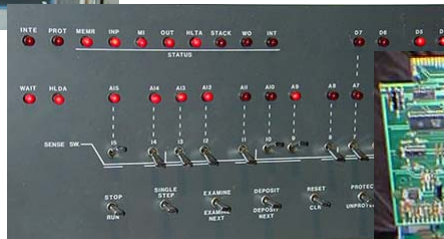
What Is Microcomputer?

- Sometimes it's referred to as a 'PC' (Personal Computer)

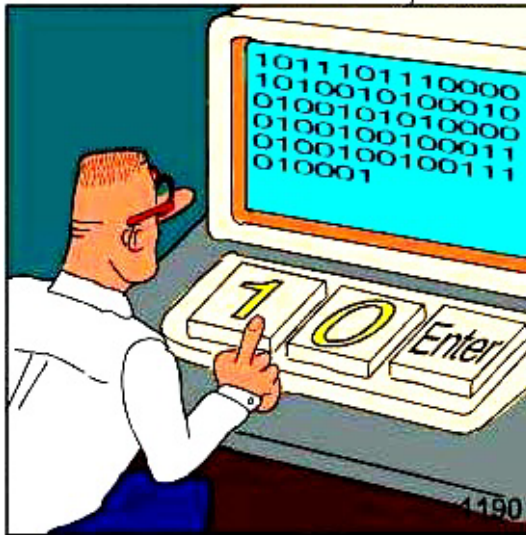


James Tam

The First Computer For Home Users: The Altair



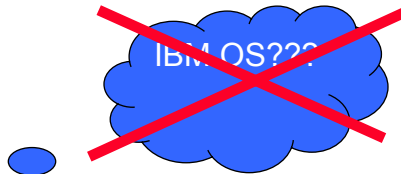
**Note: Most Computer Users At The Time Were
Extremely Technically-Oriented**



REAL Programmers code in BINARY.

James Tam

Microsoft's Influence On Microcomputers



James Tam

Microsoft's Influence On Microcomputers (2)

- IBM approached two companies as possible vendors of an operating system to run its computers:
 - Digital Research
 - Microsoft
- IBM and Microsoft worked out an arrangement to have a version of Microsoft's DOS (*Disk Operating System*) run IBM computers: PC-DOS

James Tam

Microsoft's Influence On Microcomputers (3)

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

```
C:\Documents and Settings\tamj>dir
Volume in drive C: is System Disk
Volume Serial Number is 7839-55BE

Directory of C:\Documents and Settings\tamj

02/17/2007  06:34 PM    <DIR>      .
02/17/2007  06:34 PM    <DIR>      ..
11/04/2003  03:11 PM    <DIR>      .java
11/04/2003  03:11 PM    <DIR>      .javaws
11/04/2003  03:11 PM    <DIR>      .jpi_cache
01/29/2004  02:07 PM    <DIR>      .plugin141_02.trace
02/13/2003  11:18 AM             3,226  =
02/13/2003  03:36 PM             0  AdobeWeb.log
02/07/2007  07:27 PM    2,592,068  cached-routers
02/08/2007  09:12 PM    12,216    cached-routers.new
02/24/2007  02:51 PM    <DIR>      cached-status
02/15/2003  04:01 PM    <DIR>      Contacts
02/22/2007  07:39 PM    <DIR>      Desktop
02/17/2007  06:36 PM    <DIR>      Favorites
02/13/2007  06:27 PM    <DIR>      8,422    gsview02.ini
02/05/2007  11:17 AM    <DIR>      junk
02/05/2007  11:17 AM    <DIR>      My Documents
04/05/2007  12:06 AM    <DIR>      My pictures and videos
10/19/2003  07:06 AM             24    presets.ini
10/19/2003  07:06 AM             0     plog
02/12/2007  08:37 PM    <DIR>      RECENT
02/08/2007  07:44 PM    <DIR>      Start Menu
12/13/2003  07:03 AM    23,040    state
12/13/2003  07:03 AM    4,131    suble_technologies.doc
11/19/2003  07:13 PM    <DIR>      T
02/29/2003  05:49 PM    <DIR>      VSWebCache
02/12/2004  02:25 PM    <DIR>      WINDOWS
02/19/2003  02:51 AM    <DIR>      zip utilities
08/19/2003  04:11 AM    502,744  o
02/01/2003  03:26 AM    3,236   f
02/01/2003  04:11 PM    24,852  f
12/27/2003  06:24 PM    4,131  U1
12/06/2003  07:39 AM    4,131  s
19 File(s) 3,155,041 bytes
17 Dir(s)  56,508,698,624 bytes free

C:\Documents and Settings\tamj>
```

Command

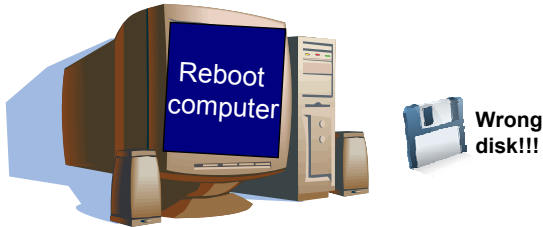
Effect of the command

James Tam

Microsoft's Influence On Microcomputers (4)

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

CP/M operating system

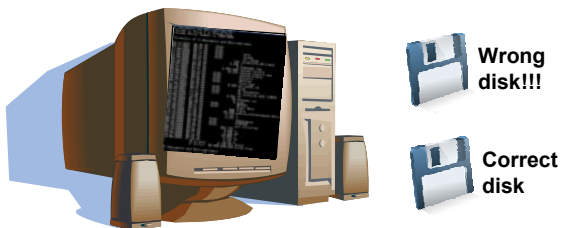


James Tam

Microsoft's Influence On Microcomputers (4)

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

PC/MS-DOS operating system



James Tam

Versions Of Microsoft Operating Systems

- PC/MS-DOS (many versions)
 - Windows 3.1
- Windows 95
- Windows 98
- Windows 2000
- Windows XP
- Windows Vista

James Tam

The IBM PC (Personal Computer: 1981)

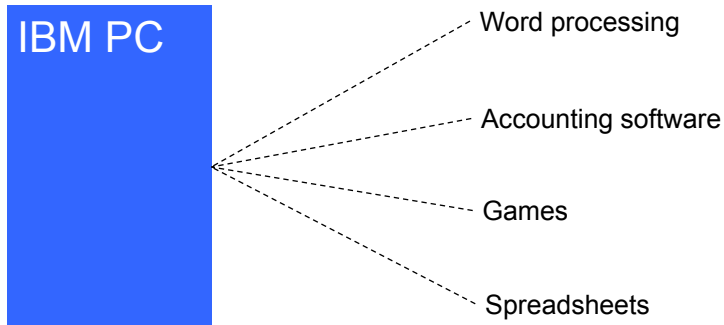


- IBM was a large company but a late comer into the personal computer market.
- As mentioned its machines used an operating system produced by Microsoft.

James Tam

The IBM PC (Personal Computer: 1981): 2

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



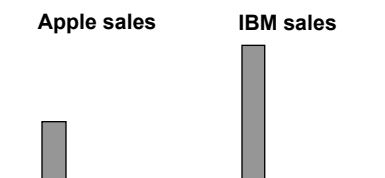
James Tam

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.



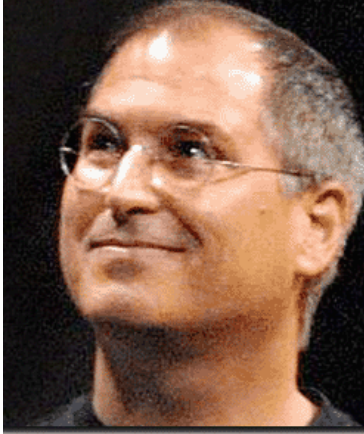
- Because of the prevalence of so much software the IBM-PC soon overtook the Apple in Sales



James Tam

The History Of Apple Computers: Steve And Steve

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



Steven Jobs



Steve Wozniac

James Tam

The Apple I Computer (1976)



© 1992 Smithsonian Institution

- Purportedly built under extreme conditions
- It was far from the standard of a modern computer

James Tam

The Apple II Computer (1977)



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

James Tam

The Apple II Computer (1977): 2



- The storage device was primitive by today's standards but sufficient to meet the needs of the time
- VisiCalc: *"It was the software tail that wagged the hardware dog"*

James Tam

The Apple Lisa (1984)



- The Lisa (1983) incorporated many of the features of the Xerox Star
- Like the star it was expensive (\$10K) and sales were weak

James Tam

The Apple Macintosh (1984)

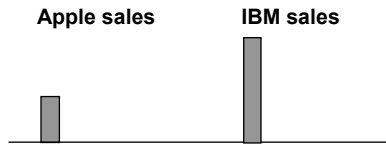


- Apple's next computer was the Macintosh
- It incorporated the best features of the Lisa but was sold at a substantially lower price.
- Also features not present in the Lisa were added to the Macintosh
- Compared to IBM-PC it was a speed vs. ease of use tradeoff

James Tam

The Attack Of The Clones

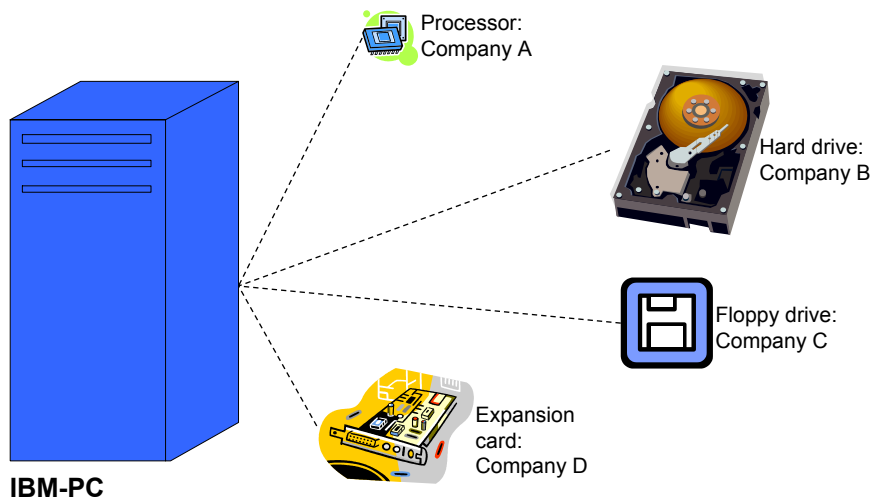
- Although it was a late entry into the microcomputer market IBM eventually dominated.



James Tam

The Attack Of The Clones (2)

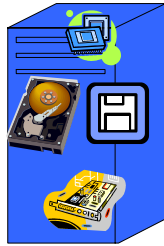
- Although the IBM-PC was marketed and sold under the IBM brand most of the parts were not manufactured in-house.



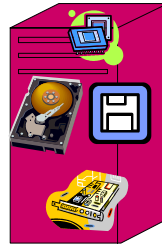
James Tam

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

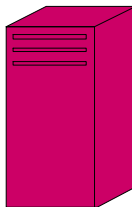


Compaq clone

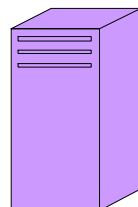
James Tam

The Attack Of The Clones (4)

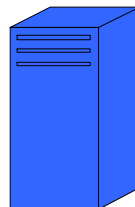
- This opened the flood gates for other computer manufacturers to produce their own clone computers.



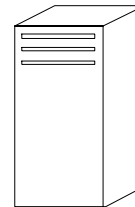
**Compaq
clone**



**Dell
clone**



IBM-PC

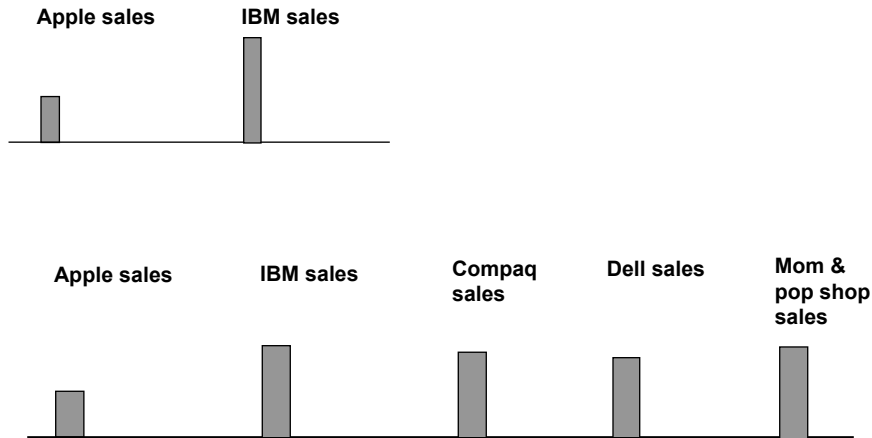


**Mom and pop
shop clone**

James Tam

The Attack Of The Clones (5)

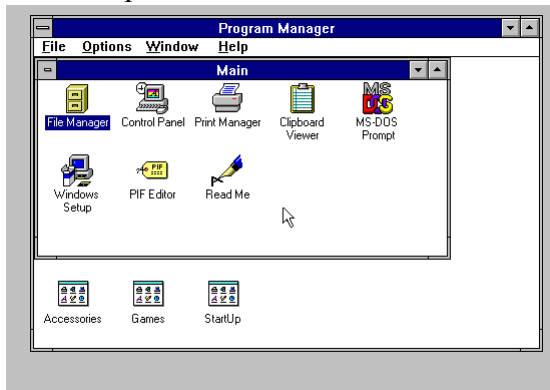
- The result was that IBM eventually lost control over the computer architecture that it invented.



James Tam

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 1990's Windows developed an interface for MS-DOS that incorporated some of the features of the MAC GUI.



Windows 3.1 © Microsoft

James Tam

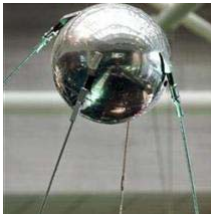
Intel Microprocessors

- Many of today's microcomputers are run by Intel microprocessors.
- Early processors were simply numbered e.g., 80286, 80386, 80486 etc.
- In a fashion similar to how the IBM-architecture was copied, other manufacturers produced their own version of the Intel processor.
- This practice ended when the Pentium line was released:
 - P5 architecture: first released in 1993 and had 3 times the core frequency of the 80486.
 - P6 architecture: first released in 1995 grew out of a desire to increase the number of instructions executed per clock.
 - P7 architecture: first released in 2000, the new architecture offered the ability to process more instructions per clock and reach even higher frequencies than its predecessors. Also the die size of the Pentium 4 processor was reduced.

James Tam

The Origins Of The Internet

- State of the US space program 1957: a sophisticated three stage rocket was planned as the first man-made vehicle to be spent into space.
- The USSR surprised the world by launching Sputnik I



- One of the reactions of the American government was the creation of the Advanced Research Projects Agency (ARPA) within the Ministry of Defense.

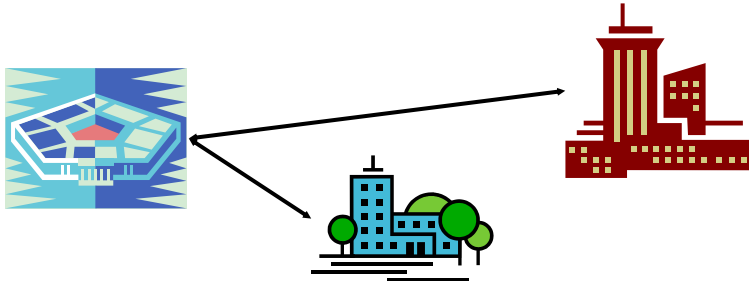
James Tam

The Origins Of The Internet (2)

- The main focus of ARPA was on national defense.



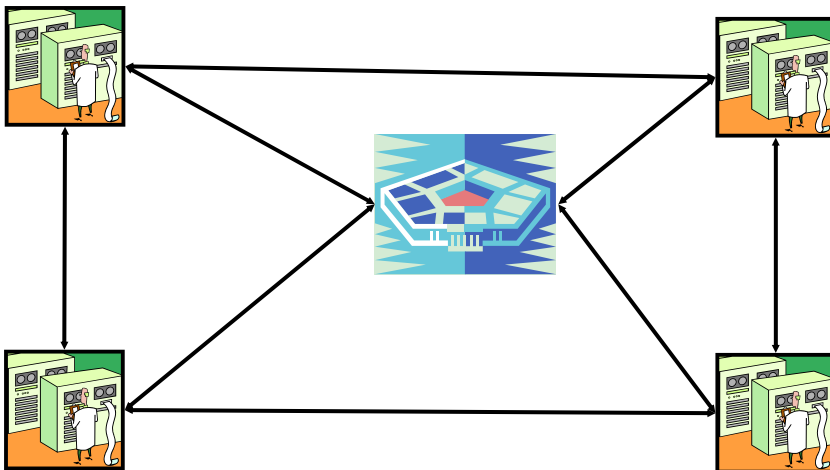
- But an important part of defense involved communications.



James Tam

The Origins Of The Internet (3)

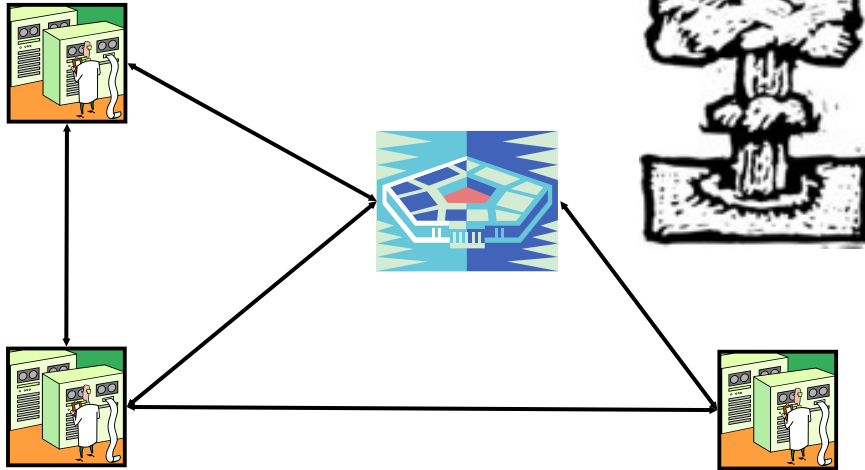
- Another motivator for research was to have computers functional in the advent of disaster



James Tam

The Origins Of The Internet (3)

- Another motivator for research was to have computers functional in the advent of disaster



James Tam

The Origins Of The Internet (4)

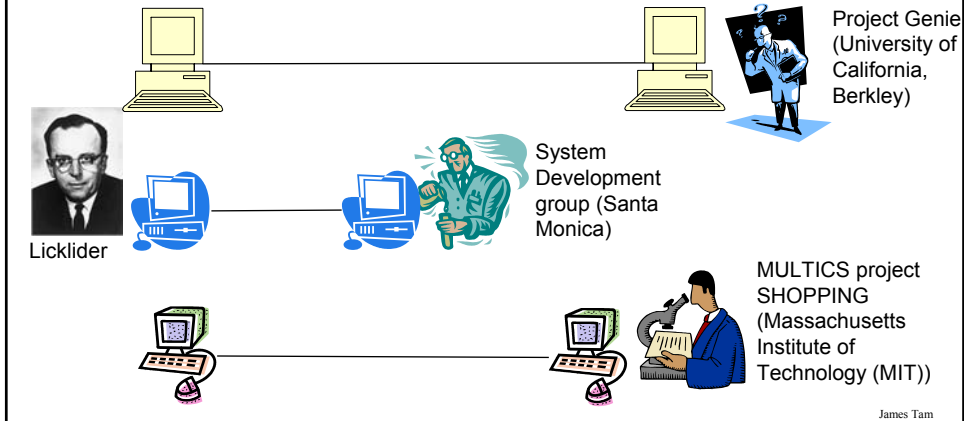
- Researchers working for ARPA needed computers to communicate and to share information



James Tam

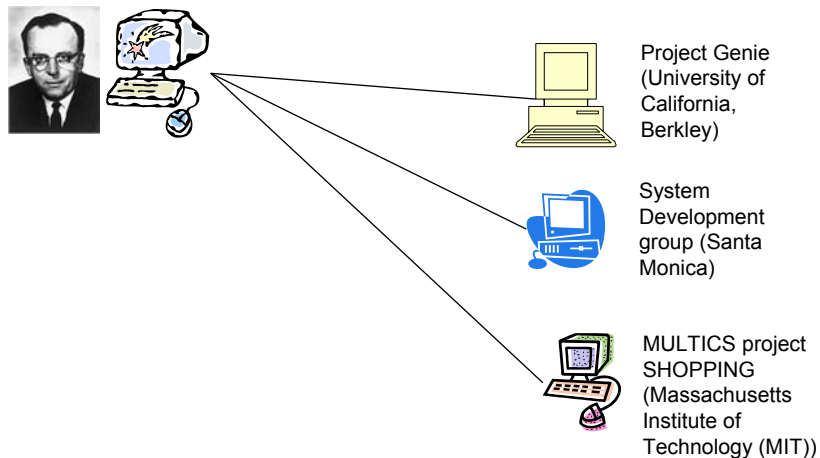
The Origins Of The Internet (5)

- Current approaches for connecting computers were unsatisfactory.
- J.C.R. Licklider headed the US Department of defense information processing office DARPA (Defense Advanced Research Projects Agency) - formerly ARPA.



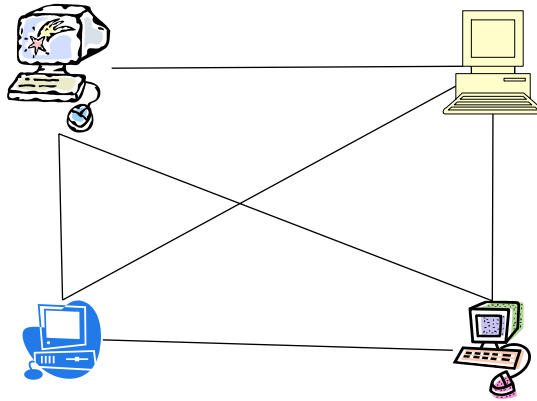
The Origins Of The Internet (6)

- Motivations driving the research at DARPA:
 1. Computers to be connected using a common language



The Origins Of The Internet (7)

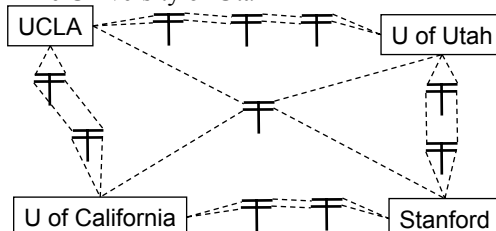
- Motivations driving the research at DARPA:
 2. Decentralized computing (usable in the advent of disaster)



James Tam

ARPANET

- The first computers were connected via ARPANET (Advanced Research Projects Agency Network).
- The initial ARPANET consisted of 2 host computers which were connected at the start of 1969 from the following locations:
 - UCLA
 - Stanford
- Later additional hosts were added to the network (end of 1969) from:
 - The University of California (Santa Barbara)
 - The University of Utah



James Tam

Important Milestones Of The ARPANET

- By the end of 1971 ARPANET linked 23 hosts.
- In 1972 the first "hot" application was introduced by Ray Tomlinson.
- 1976 Bell labs developed a language that allowed UNIX machines to communicate.
- Further expansions of the ARPANET community:
 - 1981 Bitnet was developed by City University New York linked university faculty regardless of discipline.
 - 1982 a European version of the UNIX network EUNET linked European researchers.
- 1985 the US National Science Foundation established NSFNET which now took over from APRPANET as the backbone of the network.
- In the 1980's the network continued to grow:
 - 1986 number of computer hosts reached 5000
 - 1987 the number of hosts reached 28000

James Tam

Important Milestones Of The ARPANET (2)

- However in the 1980's the main focus of the NSFNET was research.
 - NSFNET excluded "...purposes not in support of research and education."
- The private sector had to develop their own backbone:
 - 1987 the first Internet provider UUNET was founded.
 - But the Internet was still largely unused.
 - Main attractions for business: email, online discussion groups and chat facilities.
 - So although business could now access the Internet most of it's growth still driven by governments and academia.
- 1989 the number of hosts passed 100,000
- 1990:
 - The number of hosts climbed to 300,000
 - The ARPANET was shut down
 - The first Internet search engine: Archie was developed at McGill university

James Tam

Important Milestones Of The ARPANET (3)

- 1991
 - The restriction of commercial access to the backbone computers of NSFNET was removed.
 - WWW (World Wide Web) was released to the public.

James Tam

The History Of The World Wide Web



- Designed in 1989 by Tim Berners-Lee and scientists in Geneva who were interested in making it easier to share research documents.
- Documents could be linked through a protocol called http (hyper text transfer protocol).
- Documents were made available for free browsing and downloading from the web (*substantially* easier than the alternative).
- 1990 the first web browser “WorldWideWeb” was written.
- 1993 Mark Andreessen of NCSA (National Center for Super Computing Applications) launched Mosaic X the first popular web browser.

James Tam

The History Of The World Wide Web (2)



- Prior to the advent of the web the Internet was largely used by a niche user group.
- The advent of the WWW drastically changed that.

James Tam

Milestones Of The WWW

- 1994 there were over 3 million hosts and 3,000 web sites.
- 1995 there were over 6 million hosts and 25,000 web sites.
- 1996 there were over 12 million hosts and over 250,000 web sites.
- 1997 the number of hosts exceeded 19 million with over 1 million web sites.
- 2001 the number of hosts approximately 110 million and the number of web sites reaching 30 million.

James Tam

You Should Now Know

- 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
- How the rise of clone computers lead to the market dominance of Microsoft in the microcomputer market

James Tam

You Should Now Know (2)

- The history of Intel microprocessors
- The history behind the origins of the Internet:
 - What was the initial motivation for developing the Internet and what factors later affected its development
 - What were the agencies behind its development
- The history of the ARPANET
- The history of the World Wide Web

James Tam