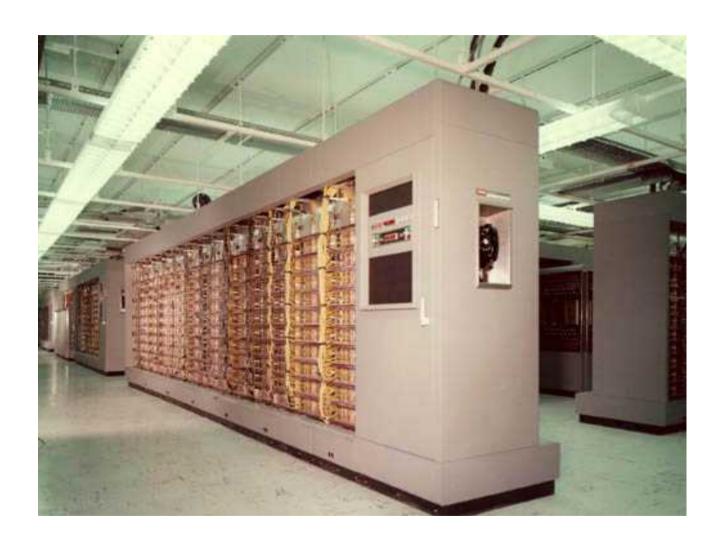# Generation of Computers

- Use of computers expanded after UNIVAC I.
- Generations of computer systems based on technology.
  - First Generation (1951 – 1959)
  - Second Generation (1959 – 1965)
  - Third Generation (1965 – 1971)
  - Fourth Generation (1971 -- ?)

First Generation (1951 – 1959)

- Built using Vacuum tubes.

- Magnetic drum as memory.

- Later magnetic tape drives as storage.

  - Sequential access of data.

- Tubes

  - Great heat, poor reliability

  - Special rooms with heavy air conditioning

  - Frequent maintenance

First Generation Computer

http://en.wikipedia.org/wiki/File:SAGE_computer_room.jpg

Second Generation (1959 – 1965)

- Constructed using transistors.

- Memory using magnetic cores

  - Tiny doughnut shaped devices combined using wires to form memory.

- Magnetic Disk.

  - Faster than magnetic tape.

  - Random access.

Second Generation Computer

http://en.wikipedia.org/wiki/File:Titan_computer.jpg

Third Generation (1965 – 1971)

- Transistors and other components assembled by hand on printed circuit boards.

- Start of Integrated Circuits (IC)

  - Moore's Law – Number of circuits that could be placed on an IC was doubling every year.

- Memory made using transistors.

- The terminal – and input/ output device with a keyboard and screen – was introduced.

Third Generation Computer

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http://en.wikipedia.org/wiki/File:Data_General_NOVA_System.jpg

Fourth Generation (1971 - ?)

- Large scale integration of components.

  - 1000s of components in a chip in 1970s.

  - Computer on a chip now.

  - Moore's Law restated – Chip density doubling every 18 months.

- Rise of Personal Computers (PC)

Fourth Generation Computer

http://en.wikipedia.org/wiki/File:Apple_II.jpg

Software Generations

- Computer software can be thought of as belonging to several distinct generations:

  - First Generation (1951 – 1959)

  - Second Generation (1959 – 1965)

  - Third Generation (1965 – 1971)

  - Fourth Generation (1971 – 1989)

  - Fifth Generation (1990 – Present)

First Generation Software (1951 – 1959)

- Machine Language – instructions built into electric circuits.

- Assembly languages – first artificial programming languages.

- Software translators – assemblers.

- System programmers.

Second Generation Software (1959 – 1965)

- Development of High-level languages.

    - FORTRAN for scientific computing.

    - COBOL for business computing.

    - LISP for artificial intelligence.

- Same program could be run on multiple computers.

- Compilers developed.

- Application programmers as a distinct group.

Third Generation Software (1965 – 1971)

- Operating System – computer resources under the control of the computer.

- Loaders and Linkers.

- Time sharing – many users in different terminals communicating with a single computer at the same time.

- General purpose application programs.

- Computer users as a distinct group from programmers.

Fourth Generation Software (1971 – 1989)

- Structured Programming – Pascal, BASIC, C, C++.

- UNIX, DOS, Macintosh systems.

- Readily available application software packages:

  - Spreadsheets.

  - Word Processors.

  - Database Management Systems.

Fifth Generation Software (1990 – Present)

- Office suites.

- Object Oriented development – C++, Java, C#.

- World Wide Web – HTML, Javascript.

- Web Browsers – text based to modern graphical browsers.

- Web browsers as a platform – the rise of web apps.

Thank You.