

CS1110: Computer Science I

Chapter 1

What Is a Computer?

- A computer is a device capable of performing computations and making logical decisions
 - At a speed billions of times faster than humans
- Computers process data under the control of sets of instructions called computer programs

The First Computer

- ENIAC (Electronic Numerical Integrator and Computer)
 - first large-scale, electronic, digital computer capable of being reprogrammed to solve a full range of computing problems
 - Born on 2/15/46 at UPenn
 - 30 tons, 1800 feet², 150 kW
 - cost \$500,000
 - 5000 additions or 385 multiplications per second



Personal Computer

- Tom Watson, founder of IBM, predicted that there was a world market for about 5 computers.
- 1981 IBM PC
- 1977 Apple II
- 1973 Xerox Alto
 - Mouse, GUI, object-oriented OS and development tools, and Ethernet card!
- Moore's Law: capacities of computers double every one or two years while prices remain constant

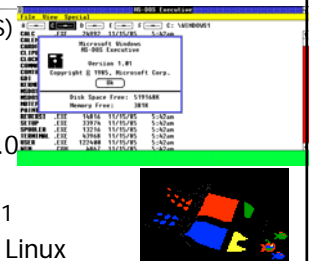


Computer Organization

- Input/Output Units
- Memory Unit
- Arithmetic and Logic Unit (ALU)
- Central Processing Unit (CPU)
- Secondary Storage Unit

PC Operating Systems

- 8/1981: MS-DOS(QDOS) 1.0
 - 1997: MS-DOS 7.1
- 11/1985: Windows 1.0
- 5/1990: Windows 3.0
 - 10 millions sold
 - 4/1992: Windows 3.1
- Biggest competitor: Linux
 - Free open-source OS



Machine and Assembly Languages

- Machine languages consist of strings of numbers
 - The only language a computer can understand directly
 - Machine-dependent
- English-like abbreviations form the basis of assembly languages.
 - Assemblers convert it to machine language

High-level Languages

- High-level languages contain English words and conventional mathematical notations.
 - Compilers v.s. Interpreters

```
+1300042774    LOAD BASEPAY    grossPay = basePay +
+1400593419    ADD OVERPAY     overTimePay
+1200274027    STORE GROSSPAY
```

C, C++, Java

- C was developed by Dennis Ritchie at Bell Labs in 1973
 - Development language for UNIX
- C++ was developed by Bjarne Stroustrup in early 1980s at Bell Labs
 - Object-oriented programming
- Java was released in 1995
 - Designed for Web applications
- Other high-level languages
 - Fortran(50s), COBOL(59), Pascal(71), Ada(80s)

C#

- Microsoft announced C# in 2000
 - Integration of programs in different language
 - Programs for mobile electronic devices
 - Designed specifically for .NET, has roots in C, C++, Java
 - It is an event-driven, object-oriented programming language

.NET

- Microsoft announced .NET in 2000
 - To embrace the Internet and the Web in the development and use of software
 - .NET can exist on multiple platforms
 - Web services, language interoperability
- Common Language Runtime (CLR) executes .NET programs
 - Programs are compiled into Microsoft Intermediate Language (MSIL)
 - MSIL is then translated into machine language