

6. Implementation Methods

Primary components of a computer:

- Internal memory: stores programs and data
- Processor: realizes primitive operations, or machine instructions (arithmetic and logic) or also called macroinstructions.
 - Microinstructions [*more of a hw concept*]

Machine language

- is the set of macroinstructions of a specific computer
- its own machine language is the only language that most hw comps can understand.

Chapter 1

Programming Languages

1

Language Implementation System (LIS)

The software that provides the high-level language i/f to a computer.

Operating System (OS)

Large collections of progs that supplies higher-level primitives than those of the mach.lang.

- System resource mgmt
- i/o operations
- file mgmt system
- text and/or program editors

Chapter 1

Programming Languages

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- LISs need many of the OS facilities therefore interface to the OS rather than directly to the processor (or machine language)
- OS and LISs are layered over the mach.lang. i/f of a computer and can be thought of as **virtual computers** that provides an interface to users at higher levels.
- See Figure 1.2

Chapter 1

Programming Languages

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Implementation of PLs

- **Compiler implementation:**
 - programs are translated to machine language and then executed directly on the computer
 - slow translation
 - fast execution
- **Pure Interpretation**
 - programs are interpreted by another program called an interpreter that simulates a machine in software
 - 10 to 100 times slower than compiled programs
 - requires more space for source code and symbol table
 - only suitable for langs with simple structure, like LISP
- **Hybrid Implementation Systems**
 - programs are translated into an intermediate language and then interpreted by an interpreter
 - small translation cost
 - medium execution speed

Chapter 1

Programming Languages

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