

System Programming

Second Class

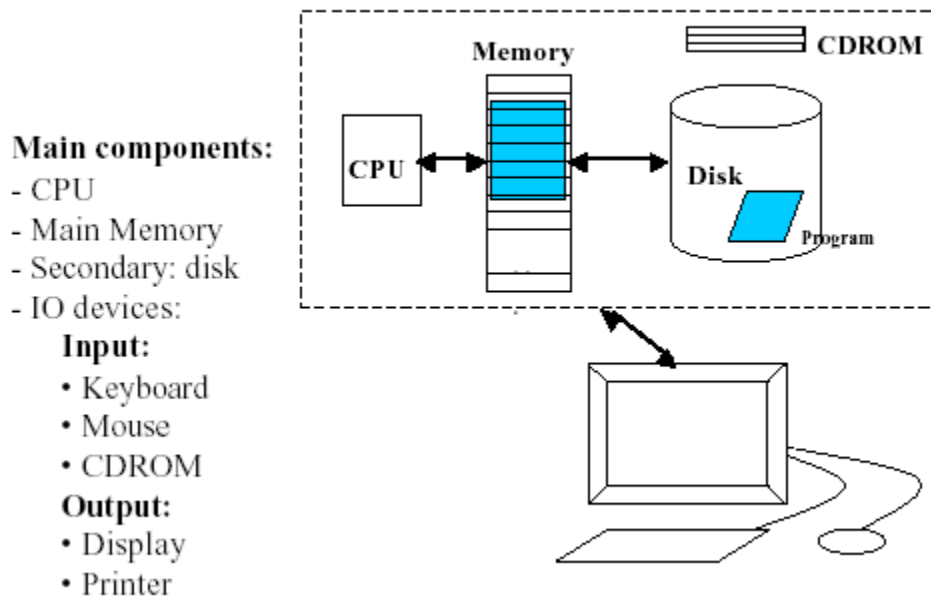
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CHAPTER TWO (Introduction to system software)

Introduction System Programming:

- 1) Hardware
- 2) Software

Typical Computer Structure



A) Application Programs

Primarily concerned with the solution of some problem, using the computer as a tool. The focus is on the application, not the computing system.

B) System Programs

- i) Intended to support the operation and use of the computer itself, rather than any particular application.
- ii) Usually related to the architecture of the machine on which they are to run. (assemblers, compilers, operating systems, etc...)
- iii) Most system software is machine-dependent.

System software consist of a variety of program that support the operation of a computer. System programs were developed to make computers better adapted to the needs of their users. It allow us to focus on application without knowing details of machine.

Definition of system software:

System software consists of a variety of programs that support the operation of computer.

Examples of system software are text editor, compiler, loader or linker, debugger, macro processors, operating system etc.

1. Text editor is used to create and modify the program.
2. Compiler translate the user program into machine language.
3. Loaders are system programs that prepare machine language programs for execution.
4. Debugger helps to detect errors in the program.
5. A translator is used to translate the assembly code into machine code.

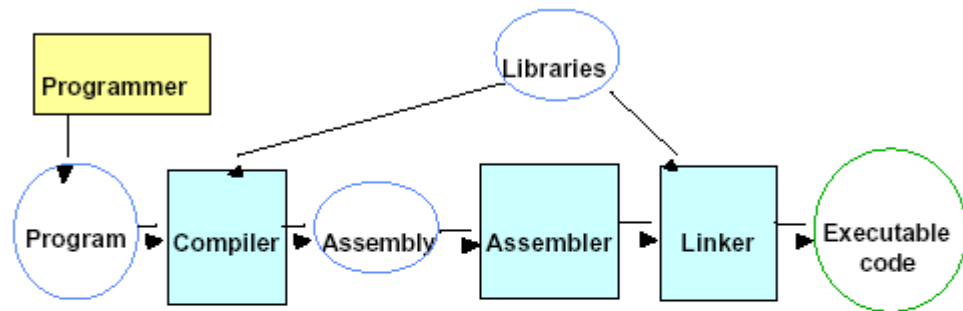
This translator is called an assembler.

The translated programs were prepared for execution by the loader or linker and may have been tested using the debugger. The most important system software is the operating system, which is an integrated system of programs that manages the system resources, and provides various support services such as the computer executing the application programs of users.

System software and machine architecture:

System software is strongly machine dependent. Most of the system software differs from application software in terms of machine dependency. Application program is used to solve some problem using the computer as a tool. System program are intended to support the operation and use of the computer itself. System software that do not directly depends upon the type of computing system being supported. For example, the code optimization techniques used by compilers are independent of the target machine.

“Building” a Program



`z = x + y;`

```
load  r1, x
load  r2, y
add   r3, r1, r2
store r3, z
```

```
1100 0110
1010 1111
0101 1000
1010 1111
0101 1000
0000 1001
1100 0110
0000 1001
```

Running the Program

- ❑ *Loader* puts the program into the computer memory
- ❑ Running the program is done by an Operating System command
- ❑ Input are read from the I/O devices and from Memory
- ❑ Output is written to I/O devices and to Memory

