Becoming independent

Windows API introduction

Assembly language programming
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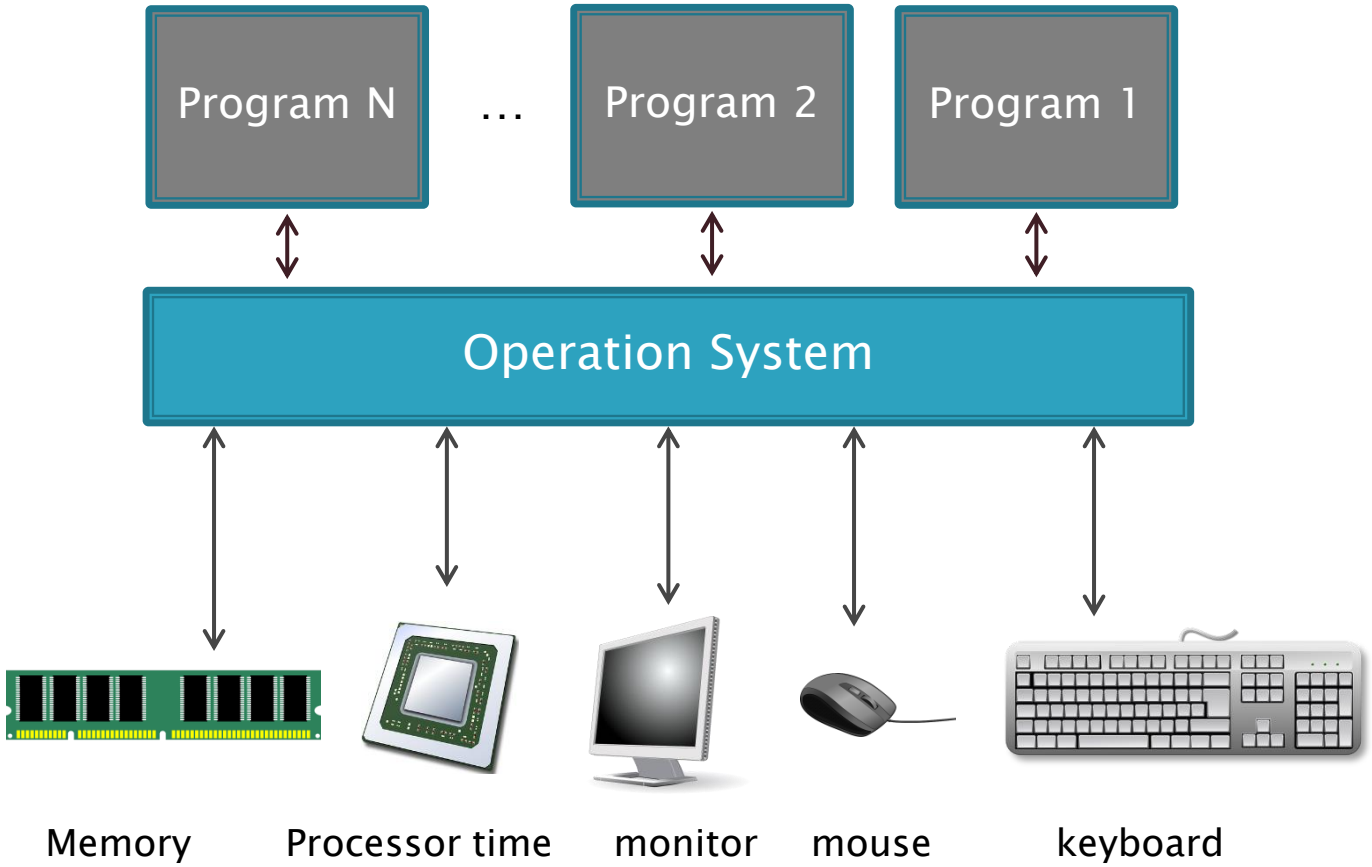
Getting Along

- Your program lives together with other programs on the same computer.
- How do the programs get along?
  - How can more than one program run on the same processor?
  - Which program gets to read the mouse movements at a specific moment?
  - Who gets to write to a specific pixel on the screen?
- The operation system has full control over the computer.
  - It shares the resources between the programs.
  - Programs have to send “requests” to the operation system.

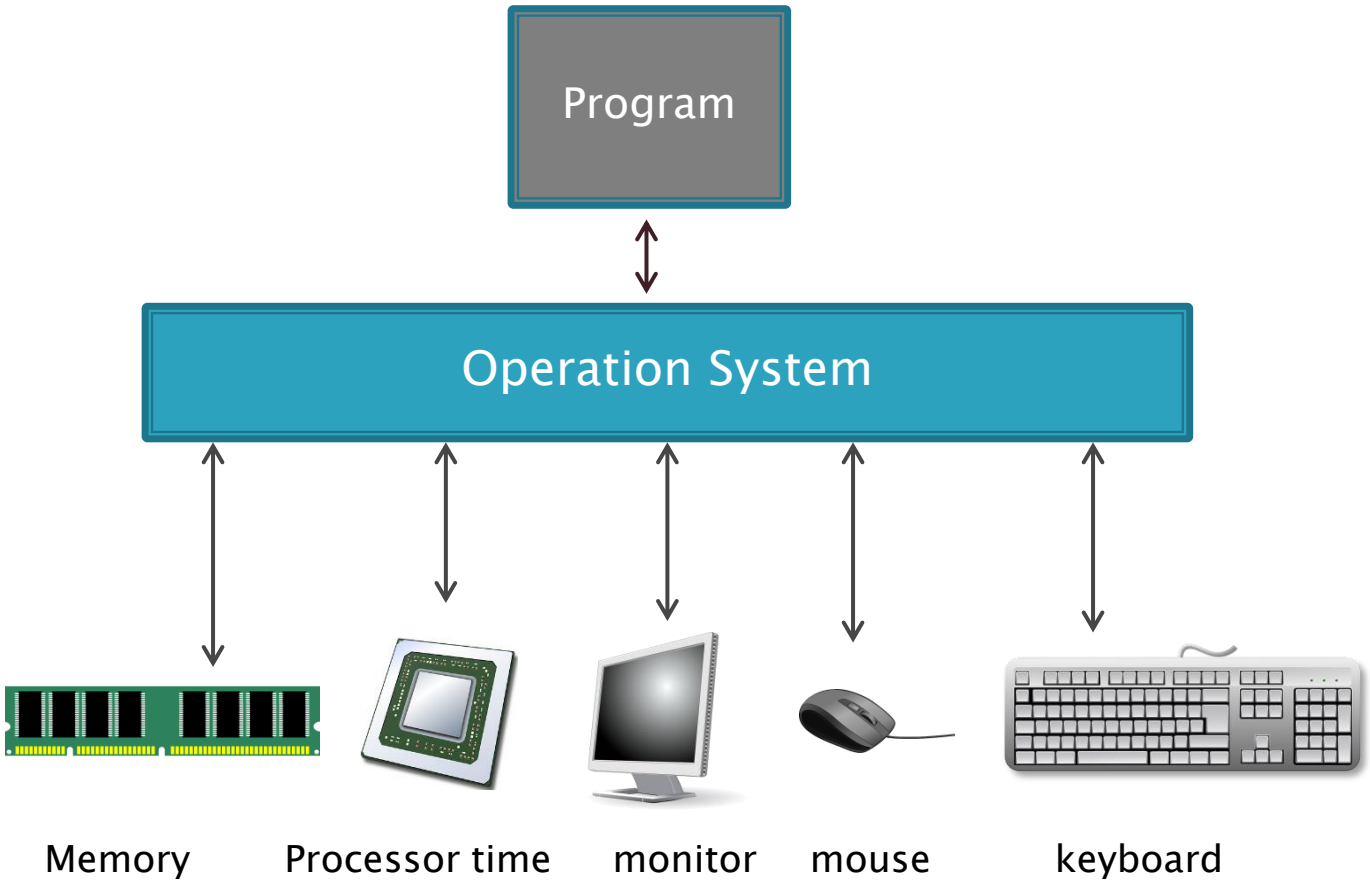
Getting Along (Cont.)



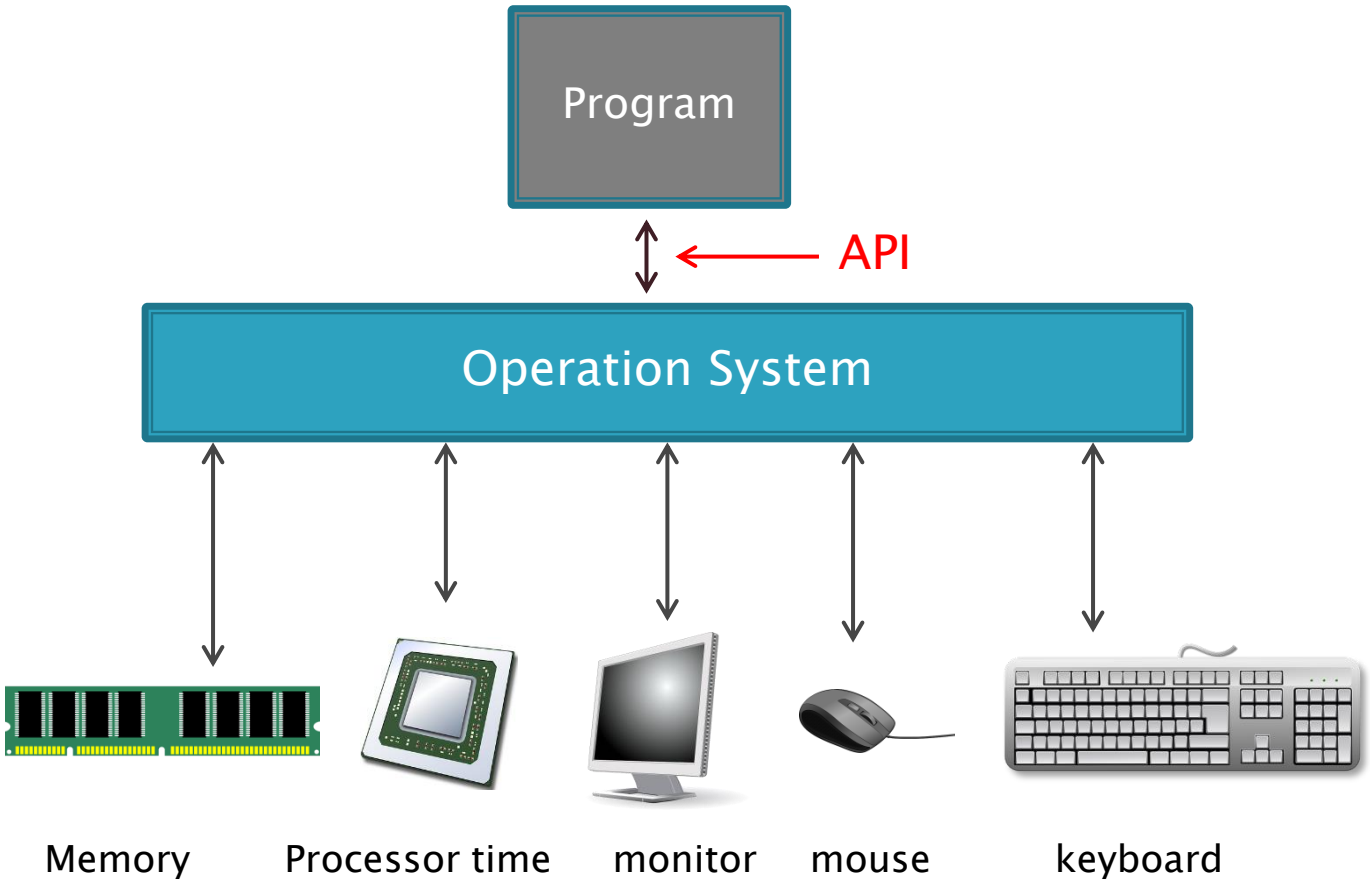
Talking to the OS

- Your program has no direct access to the system resources.
  - In the past, programs did have such direct access.
- Instead, programs can only communicate with the operation system.
- Communication is done using special functions called API functions.
  - API – Application Programming Interface.

Talking to the OS (Cont.)



Talking to the OS (Cont.)



Windows API

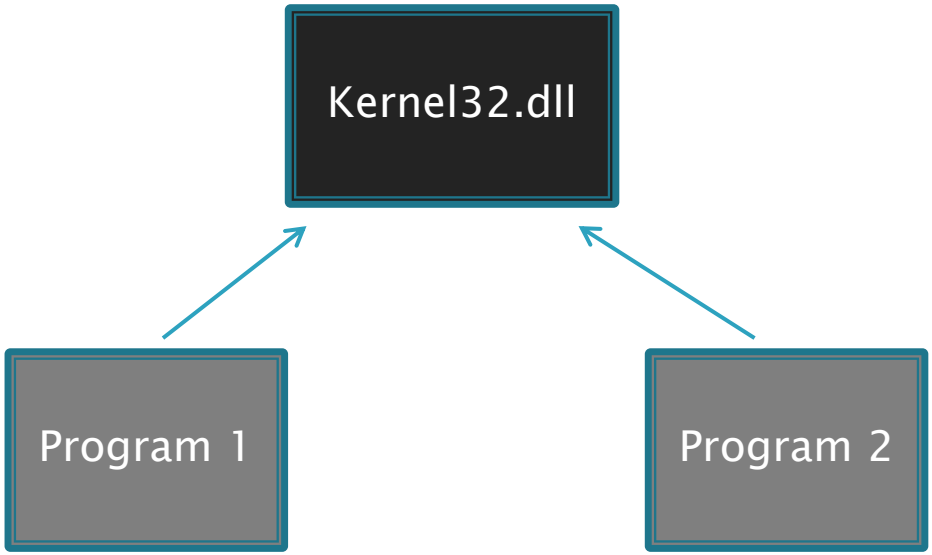
- A set of functions provided by the Windows operation system.
  - Used to communicate with the Windows operation system.
- Show up in the form of DLL files.
- Follow the STDCALL convention.
- Almost every windows program relies on a few API functions.

DLLs

- DLL – Dynamic Link Library.
- An executable file (PE) without an entry point.
  - Contains functions.
- Other programs can “link” to DLL files.
  - In order to use their functions.
- Shared libraries
  - Only one instance of a DLL is loaded to physical memory – To save space.

DLLs (Cont.)

- DLLs are loaded to physical memory only once.
- One DLL could be used by many different programs at the same time:



DLLs (Cont.)

- Not every DLL belongs to the operation system.
- You could even create DLLs yourself.
- Not every DLL supplies windows API.

Common API DLLs

- kernel32.dll
  - File systems, Memory management, Processes, Threads, Error handling.
- user32.dll
  - Windows GUI: windows, buttons, mouse and keyboard input etc.
- gdi32.dll
  - Graphics: Outputting to monitors, printers etc.
- There are much more.

Documentation

- Microsoft Developer Network (msdn)
  - **www.msdn.com**
  - Contains full documentation for the windows API.

Summary

- Programs do not have direct access to the system resources.
  - They have to talk to the operation system.
  - This is done using API function calls.
- Windows API access is done by calling functions inside specific DLL files.
- **msdn.com** contains a full documentation for the Windows API.