

CSCE 451/851

Operating Systems Principles

History of Operating Systems & Basic Operating System Concepts

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CSCE 451/851
Introduction & History of OS

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What is an Operating System?

- A program
- An interface
- A programming environment
- A resource manager
- A service provider

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Introduction & History of OS

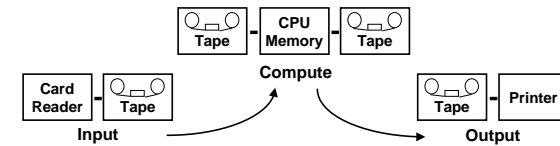
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Why do we need operating systems?

- They provide a high-level abstraction of physical resources
- They allow sharing of limited or expensive physical resources

A brief history of Operating Systems

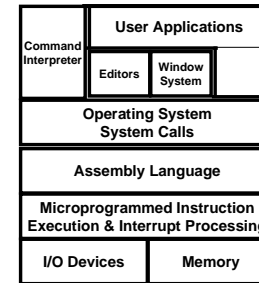
- Hand programmed machines ('45-'55)
- Batch processing/Off-line processing ('55-'65)



A brief history of Operating Systems

- On-line processing ('62-'69)
- Multiprogramming ('65-'80)
- Timesharing ('70-)
- Personal computing ('80-)

What is an Operating System Today?

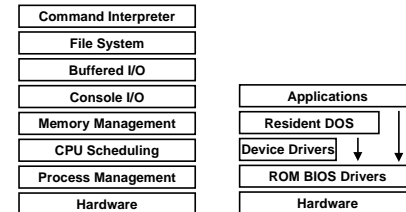


Basic Operating System Functions

- **Device management**
 - » Programmed I/O
 - » DMA
- **Secondary storage management**
- **File systems**
- **Memory management**
- **Process management**
- **Protection & Security**
- **Network communications**

Operating System Structures

● Layered

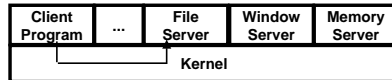


● Monolithic

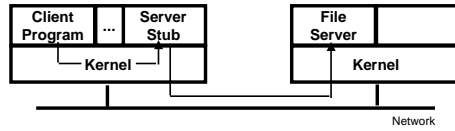
Operating System Structures

- Client/Server or “Microkernel”

- » Centralized



- » Distributed



Basic Operating System Concepts

- A process
- An address space or context

Basic Operating System Concepts

A system call

Example: Programmed I/O

```
process UserProg
begin
:
read(file, buffer, #bytes)
:
end UserProg

procedure Read(file, buff, bytes)
begin
:
Read(file, buff, bytes)
:
end Read

_Read:
LOAD r1, @SP+2
LOAD r2, @SP+4
LOAD r3, @SP+6
TRAP Read_Call
```

The diagram illustrates a system call. An arrow points from the `read(file, buffer, #bytes)` line in the `UserProg` process to the `Read(file, buff, bytes)` line in the `Read` procedure. Another arrow points from the `end Read` line back to the `_Read:` label, indicating the return path.

Course Overview

What sorts of things will I learn in CSCE 451/851?

- Why do I have to reboot my Mac/PC every other day while my workstation runs for months?
- Why when I add a faster disk to my system, overall performance degrades?
- How can I process a 100MB image on my machine with 10MB of RAM?
- How can I edit a file that resides on a remote computer as quickly as a file that resides on my machine?