Cheatography

CSE 120 Cheat Sheet

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Fundamental OS Issues

Structure
How is an operating system organized?

Sharing
How are resources shared among users?

Naming
How are resources named (by users and programs)?

Protection
How are users/programs protected from each other?

Security
How can information access/flow be restricted?

Communication
How to exchange data?

Reliability and fault tolerance
How to mask failures?

Extensibility
How to add new features?

Concurrency
How to control parallel activities?

Performance
How to make efficient use of resources, reduce OS overhead?

Scale and growth
How to handle increased demand?

Compatibility
Can we ever do anything new?

Distribution
How to coordinate remote operations?

Accountability
How to change for/restrict use of resources?

The **principles** in this course are the design **methods**, **approaches**, and **solutions** to these issues

What is an operating system?

The OS is the software layer between user applications and the hardware

The OS and Hardware

The OS *abstracts/controls/mediates* access to hardware resources:

Computation (CPUs)

Volatile storage (memory) and persistent storage (disk, etc.)

Communication (network, modem, etc.)

Input/output devices (keyboard, display, printer, camera, etc.)

The OS defines a set of logical resources (*objects*) and a set of well-defined operations on those objects (*interfaces*):

Physical resources (CPU and memory)

Logical resources (files, programs, names)

Benefits to applications:

Simpler (no tweaking device registers)

Device independent (all network cards look the same)

Portable (across Windows95/98/ME/NT/2000/XP/VISTA/...)

Transportable (same program across different OSes (Java))