

EI338: Computer Systems and Engineering

(Computer Architecture & Operating Systems)

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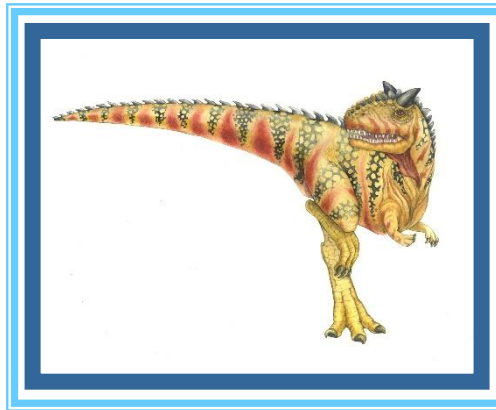
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Download Lectures

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Summary





Questions & Answers

- Face to face Q & A
- Time: 1:30pm to 4:30pm on Dec. 28th (Thursday)
- Place: Room 513, SEIEE-3 Building





About The Final Exam (1)

- East Central Building (东中院) 3-401
- On Jan. 3rd (Wednesday)
- Time: 13:10-15:10
- Close Book
 - Computer Architecture 40%
 - Operating System 60%





About The Final Exam (2)

■ Question Types

■ Blank Filling (20%)

■ Definitions

给定义，写名词

■ Pseudo Codes in Projects

书上的&project中的代码，比如进程同步

■ Questions (~30%)

■ Calculations (~50%)





OS-Chapter 1: Introduction

- Operating Systems Definitions
- Operating-System Structure
- Operating-System Operations
- Computer-System Architecture
- Computer-System Organization
- Interrupt, DMA, Cache
- Storage Hierarchy
- Process Management
- Memory Management
- Storage Management
- Multiprocessor Systems/Multi-core Systems
对称/非对称
- Distributed Systems





OS-Chapter 2: Operating-System Structures

- Operating System Services
- User Operating System Interface (CLI, GUI)
- System Calls
- Types of System Calls
- System Programs
- Operating System Design and Implementation
- Operating System Structure
 - Microkernel system structure
- System Boot

Layer
Microkernel
Modules





OS-Chapter 3: Processes

- Process Concept
- Process State
- Process Control Block (PCB)
- Process Scheduling
 - Context switch
- Operations on Processes (Creation and Termination) fork()
abort() exit()
- Interprocess Communication
 - Communication Models
 - Communication in Client-Server Systems





OS-Chapter 4: Threads

- Multithreading Concepts
- Multithreading Models
 - Many-to-One
 - One-to-One
 - Many-to-Many
- Thread Libraries
 - Pthread
- Threading Issues





OS-Chapter 5: CPU Scheduling

- Scheduling Concepts
- Scheduling Criteria Turnaround time
Response time
Waiting time
- Scheduling Algorithms
 - FCFS
 - SJF
 - Priority Scheduling
 - Round-Robin (RR)
 - Multi-core Scheduling





OS-Chapter 6: Process Synchronization

IMPORTANT

- Background
- The Critical-Section Problem
- Peterson's Solution
- Synchronization Hardware
- Locks, Semaphores
- Classic Problems of Synchronization
 - Bounded Buffer
 - Readers-Writers
 - Dining Philosophers
- Monitors
- Atomic Transactions





OS-Chapter 7: Deadlocks

IMPORTANT

- The Deadlock Problem
- Deadlock Characterization
- Methods for Handling Deadlocks
 - Resource-Allocation Graph
 - Banker's Algorithm
- Deadlock Prevention
- Deadlock Avoidance
- Deadlock Detection
- Recovery from Deadlock





OS-Chapter 8: Memory Management

IMPORTANT

- Background
- Swapping
- Contiguous Memory Allocation
- **Paging**
- **Structure of the Page Table**
- Segmentation
- Example: The Intel Pentium



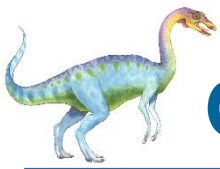


OS-Chapter 9: Virtual Memory

IMPORTANT

- Background
- Demand Paging
- Copy-on-Write
- Page Replacement Algorithm
 - FIFO
 - Optimal
 - LRU
- Allocation of Frames
- Thrashing
- Memory-Mapped Files
- Allocating Kernel Memory
- Other Considerations





OS-Chapter 10: File-System Interface

- File Concept
- Access Methods
- Directory Structure
- File-System Mounting
- File Sharing





OS-Chapter 11: File System Implementation

- File-System Structure
- File-System Implementation
- Directory Implementation
- Allocation Methods
- Free-Space Management

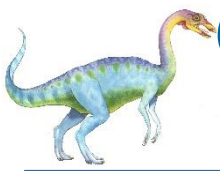




OS-Chapter 12: Mass-Storage Systems

- Overview of Mass Storage Structure
- Disk Structure
- Disk Attachment
- Disk Scheduling
- Disk Management
- Swap-Space Management
- RAID Structure





CA-Chapter 1: Fundamentals of Quantitative Design and Analysis

- Introduction
- Quantitative Principles of Computer Design
- Classes of Computers
- Computer Architecture
- Trends in Technology
- Trends in Cost
- ■ Dependability
 - MTTF, MTTR
- ■ Performance
 - Amdhal's law





CA-Chapter 2 & Appendix B: Memory Hierarchy Design

- Memory Hierarchies
- Six Basic Cache Optimizations
- Ten Advanced Cache Optimizations
- Calculate Memory Access Time based on Miss Rate.

IMPORTANT

memory access time





CA-Appendix A & C: Instruction Set Principles and Pipelining

- Instruction Set Architecture
- Classifying ISAs
- Encoding the Instruction Set
- 5 stage pipelining
- Structural and Data Hazards
- Forwarding
- Branch Schemes





CA-Chapter 3: Instruction-Level Parallelism and Its Exploitation

- ILP

- Loop unrolling

- Static Branch Prediction

- Dynamic Branch Prediction



S.O.A.B!

Merry Christmas!

Happy Chinese New Year!

Wish all students have good grades!

End of Summary

