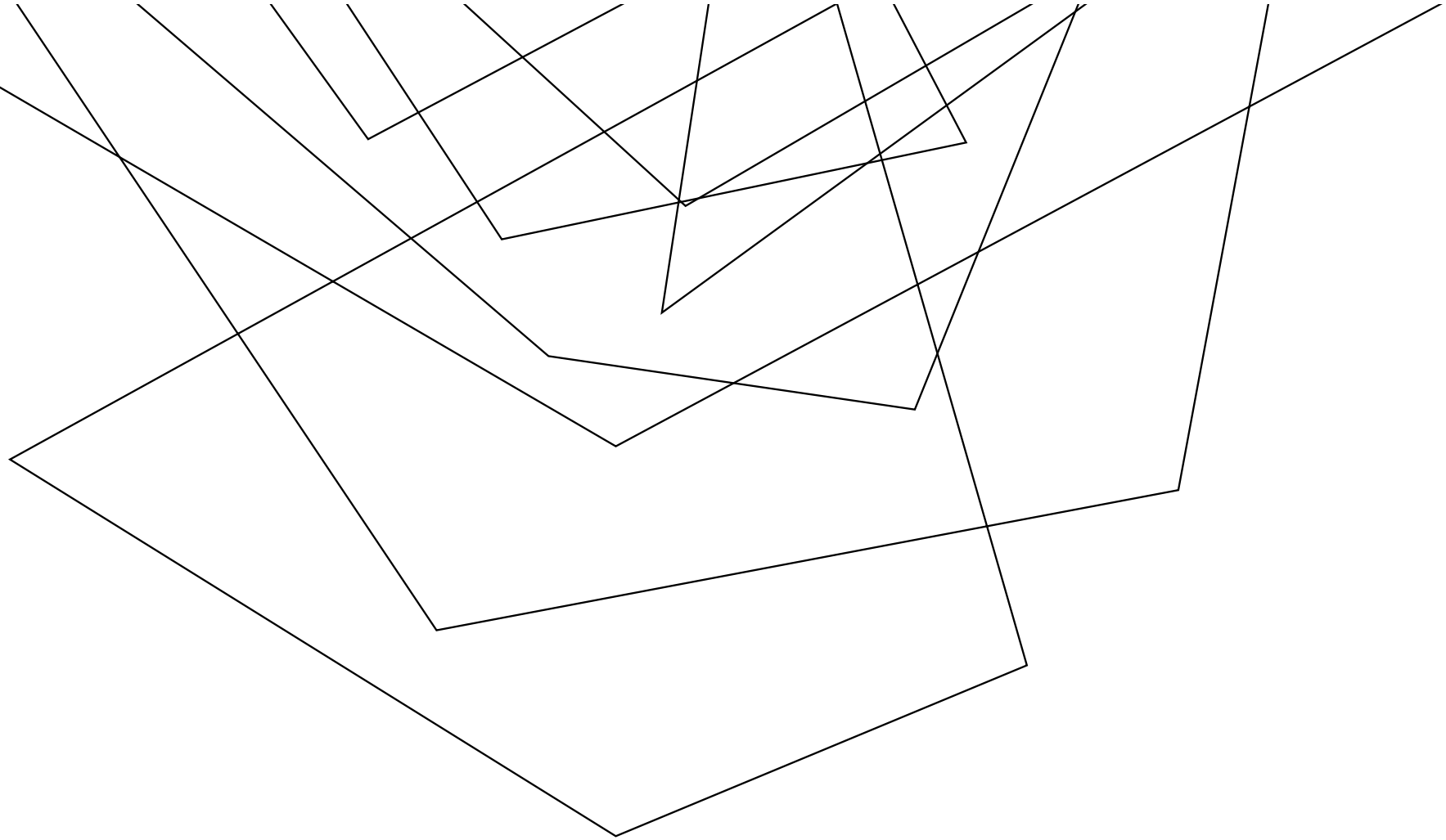
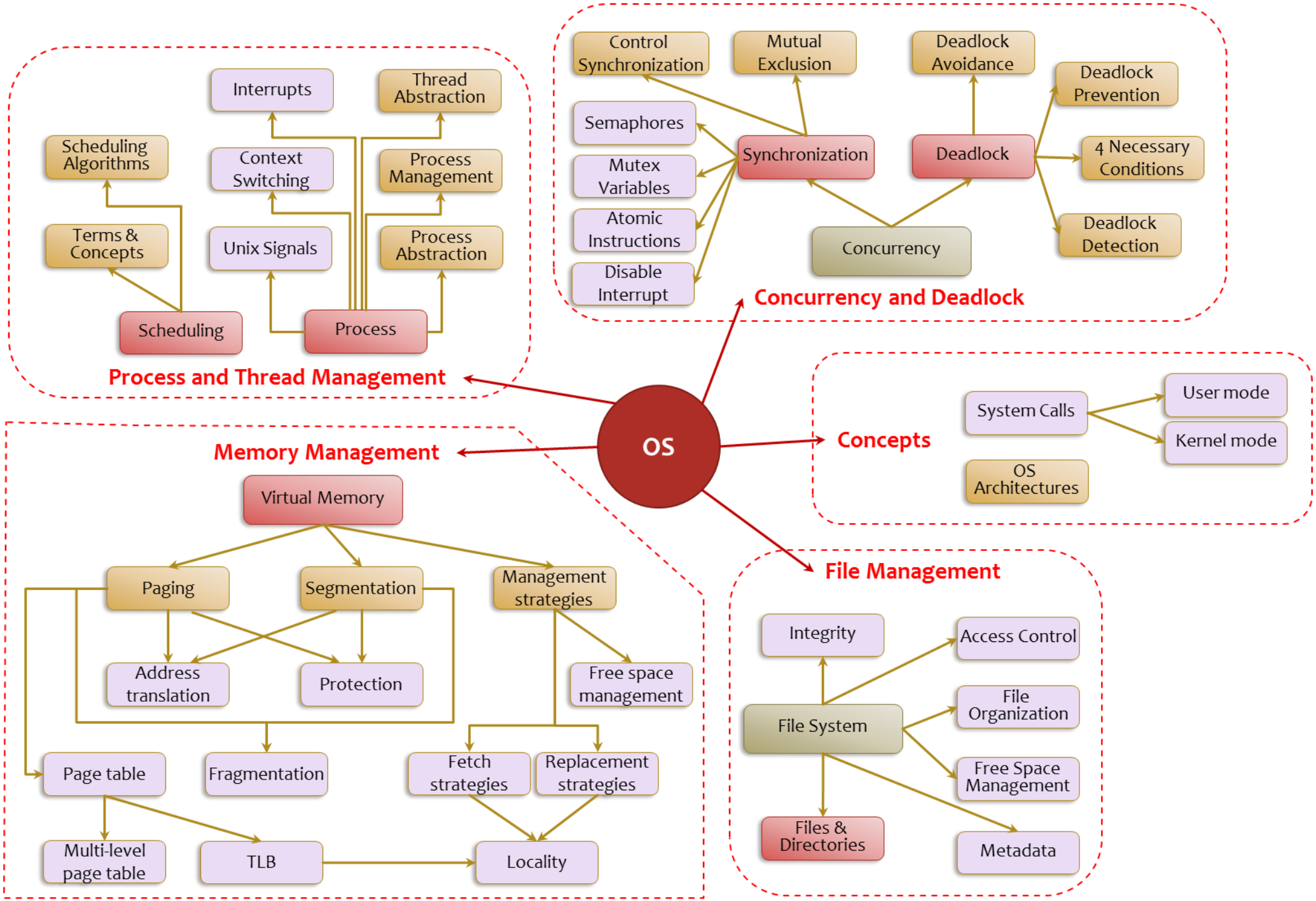


Final Examination


OS
Process and Thread Management
Interrupts
Thread Abstraction
Scheduling Algorithms
Context Switching
Process Management
Terms & Concepts
Unix Signals
Process Abstraction
Scheduling
Process
Concurrency and Deadlock
Control Synchronization
Mutual Exclusion
Deadlock Avoidance
Deadlock Prevention
Semaphores
Synchronization
Deadlock
4 Necessary Conditions
Mutex Variables
Atomic Instructions
Concurrency
Deadlock Detection
Disable Interrupt
Concepts
System Calls
User mode
Kernel mode
OS Architectures
Memory Management
Virtual Memory
Paging
Segmentation
Management strategies
Address translation
Protection
Free space management
Page table
Fragmentation
Fetch strategies
Replacement strategies
Multi-level page table
TLB
Locality
File Management
Integrity
Access Control
File System
File Organization
Free Space Management
Files & Directories
Metadata

Final Examination

- Time and Date: 14:30 – 17:30 Dec 13, 2023 (Wednesday)
- Venue: CPD-LG7-10
- This is an open book examination. Candidates may bring to their examination any printed/written materials.
- Remember to bring your **calculator** to the examination
- Answer each question in the space provided.
  - If you need to continue an answer onto the back of a page, clearly indicate that and label the continuation with the question number

Final Examination

- Total 100 points in **Seven** questions
- Answer all questions
- Question 1 – MC Questions
- Question 2 – True/False Questions
- Questions 3 – 7
  - Each question focuses on a specific topic
  - If involves calculation, show the steps
  - Mostly related to the concepts
    - Given a scenario/situation, comment or explain on matters related to the OS features
  - Mostly request you to give a short answer to the question
    - Please take note of the number of points allocated to the questions. Don't write too many
- If you find a question ambiguous, be sure to write down any assumptions you have made

Examination Scope

- Include all Lectures, Programming Labs, Tutorials, & Assignments

- Levels of difficulty
  - Basic: 55%
  - Intermediate: 45%

Prepare the Examination

- Try to focus on key topics covered in the lecture notes
  - Read related sections of the readings would be helpful
  - Questions from the assignments and tutorials are good for helping you to understand some key topics/concepts

- Open-book means you don’t need to memorize the details
  - Should focus on understanding of the concepts

Suggested Readings (Not For the Examination)

Intro	Virtualization		Concurrency	Persistence	Security
Preface	3 *Dialogue*	12 *Dialogue*	25 *Dialogue*	35 *Dialogue*	52 *Dialogue*
TOC	4 Processes	13 Address Spaces code	26 Concurrency and Threads code	36 I/O Devices	53 *Intro Security*
1 *Dialogue*	5 Process API code	14 Memory API	27 Thread API code	37 Hard Disk Drives	54 *Authentication*
2 Introduction code	6 Direct Execution	15 Address Translation	28 Locks code	38 Redundant Disk Arrays (RAID)	55 *Access Control*
	7 CPU Scheduling	16 Segmentation	29 Locked Data Structures	39 Files and Directories	56 *Cryptography*
	8 Multi-level Feedback	17 Free Space Management	30 Condition Variables code	40 File System Implementation	57 *Distributed*
	9 Lottery Scheduling code	18 Introduction to Paging	31 Semaphores code	41 Fast File System (FFS)	
	10 Multi-CPU Scheduling	19 Translation Lookaside Buffers	32 Concurrency Bugs	42 FSCK and Journaling	**Appendices**
	11 *Summary*	20 Advanced Page Tables	33 Event-based Concurrency	43 Log-structured File System (LFS)	*Dialogue*
		21 Swapping: Mechanisms	34 *Summary*	44 Flash-based SSDs	Virtual Machines
		22 Swapping: Policies		45 Data Integrity and Protection	*Dialogue*
		23 Complete VM Systems		46 *Summary*	Monitors
		24 *Summary*		47 *Dialogue*	*Dialogue*
				48 Distributed Systems	Lab Tutorial
				49 Network File System (NFS)	Systems Labs
				50 Andrew File System (AFS)	xv6 Labs
				51 *Summary*	

Operating System Research

- Many Core and Heterogenous Core systems
  - Their impact on the OS design, scheduler design, file systems design, and mutex lock design
- Performance benchmarking and analysis
- IoT OS
  - Designed to perform within the strict constraints (memory, processing power, networking, and power) of small IoT devices
- Cloud platforms and Data Centers
  - Resource management, scheduling, virtual machine migration

SFTL

- The online SFTL evaluation will be conducted for all Common Core courses, UG & RPG courses during **Nov 6 - Dec 4, 2023**. Students can complete the questionnaires any time before the deadline.

- The SFTL system can be accessed via: https://sftl.hku.hk/