

Department of Computer Science and Engineering
National Sun Yat-sen University
First Semester of 2024 PhD Qualifying Exam

Subject : Operating Systems

1. [Process Management and Coordination: 20%]

- (1) Explain the five states of a process. (10%)
- (2) Explain the three multithreading models. (6%)
- (3) How does the deadlock prevention scheme work? (4%)

2. [Memory Management: 20%]

- (1) Give two benefits of using paging. (4%)
- (2) Explain the six steps to handling a page fault. (6%)
- (3) Explain how a hashed page table works. (10%)

3. [Storage Management: 20%]

- (1) What are consistency semantics in a file system? (8%)
- (2) Give two benefits of using location transparency. (4%)
- (3) Explain four variations of the write-back policy. (8%)

4. [Protection and Security: 20%]

- (1) Explain two solutions to the setuid-on problem in UNIX. (6%)
- (2) Explain how a stack & buffer overflow attack works. (6%)
- (3) Explain the four common types of firewalls. (8%)

5. [Explanation of Glossary: 20%]

- (1) Anonymous pipes
- (2) Pthreads
- (3) Zero-fill-on-demand
- (4) Least privilege principle
- (5) Defense-in-depth theorem