

國立臺灣科技大學

107 學年度第 一 學期 博士班 複考 考試命題用紙

第 / 頁共 / 頁

考試科目：Operating Systems

- 研究所
 大學部
 工程在職進修

博士班
複考
系班別：

1. (30%) Compute the completion and waiting times for the following set of jobs under the Shortest-Job-First (SJF), Round Robin (RR), and Multi-Level Feedback Queue (MLFQ) scheduling algorithms given the following assumptions:
- Assume that Job A is scheduled before Job B.
 - Job C performs 1.5 seconds of computation, followed by 1.0 second of I/O. This routine is then repeated 2 more times. So Job C performs total of 4.5 seconds of computation and 3.0 seconds of I/O.
 - SJF is preemptive.
 - For RR, assume a 2 second time-slice, and when a job arrives in the middle of execution of another job, the new job is placed at the end of the RR queue.
 - For MLFQ, assume 3 levels of time slices of 1, 2, and 4 seconds.
 - Overhead of context switch is negligible.

Clearly state any additional assumptions that you make. **Show all steps of the computation or receive no credit.**

			Completion Time			Waiting Time		
Job	Length	Arrival time	SJF	RR	MLFQ	SJF	RR	MLFQ
A	10	0						
B	2.0	0						
C	4.5	1						

2. (20%) Consider the following questions regarding disk scheduling.
- (10%) Describe the elevator disk scheduling algorithm.
 - (10%) What is the advantage of the elevator algorithm over the shortest-seek-first algorithm?
3. (30%) About the deadlock problem, please answer the following questions:
- (6%) What is the deadlock problem?
 - (12%) What are the necessary conditions?
 - (12%) Please describe how to avoid the deadlock problem.
4. (20%) About the critical-section problem, please answer the following questions:
- (8%) Please describe/define/explain the "critical-section" problem.
 - (12%) If we want to design a solution to the critical-section problem, what requirements should we take into account? Please list these requirements and give brief explanations for them.