

考試時間	月	日上午	節	份數	任課教師
(星期)		下午			
		晚間			

國立臺灣科技大學

106學年度第

2學期

博班格  
系班別  
試命題用紙

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考試科目：Operating System

研究所  
 大學部  
 工程在職進修

1. What are the actions taken by a kernel to context-switch between processes? (10%)  
Among the code section, data section, open files, registers, and stacks, which ones are shared across threads in a multithreaded process? (5%)

2. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0. What are the turnaround time and the waiting time of each process for each of the following scheduling algorithms? Explain your answer to receive full credit. (21%)

- (a) FCFS  
(b) SJF  
(c) RR with quantum = 1

3. Consider the following snapshot of a system with five processes (i.e., P1, P2, P3, p4 and P5) and four resource types (i.e., A, B, C and D):

	Allocation (A,B,C,D)	Max (A,B,C,D)	Available (A,B,C,D)
P1	(2,1,1,0)	(4,1,1,2)	(0,0,1,9)
P2	(2,2,0,0)	(3,5,0,1)	
P3	(1,0,1,1)	(1,0,1,1)	
P4	(0,4,2,2)	(0,4,4,2)	
P5	(0,2,5,2)	(2,2,5,6)	

Please answer the following questions based on the snapshot provided above.

- (a) Show the content of matrix *Need* used in the banker's algorithm. (4%)  
(b) Run the safety algorithm and determine if the system is in a safe state. Explain your answer to receive full credit. (10%)

