

科目：作業系統 A

日期：104 年 1 月 27 日 第 1 頁 共 1 頁

請“✓”明 ✓不可看書 可看書

* 請將答案依題號順序寫入答案卷

答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

- (12%) Most operating systems have three general methods used to pass parameters for system calls. Please briefly describe them and compare these three methods.
- (9%) Please compare **similarities and differences** between multi-processes and multi-threads. And consider that you are planning to develop a server having thousands of requests from users. Which method you should use? And Why?
- (9%) Please briefly describe the following terms.
 - Race condition.**
 - Deadlock.**
 - Starvation.**
- (8%) Discussing the advantages and disadvantages of the two methods (**centralized approach** and **distributed approach**) for generating globally unique timestamps.
- (12%) Considering the banker's algorithm, there is a system with 5 processes (P0-P4) and 3 types of resources (A-C). Resource A has 10 instances, resource B has 5 instances and resource C has 7 instances. At the beginning, the following snapshot of the system has been taken:

PID	Allocation	Max	Available
	A B C	A B C	A B C
P0	0 1 0	7 5 3	3 3 2
P1	2 0 0	3 2 2	
P2	3 0 2	9 0 2	
P3	2 1 1	2 2 2	
P4	0 0 2	4 3 3	

- What is the content of the matrix Need?
- Please list a sequence of processes satisfies the safety criteria.
- Suppose that the process P1 request 1 additional resource A and 2 resource C. Decide whether this request can be immediately granted?)
- Suppose that the process P4 request 2 additional resource B. Decide whether this request can be immediately granted?

◎ 請用深黑色鋼筆或原子筆出題

命題老師簽名：

國立交通大學試題紙

一百零三學年度第一次
博士班資格考

科目：作業系統 B

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答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

1. (10 pts) Provide a detail description about how demand paging works in the Intel 80386 processor (or above).
2. (10 pts) Best-fit and first-fit are two dynamic memory allocation algorithms. Does best-fit always perform better than first-fit? Prove it if yes. Otherwise, give a counter example.
3. (10 pts) Consider a paging system using a single-level page table. Let the reference latencies of the main memory and the TLB be 100 ns and 10 ns, respectively. Let the TLB hit ratio r be modeled by $r = (1 - c^{-1})$, in which c is the TLB size in kilobytes. If page faults never occur, how large should the TLB be so that the effective memory access time is 120 ns?
4. (10 pts) Modern file systems allocate disk space using extents (i.e., large chunks of contiguous disk space). What are the benefits and drawbacks of the extent-based allocation strategy?
5. (10 pts) The SSTF disk scheduling algorithm is prone to starvation. Suggest a solution to this problem.

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命題老師簽名：