

- [1] In some computer systems, multiple threads may run concurrently within a process environment. In such systems, the C libraries that are to be linked with the multi-threaded user programs are generally reentrant. Why should the C libraries be reentrant? (8%)
- [2] Can we use DISABLE-INTERRUPT/ENABLE-INTERRUPT instructions to ensure the mutual exclusion of critical sections (as shown in the following) in any computer systems? Why? (7%)

(some code here ...)

DISABLE-INTERRUPT

(Critical Section)

ENABLE-INTERRUPT

(some code here ...)

- [3] In a demand paging system, two processes may exchange data by using shared memory. Please explain how does the operating system implement this function. (You should draw a diagram for explanation.) (12%)
- [4] Please describe briefly the typical operations that may be done by the operating system when an

OPEN_FILE(file_name, mode)

system call is requested by a user program. (12%)

In general, what will be returned to the user program when the operating system completes the system call service? (2%)

- [5] Explain the concept of 'linking' that may be needed when we make an executable program. (6%)
Can linking be done during execution? Please explain why if the answer is 'no', and explain the advantages if the answer is 'yes'. (6%)
- [6] What are the factors that would affect the efficiency of searching when we use hashing as the method? (12%)

7. Explain the following terminologies: (15%)

- 1) Context-free Grammar
- 2) Regular Expression
- 3) Deterministic Finite Automaton

8. Consider the following grammar for arithmetic expressions (10%)

$E \rightarrow E+T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

Eliminating the immediate left recursion.

(背面仍有題目,請繼續作答)

9. Is the following if-then-else grammar a LL(1) grammar? Explain why. (10%)
- stat \rightarrow if expr then stat stat' | a
- stat' \rightarrow else stat | e
- else \rightarrow b