一　選擇題（每題 3 分）

1) All of the following instructions should be privileged except
   A) change to monitor mode　　B) set value of timer
   C) fetch an instruction from monitor memory
   D) clear memory

2) $(377)_8 - (F0)_{16} = ?$　A) $(1101)_2$　B) $(10)_{16}$　C) $(12)_{16}$　D) $(17)_8$

3) 某電腦使用 7 bits 之 ASCII code 表達文數字. 爲能使用一個 byte 來儲存一個文數字,此電腦加入 ASCII code 之 parity bit 於每一 byte 中之 MSB. 如果"A" 在該電腦中是 41H, 則 "E" 在該電腦中爲 A) 45H　B) C5H　C) 4EH　D) 85H

4) 10110111_2 XOR $10001000_2 = (\ ?\ )_{16}$　A) 3F　B) BF　C) 30　D) B7

5) All of the following are requirements to solve the critical-section problem except
   A) mutual exclusion B) progress C) bounded waiting D) fairness

6) Consider the following C++ code.

   ```
   const int len = 100;
   typedef float Temp[len];
   ```

   Which statement is the most appropriate one?
   A) This code declares an array variable called Temp. Its length is 100
   and its basis type is float.
   B) This code defines a new type called Temp. The new type is an array-type
   of length 100 and its basis type is float.
   C) This code assigns the value 100 to Temp.
   D) This code stores the value of Temp in a float called len.

7) Asynchronous I/O means that
   A) I/O is done independent from how the CPU operates
   B) When I/O starts, control returns to the user program without waiting for the I/O
   to complete.
   C) When an I/O device begins to operate, all other devices stop their operations.
   D) None of the above.

8) Solid state disk
   A) is less expensive as magnetic disk
   B) is the same as magnetic disk.
   C) can operate in RAM speed, but is as non-volatile as a magnetic disk.

（背面仍有題目,請繼續作答）

D) all of the above.

9) A microkernel Operating System

A) is an OS structuring approach adopted by Linux.

B) is strongly related to micro-electronics.

C) is a kernel that can runs on a microprocessor.

D) removes all nonessential components from the kernel.

10) What is the idea of allowing computer users to solve a problem by concentrating on what the problem is rather than on how it is to be solved?

A) Declarative programming

B) Church-Turing Thesis

C) Coercion

D) Interactive processing

二　For each of the terms in the left-hand column below, select the term in the right-hand column that best matches it. (每題 3 分)

1. _____ Coupling

A. A product that includes a server and a development toolset designed to integrate databases and Web pages.

2. _____ Cohesion

B. A section of code that only one process at a time can be executing

3. _____ Critical section

C. A student doesn't really understand a subject until the subject's overall scope and relationship with other subjects has been grasped.

4. _____ Cycle stealing

D. Separation of a concept from the details of its implementation

5. _____ Abstraction

E. For a student to learn, the subject should be presented in well-organized units with specific goals.

6. _____ ColdFusion

F. CPU is momentarily prevented from accessing main memory.

G. A high-speed subnetwork of shared storage devices

三　問答題

1. Suppose an array with 6 rows and 8 columns is stored in row major order starting

at address 20 (decimal). If each entry in the array requires only one memory cell, what is the address of the entry in the third row and fourth column? What if each entry requires two memory cells?　(6 分)

2. Design a recursive version of the Euclidean algorithm.　(8 分)

3. What is a *safe state* in deadlock avoidance?　(5 分)

4. When virtual memory is implemented in a computing system, there are certain costs associated with the technique, and certain benefits. List the costs and the benefits. (12 分)

5. What advantage is there in having different time quantum sizes on different levels of a multilevel queueing system ?　（5 分）

6. When a process is rolled out of memory, it loses its ability to use the CPU (at least for a while). Describe another situation where a process loses its ability to use the CPU, but where the process does not get rolled out. (4 分)

7. What is the main advantage of the layered approach to system design? (8 分)

8. Suppose a machine has multiple register sets. Describe the actions of a context switch if the new context is already loaded into one of the register sets. (4 分)