（1）請設計一個集合 (Set) 的資料結構，並說明這樣的資料結構如何有利於處理集合的運算。

（2）何謂 static scoping？
何謂 dynamic scoping？
它們的優缺點為何？

（3）解釋名詞
1. bootstrap loader
2. DMA (Direct Memory Access)
3. non-maskable interrupt
4. benchmark
5. microprogramming

（4）請寫出下列四種 -1 的二進位元表示法
(1) Signed-magnitude  (2) One's complement  (3) Two's complement  (4) Excess-3（以 4 個位元表示即可）

（5）RISC與CISC相比較，前者擁有許多特點，請任意寫出其中四點

（6）What is the effective access time of a two-level cache memory system that has the following parameters: \( c_1 = 2 \), \( h_1 = 85\% \), \( c_2 = 12 \), \( h_2 = 98\% \), and \( m = 40 \), where \( c_1, c_2 \) represent cache access times, \( h_1, h_2 \) represent hit ratios, \( m \) represents main memory access time. Access times are in clock cycles. (備註：此題必須寫下計算式方子以計分)

（7）解釋下列名詞，並指出其適用的資料結構。
(a) Hashing
(b) B-tree

（8）解釋集中式 (centralized) 與分散式 (distributed) 資料處理，並比較兩者之優缺點。
(9) Write a function in C or Pascal that can convert a string of digits (0 to 9) into an integer. The function should take a string as input and return an integer. For example, the function should convert "145" to the integer value 145, and "Lin" should return an error message.

(10) List out at least five capabilities that text processing software (such as Microsoft Word or Adobe Acrobat) has that a general-purpose text editors (like Notepad) does not.

(11) From an information management viewpoint, please discuss the applications and values of information networks. To the best of your understanding, please discuss the most important conceptual framework of the networks.

(12) Please discuss the interprocess communication in operating systems. And please state its applications and values.