

## 單選題 (每題 3 分)

- 下列何者是 N 階層演算法的遞迴步驟？  
A. return (1)    B. return (n-1)    C. return (n \* factorial(n-1))    D. return (factorial(n-1))
- 二元搜尋演算法是從資料清單的哪一部份開始尋找？  
A.最前面    B.中間    C.最後面    D.任意位置
- 下列何者通常不屬於系統文件？  
A. 流程圖    B. 使用說明    C. 虛擬碼    D. 測試數據
- 在軟體開發生命週期中，哪一個階段的工作重點是完成新軟體的程式設計？  
A. 系統分析    B. 系統設計    C. 系統建置    D. 系統測試
- 循序搜尋演算法的時間複雜度為  $O(n)$ 。假設你想在一個有 100 萬筆資料的已排序清單中尋找某筆資料，請問要花多少次的比較步驟？  
A. 1    B. 6    C. 20    D. 100 萬
- 指揮電腦完成一項基本任務的命令稱為什麼？  
A. 套裝軟體    B. 程式    C. 程式語言    D. 指令
- 下列何者不具有可攜性？  
A. 組合語言    B. C 語言    C. C++    D. Java
- 下列哪個程式語言不是一般用途語言？  
A. Ada    B. Modula II    C. SQL    D. C
- 將組合語言翻譯成目的碼的程式叫做什麼？  
A. 編譯程式    B.直譯程式    C.翻譯程式    D.組譯程式
- 下列何者是循序檔案末端的結尾符號？  
A. NIL    B. NULL    C. EOF    D. TAIL
- Suppose the bit pattern 11111100 represents a value stored in two's complement notation. What is the equivalent base ten form of the value ? (a) -1 (b) -2 (c) -3 (d) -4.
- How many cells can be in a computer's main memory if each cell's address can be represented by two hexadecimal digits? (a) 256 (b) 512 (c) 1024 (d) 2048.
- Which register in a CPU holds the instruction being executed ? (a) program counter (b) instruction register (c) status register (d) stack pointer.
- What is the result of performing a four-bit left circular shift on the byte C5 represented in hexadecimal notation? (a) 8B (b) 17 (c) 27 (d) 5C.
- What is the portion of an operating system that communicates with the user? (a) utility software (b) the device driver (c) the shell (d) the file manager.
- What is the portion of memory that contains the bootstrap program? (a) ROM (b) the cache (c) RAM (d) the hard disk.
- What information is not contained in a process table within an operating system? (a) the memory area assigned to the process (b) the priority of the process (c) the interrupt handler (d) the process state.
- A program that places an executing file in memory is called (a) a linker (b) a loader (c) a parser (d) a code generator.

19. Which of the following is not associated with object-oriented programming? (a). Inheritance (b) Resolution (c) Encapsulation (d) Polymorphism.
20. Which of the following can Prolog conclude from the following program?
- ```
parent(jill, sue).
parent(jill, sally).
parent(john, sue).
parent(john, sally).
sibling(X, Y) :- parent(Z, X), parent(Z, Y).
```
- (a) parent(jill, john) (b) sister(sue, sally)  
(c) sibling(sue, sally) (d) sibling(jill, sue)
21. In what network topology, all nodes are connected to a single shared communication line? (a) Star (b) Helix (c) Ring (d) Bus
22. Which of the following converts a symbolic host name into its 32-bit IP address? (a) IP (b)TCP (c)DNS (d)URL
23. In the computer network, which layer is responsible to create a high quality, error free, order preserving, end-to-end delivery service? (a)Transport (b)Network (c)Data link (d)Physical
24. Which of the following identifies a Web page? (a)DNS (b)URL (c)HTTP (d)TCP
25. How many bits are used in the true color scheme to represent a pixel? (a)8 (b)16 (c)24 (d)32

### 複選題(每題 3 分)

1. Which of the followings are the reasons why we use cache memory in a computer system?
- Small size, fast memory just for values currently in use speeds computing time
  - Faster memory is too expensive to use for all memory cells
  - Once a value is used, it is likely to be used again (Locality principle)
  - The space provided by RAM is not enough
  - Memory access is much slower than processing time
2. Which of the followings are non-volatile storage?
- Cache memory
  - Magnetic tape
  - ROM
  - RAM
  - Hard disk
  - CD
  - DVD
  - Register
3. Which of the followings are true for Von Neumann architecture?
- contains four components: Memory, Input/Output, Arithmetic/Logic unit (ALU), Control unit
  - stored program concept

- c. parallel execution of instructions
- d. Proposed by John Von Neumann in 1946
- e. Modern computers remain, fundamentally, Von Neumann machines

4. Which of the following operations of machine language are used to implement the conditional operation “IF  $a > b$  then do Step 5.1 else do step 5.2” in algorithms?

- a. Data transfer
- b. Arithmetic
- c. Logic
- d. Compares
- e. Branches

5. Which of the followings are true for SIMD architecture?

- a. Single instruction/Multiple data
- b. Multiple processors running in parallel
- c. All processors execute same operation at one time
- d. Each processor operates on its own data
- e. Processors communicate with each other
- f. Suitable for ”vector” operations

### 問答題(每題 5 分)

1. Please provide the algorithm for adding two 16-bit unsigned binary numbers. A result and a carry would be produced by this algorithm.
2. Use C or other programming language to design a program satisfying the following requirements:
  - (1) Input: a string consisting of the English lowercase alphabet.
  - (2) Output: the frequency of each letter in the string.
  - (3) Example: if input the string "book", then the following message will be shown:  
b = 1, k = 1, o = 2.