

I. 選擇題 (請作答於試卷內之「選擇題作答區」, 每題2分, 共30分)

- Which of the following is the binary representation of $4\frac{5}{8}$?
(A) 100.11 (B) 10.011 (C) 110.101 (D) 100.101
- Which of the following data storage systems provides the most efficient random access to individual data items?
(A) Main memory (B) Magnetic disk (C) Optical CDs and DVDs (D) Floppy disk
- Which of the following components of an operating system is not part of the kernel?
(A) Shell (B) File manager (C) Scheduler (D) None of above
- Which of the following events is detrimental to an operating system's performance?
(A) Deadlock (B) Interrupt (C) Booting (D) Restart
- Which of the following is not a way of classifying networks?
(A) WAN versus LAN (B) Closed versus open (C) Router versus bridge (D) Star versus bus
- Which layer of the TCP/IP hierarchy actually transmits a message?
(A) Application (B) Transport (C) Network (D) Link
- Which of the following is not a means of repeating a block of instructions?
(A) Pretest loop (B) Posttest loop (C) Recursion (D) if-then-else statement
- When searching within the list
Lewis, Maurice, Nathan, Oliver, Pat, Quincy, Roger, Stan, Tom
which of the following entries will be found most quickly using the binary search algorithm?
(A) Lewis (B) Pat (C) Tom (D) Stan
- Which of the following does not require a Boolean structure?
(A) If-then-else statement (B) While loop statement (C) Assignment statement (D) For loop statement
- Which of the following is ignored by a compiler?
(A) Control statements (B) Declarations of constants (C) Procedure headers (D) Comment statements
- Which of the following is an attempt to construct software from off-the-shelf components as is done in other engineering fields?
(A) Extreme programming (B) Evolutionary prototyping (C) Component architecture (D) Open-source development
- Suppose you were going to retrieve items of data that you would later need to process in the opposite order from that in which they were retrieved. Which of the following would be the best structure in which to store the items?
(A) Traditional linked list (B) Stack (C) Queue (D) Tree
- Which of the following file structures requires a small "auxiliary" storage system that must be updated as entries in the file are inserted or deleted?
(A) Sequential (B) Indexed (C) Hash (D) None of above
- A memory system that is able to provide related information is called
(A) Read-only memory (ROM) (B) Associative memory (C) An artificial neural network (D) Main memory
- Which of the following systems is least efficient when encoding numeric values?
(A) Two's complement notation (B) Excess notation (C) ASCII (D) Floating-point notation

II. 申論題 (請作答於試卷內之「非選擇題作答區」, 每題10分, 共70分)

- Explain the distinction between time complexity and space complexity.
- Draw the search tree that would be generated by a heuristic search when solving the eight-puzzle from the starting configuration below assuming that "the number of tiles out of place" were used as the heuristic.

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1 2 3
5 6
4 7 8

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- List five possible data mining techniques.
- In what sense is the software life cycle different from the life cycle of other products?
- The table below represents a portion of a computer's main memory containing a binary tree stored row by row in a contiguous block as described in the chapter. Draw a picture of the tree and explain why.

Address	Contents
50	A
51	B
52	C
53	D
54	E
55	F
56	G

- Rewrite the following routine using a pre-test while statement.

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repeat (print the value of X;
      X ← X + 1)
until (X > 5)

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- (a) Describe a scenario that leads to deadlock in a computer system.
(b) What conditions are necessary for deadlock to occur?