

大同大學 九十一 學年度研究所碩士班入學考試試題

考試科目：計算機概論

所別：資訊工程研究所

第 2/3 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以查字典； 不可以使用計算器。

12. A multiplexer, sometimes referred to as a MUX, _____.
- a. converts digital signals of a computer into analog signals that are transmitted X
 - b. combines more than one input signal into a single stream of data
 - c. handles the communications requirements of a larger computer ✓
 - d. coordinates the transmission, receipt, and error checking of transmitted data
- d. 13. A pure _____ consists only of point-to-point lines between the central computer and the other computers on the network.
- a. star network
 - b. bus network
 - c. ring network
 - d. all of the above
14. Intranets are _____.
- a. formed when two or more computers are connected
 - b. private networks that include more than one organization
 - c. not owned or controlled by any one organization
 - d. internal networks that use Internet and Web technology
- d. 15. _____, one of the original features of the Internet, enabled scientists and researchers working on government-sponsored projects to communicate with their colleagues at other locations.
- a. Telnet
 - b. Usenet
 - c. E-mail
 - d. FTP
- d. 16. Network computers, or NC, _____.
- a. are designed to work as a stand-alone computer
 - b. are designed to work while connected to a network
 - c. have unlimited storage
 - d. have more components and more software than typical PCs
- a. 17. Depending on the file system, a _____ either can be a fixed length and have a specific number of bytes or a variable length and have any number of bytes.
- a. record
 - b. file
 - c. folder
 - d. field
- d. 18. Records can be accessed in an indexed file _____.
- a. only directly
 - b. only sequentially
 - c. neither sequentially nor directly
 - d. both sequentially and directly
19. Which of the following is not one of the three steps performed when a record is retrieved from a direct file? _____
- a. the program obtains the key of the record to be retrieved
 - b. the program reads each record until it reaches the one desired
 - c. the program determines the location of the record to be retrieved
 - d. the software directs the computer to a bucket to retrieve the record
- a. 20. The _____ database structure is the most recently developed and takes advantage of large-capacity, direct-access storage devices.
- a. relational
 - b. hierarchical
 - c. network
 - d. object-oriented
- b. 21. The graphic or written description of the step-by-step procedure is called the _____.
- a. module
 - b. solution algorithm
 - c. subroutine
 - d. program specification
- a. 22. _____ is a methodology where all program logic is constructed from three control structures.
- a. Structured design
 - ✓b. Do-while control structure
 - ✓c. Top-down design
 - d. Proper program design

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- C 23. Misspelling a command, leaving out required punctuation, or typing command words out of order generally results in a _____ error.
- dead code
 - logic
 - syntax
 - debug utility
- d. 24. Program maintenance _____.
- refers to the process of writing the program instructions that process the data and produce the output specified
 - includes all changes to a program once it is implemented and processing real transactions
 - is the process of reading the program and mentally reviewing its logic
 - refers to the process of locating and correcting program errors, called bugs, found during testing
- d. 25. The only language the computer directly understands is _____ language.
- machine
 - assembly
 - procedural
 - high-level

二、問答題 50%：

- ✓ (a) Simplify 4-input logic function $F(a, b, c, d) = \Pi_M(0, 2, 4, 6, 8, 10, 11, 14, 15)$ of using Karnaugh map. Represent the simplified logic function of $F(a, b, c, d)$ in minimum product-of-sum(POS) form. (5%)

✗ (b) Using the J-K flip-flops and some gates to design the synchronous 4 bits serial-in, serial-out shift register. You must draw the complete diagram. (5%)
- ✓ (a) Translate the following expression from postfix form into infix form, using parentheses as necessary to avoid ambiguities.
 $a b c + * a / c b + d / -$ (2%)

✓ (b) Use binary tree to represent the above expression. (2%)

✓ (c) Give a recursive definition for the postfix form. (3%)

(d) List the nice features of the expression in postfix form compared to infix form. (3%)
- ✓ (a) Give the definition of binary search tree. (3%)

✓ (b) The following ten integers are inserted into an initially empty binary search tree. Draw the final binary search tree. The properties of the binary search tree must be kept after each insertion.
 20 25 15 40 35 30 10 70 90 5 (3%)

✓ (c) Give the definition of min-heap. (3%)

o b f ✓ (d) The above ten integers are inserted into an initially empty min-heap. Draw the final min-heap. The properties of the min-heap must be kept after each insertion. (3%)

✓ (e) Describe how a min-heap can be implemented with an 1-D array. (3%)

✓ (f) Describe how a min-heap can be used for sorting(called heap sort). (3%)

✓ (g) Define the term "stable sorting method" concisely. (3%)

✓ (h) In what situation should we care about whether a sorting method is stable? (3%)

✓ (i) Is heap sort a stable sort? Justify your answer. (3%)

✗ (j) Explain how the min-heap structure (and hence the heap sort) can be used to solve the selection problem. The selection problem is defined as to find the Kth smallest among N integers(where $1 \leq K \leq N$). (3%)

