

大同大學 九十二 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 1/4 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

第一部分：選擇題。選擇最恰當的單字或片語以補實每一句子。
每答對一題加 1.25 分，請依題號順序將答案寫在答案本上。

- All of the following are advantages of diskettes for storage of data except _____.
 - small size
 - portability
 - low cost for the amount of storage that they contain
 - fast access speed compared to hard disks
- CD-ROM disks provide a convenient way to store _____.
 - dictionaries and encyclopedias
 - digital photographs
 - archives of spoken sound
 - all of the above
- Which of the following input methods is not analog to digital?
 - a 3¹/₂-inch diskette
 - a mouse
 - a monitor worn by a heart patient
 - a sensor to detect nuclear radiation levels
- All of the following illustrate the concepts of an algorithm except _____.
 - listening to music
 - deciphering a coded message
 - assembling a Christmas toy
 - working toward a college major by taking certain courses
- According to Dijkstra's structured programming principles, which type of programming step is to be avoided?
 - sequence (a series of steps in a linear order)
 - selection (the if/then/else idea)
 - iteration (or looping, the repeat/until idea)
 - transfer (the go-to)
- All of the following are characteristics of modern structured programming except _____.
 - top-down design
 - modular coding
 - machine language
 - programming with procedures
- All of the following can be classified as software hazards except _____.
 - copy protection
 - computer viruses
 - Trojan horses
 - worms
- Characteristic features of a spreadsheet include all of the following except _____.
 - defined titles for rows and columns
 - horizontal rows and vertical columns of data
 - active cells for data storage
 - the ability to store relationships between numerical data
- Which of the following everyday applications is appropriate for development on a spreadsheet?
 - a teacher's grade book
 - itemized business invoices
 - baseball standings
 - all of the above
- Typical types of functions placed in cells of a spreadsheet include all of the following except _____.
 - averaging numbers
 - indexing words by subject
 - sorting text fields of data alphabetically
 - calculating trigonometric functions for scientific and mathematical data
- Which of the following is not a standard feature of database software?
 - data definition
 - data encoding
 - data sorting
 - data initiation
- Which of the following is not a Boolean operation?
 - less than
 - OR
 - complement
 - intersection
- Which database model is both the most flexible for retrieval and the most complicated to design?
 - hierarchical
 - networked
 - relational
 - tabular
- All of the following are methods of database security except _____.
 - passwords
 - logs of transactions
 - audit trails
 - security clearances
- Inside the computer, information is transferred around among components by a physical electrical connection called a _____.
 - bus
 - modem
 - communication line
 - parallel channel

<背面繼續>

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16. All of the following are elements associated with the transmission of data over modems except _____.
 - a. baud rate
 - b. fax possibility
 - c. site licenses
 - d. bits per second
17. All of the following characteristics apply to LANs except _____.
 - a. sharing resources like laser printers
 - b. networking that spans an entire state
 - c. allowing e-mail between users
 - d. buying site licenses for shared software
18. Which of the following is not used to connect LANs physically?
 - a. satellite communications
 - b. fiber optic cable
 - c. twisted-pair copper wire
 - d. coaxial cable
19. Which of the following is not an Internet service?
 - a. Telnet
 - b. Tymnet
 - c. FTP
 - d. Gopher
20. Which of the following is not a popular LAN access method?
 - a. token
 - b. CSMA/CD
 - c. parity checking
 - d. none of the above
21. Software agents fall under which of these software umbrellas?
 - a. Operating System
 - b. Data Management
 - c. Artificial Intelligence
 - d. Computer Security
22. Which of the following is not recognized as a currently active area of research in AI?
 - a. robotics
 - b. natural language processing
 - c. the Turing test
 - d. expert systems
23. Computers will need which of the following if they are really going to "understand" human language?
 - a. syntax
 - b. heuristics
 - c. semantics
 - d. all of the above
24. All of the following are robotic applications except _____.
 - a. process control
 - b. chess playing
 - c. visualization systems
 - d. image analysis
25. Which of the following is not an essential component of modern expert systems?
 - a. a grammatical parser
 - b. a knowledge base
 - c. an inference engine
 - d. an ability to adapt to changing conditions
26. All of the following represent software applications of computer graphics except _____.
 - a. the Logo computer language
 - b. raster graphics
 - c. video games
 - d. paint and draw programs
27. All of the following technical hurdles to broadcasting over the Internet are under active research expect _____.
 - a. instabilities of Internet information packets
 - b. bandwidth for file transmission
 - c. rechargeable batteries
 - d. compression schemes for multimedia
28. Which of the following is an instance of an intelligent agent built into a computer?
 - a. fuzzy logic in appliances
 - b. handwriting analysis software
 - c. user profiling for document retrieval
 - d. all of the above
29. MIDI files are _____.
 - a. waveform files
 - b. non-waveform files
 - c. minidigital files
 - d. none of the above
30. To set up a multimedia studio, a user would need all of the following except _____.
 - a. a digitizer board
 - b. a machine to press CDs
 - c. multimedia authoring software
 - d. a flatbed scanner
31. Which terminal permits system interaction via GUI?
 - a. dumb terminal
 - b. X terminal
 - c. text-based terminal
 - d. none of the above
32. What law is violated when an organization duplicates proprietary software without permission?
 - a. civil rights
 - b. antitrust
 - c. copyright
 - d. none of the above
33. A JAVA program _____.
 - a. is platform independent
 - b. can be embedded in a Web page as an applet
 - c. can be automatically downloaded onto a client computer through almost any modern Web browser
 - d. all of the above

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34. Which of the following statements is incorrect ?
- It takes $O(1)$ time to perform a STACK push operation.
 - It takes $O(1)$ time to perform a QUEUE insert operation.
 - It takes $O(1)$ time to retrieve the smallest item in a min-heap.
 - None of the above.
35. Which of the following statements is incorrect ?
- It takes $O(\log n)$ time to check whether a key is present in an AVL-tree with n keys.
 - Insertion of a new key into an AVL-tree requires at most one single-rotation or one double-rotation.
 - Deletion of an existing key from an AVL-tree requires at most one single-rotation or one double-rotation.
 - None of the above.
36. Which of the following statements is incorrect ?
- Every problem which can be solved in polynomial time by a deterministic algorithm must be a nondeterministic polynomial problem.
 - The Dijkstra's algorithm for shortest path problem is based on the greedy strategy.
 - Merge sort is stable whereas insertion sort is not.
 - None of the above.
37. Which of the following algorithms does not solve the minimum spanning tree problem ?
- Prim's algorithm
 - Kruskal's algorithm
 - Warshall's algorithm
 - None of the above
38. To prove that a problem in NP is NP-complete, we need only show that known ____ problem is reducible to it in polynomial time.
- P
 - NP
 - NP-complete
 - unsolvable
39. Which of the following statements is incorrect ?
- Both BNF and CFGs are metalanguages useful for describing the syntax of programming languages.
 - Axiomatic semantics, which is based on formal logic, were devised as a tool for proving the correctness of programs.
 - Both LEX and YACC are compiler-compiler examples.
 - None of the above.
40. Which of the following statements is incorrect ?
- When the features of a programming language are orthogonal, the language has fewer exceptions and special cases to remember.
 - The most common rule-based language is Prolog, which is also named as a logic programming language.
 - An XML document consists of a set of elements, and a companion document type declaration document describing the structures of each element type.
 - None of the above.

第二部分：簡答、演算題。請依題號順序將答案寫在答案本上。

1. An Armstrong number is a number of n digits that is equal to sum of each digit raised to the n^{th} power. For example, 153 (which has three digits) equals $1^3 + 5^3 + 3^3$.
- Write a function isArmstrong that accepts a 3-digit positive integer and returns TRUE(1) if the given integer is an Armstrong number, otherwise, returns FALSE(0). (4%)
 - Write a driving function that calls isArmstrong and finds all the 3-digit Armstrong numbers. (4%)
 - What is the parameter passing method of your functions? Why is it your choice? (2%)

<背面繼續>

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2. Applying the postorder traversal algorithm to a certain binary search tree produces the following node sequence :
40 30 70 60 80 50
- What is the node sequence produced by preorder traversal ? (3%)
 - What is the node sequence produced by applying the following triple order traversal algorithm ? (3%)
Visit the root for the first time ;
Traverse the left subtree in triple order ;
Visit the root the second time ;
Traverse the right subtree in triple order ;
Visit the root the third time ;
 - Describe the algorithm to delete a node from a binary search tree in pseudo-code concisely. You may use example figures to support your explanation. (4%)
3. Given the following digital functions:
- $$F1(a,b,c,d) = m_0 + m_1 + m_2 + m_4 + m_6 + m_8 + m_9 + m_{13} + m_{15}$$
- $$F2(a,b,c,d) = m_1 + m_5 + m_8 + m_{12} + m_{14} + m_{15} + d_2 + d_7 + d_{11}$$
- $$F3(a,b,c,d) = M_0 * M_1 * M_4 * M_5 * M_{10} * M_{11} * M_{12} * D_3 * D_8 * D_{14}$$
- (where m is abbreviated for minterm, M for maxterm, and d/D for don't care.)
- Find the new functions $F1+F2$ and $F1 * F2$. (5%)
 - Find the new functions $F2+F3$ and $F2 * F3$. (5%)
4. a. Justify that the 2^{n-1} -to-1 multiplexer is sufficient for any general n-variable digital function design implementation. (5%)
- b. Use only a single multiplexer to implement the following function :
 $F(a,b,c,d) = m_0 + m_1 + m_3 + m_6 + m_7 + m_8 + m_{11} + m_{12} + m_{14}$ (5%)
5. An n-bit data digital system contains four registers. The inputs and outputs of all four registers are connected to a common bus so that the contents of any register can be loaded into any other register. A 2-to-4 decoder is used to selectively enable the register outputs, and each register can be clocked separately. Draw a functional block diagram of the system with all the mentioned components and required control signals. (10%)