國立臺北科技大學九十五學年度碩士班招生考試

系所組別：3140 土木與防災研究所丁組

第一節 計算機概論 試題

填 准 考 證 號 碼

注意事項：

1. 本試題共 80 題，配分共 100 分（每題 1.25 分，總分四捨五入至整數，單選，答錯不倒扣）。
2. 請標明題號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Which of the following best describes the NOR operation?
   - A. An XOR followed by a NOT
   - B. An OR followed by a NOT
   - C. A NOT followed by a NOT
   - D. An AND followed by a NOT

2. Which of the following bit patterns cannot be expressed in hexadecimal notation?
   - A. 11111111
   - B. 1001
   - C. 110011
   - D. 100000000001

3. Which of the following is the binary representation of 4 5/8?
   - A. 100.11
   - B. 10.011
   - C. 110.101
   - D. 100.101

4. Which of the following bit patterns represents the value 5 in two's complement notation?
   - A. 00011010
   - B. 11111011
   - C. 00000101
   - D. 11111011

5. Which of the following bit patterns represents the value -5 in two's complement notation?

A. 00011010
B. 11111011
C. 00000101
D. 11111011

6. Which of the following representations in two's complement notation represents the largest value?

A. 00000010
B. 11111111
C. 00000001
D. 11111110

7. Which of the following bit patterns (represented in hexadecimal notation) represents a negative number in two's complement notation?

A. 7F
B. 55
C. A6
D. 08

8. 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. LAN

9. Assuming that each of the following bit patterns originally had even parity, which one contains an error?

A. 10110100
B. 11000011
C. 00011000
D. 10001001

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10. How many errors per pattern could be corrected when using an error-correcting code in which any two code patterns differ by a Hamming distance of 8?

A. 3
B. 4
C. 5
D. 6

11. How many different symbols can be encoded using Unicode?

A. 256
B. 4,096
C. 65,536
D. 1,046,476

12. 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

13. Which of the following is not contained in a CPU?

A. Instruction register
B. Program counter
C. General-purpose register
D. Memory cell

14. Which of the following is not a form of parallel processing?

A. SISD
B. MIMD
C. SIMD
D. All of the above

15. In which of the following locations is information most readily available for manipulation by the CPU?

A. General-purpose registers
B. Main memory
C. Mass storage
D. CD

The following table is included here for your reference. Questions refer to this table as the "language description table."

Op-code	Operand	Description
1	RXY	LOAD the register R with the bit pattern found in the memory cell whose address is XY. *Example:* 14A3 would cause the contents of the memory cell located at address A3 to be placed in register 4.
2	RXY	LOAD the register R with the bit pattern XY. *Example:* 20A3 would cause the value A3 to be placed in register 0.
3	RXY	STORE the bit pattern found in register R in the memory cell whose address is XY. *Example:* 35B1 would cause the contents of register 5 to be placed in the memory cell whose address is B1.
4	0RS	MOVE the bit pattern found in register R to register S. *Example:* 40A4 would cause the contents of register A to be copied into register 4.
5	RST	ADD the bit patterns in registers S and T as though they were two's complement representations and leave the result in register R. *Example:* 5726 would cause the binary values in registers 2 and 6 to be added and the sum placed in register 7.
6	RST	ADD the bit patterns in registers S and T as though they represented values in floating-point notation and leave the floating-point result in register R. *Example:* 634E would cause the values in registers 4 and E to be added as floating-point values and the result to be placed in register 3.
7	RST	OR the bit patterns in registers S and T and place the result in register R. *Example:* 7CB4 would cause the result of ORing the contents of registers B and 4 to be placed in register C.
8	RST	AND the bit patterns in register S and T and place the result in register R. *Example:* 8045 would cause the result of ANDing the contents of registers 4 and 5 to be placed in register 0.
9	RST	EXCLUSIVE OR the bit patterns in registers S and T and place the result in register R. *Example:* 95F3 would cause the result of EXCLUSIVE ORing the contents of registers F and 3 to be placed in register 5.
A	R0X	ROTATE the bit pattern in register R one bit to the right X times. Each time place the bit that started at the low-order end at the high-order end. *Example:* A403 would cause the contents of register 4 to be rotated 3 bits to the right in a circular fashion.
B	RXY	JUMP to the instruction located in the memory cell at address XY if the bit pattern in register R is equal to the bit pattern in register number 0. Otherwise, continue with the normal sequence of execution. (The jump is implemented by copying XY into the program counter during the execute phase.) *Example:* B43C would first compare the contents of register 4 with the contents of register 0. If the two were equal, the pattern 3C would be placed in the program counter so that the next instruction executed would be the one located at that memory address. Otherwise, nothing would be done and program execution would continue in its normal sequence.
C	000	HALT execution. *Example:* C000 would cause program execution to stop.

16. Which of the following instructions (as described in the language description table) changes the contents of a memory cell?

A. 10AB

B. 20AB

C. 30AB

D. 40AB

17. Which of the following instructions (as described in the language description table) places 00000000 in register A?

A. 1A00
B. 2A00
C. 3A00
D. 200A

18. Which of the following instructions (as described in the language description table) will not change the contents of register 5?

A. 1508
B. 2508
C. A503
D. A508

19. Which of the following instructions (as described in the language description table) is equivalent to requesting that register A be rotated to the left by three bits?

A. AA05
B. AA03
C. AA08
D. AA01

20. The bus in a computer is an example of which form of communication?

A. Serial
B. Parallel
C. Neither A nor B
D. Both A and B

21. Which of the following instructions does not fall in the category of arithmetic/logic instructions?

A. ROTATE
B. ADD
C. OR
D. JUMP

22. Which of the following instructions falls in the category of data transfer instructions?
    A. LOAD
    B. AND
    C. ROTATE
    D. JUMP

23. Which of the following is not a component of a machine instruction?
    A. Op-code
    B. Port
    C. Operand
    D. All of the above

24. Which of the following is not an activity performed entirely within a CPU?
    A. Fetch instructions
    B. Perform Boolean operations
    C. Perform arithmetic operations
    D. Move data between registers

25. Which of the following components of an operating system maintains the directory system?
    A. Device drivers
    B. File manager
    C. Memory manager
    D. Desktop manager

26. Which of the following components of an operating system handles the details associated with particular peripheral equipment?
    A. Device drivers
    B. File manager
    C. Memory manager
    D. Dispatcher

27. Which of the following components of an operating system is not part of the kernel?
    A. Shell
    B. File manager
    C. Scheduler
    D. Dispatcher

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28. Multitasking in a computer with only one CPU is accomplished by a technique called
    A. Bootstrapping
    B. Batch processing
    C. Time sharing
    D. VR

29. Execution of an operating system is initiated by a program called the
    A. Window manager
    B. Scheduler
    C. Bootstrap
    D. MS word

30. The end of a time slice is indicted by the occurrence of a signal called
    A. An interrupt
    B. A semaphore
    C. A login
    D. A dialogue box

31. A section of a program that should be executed by at most one process at a time is called a
    A. Utility
    B. Critical region
    C. Privileged instruction
    D. Window

32. Which of the following items of information would not be contained in an operating system's process table?
    A. The location of the memory area assigned to the process
    B. The priority of each process
    C. Whether the process is ready or waiting
    D. The machine language instructions being executed by the process

33. Which of the following is a technique for controlling access to a critical region?
    A. Spooling
    B. Time sharing
    C. Semaphore
    D. Booting

34. Which of the following is not a role of a typical operating system?
    A. Control the allocation of the machine's resources
    B. Control access to the machine
    C. Maintain records regarding files stored in mass storage
    D. Assist the computer user in the task of processing digital photographs

35. Which of the following components of an operating system is executed as the result of an interrupt signal?
    A. Dispatcher
    B. Memory manager
    C. File manager
    D. Shell

36. Which of the following statements is true?
    A. Allowing several processes to share time in a multitasking system is less efficient than executing each of them to completion one after the other.
    B. The use of passwords provides an impenetrable safeguard.
    C. Both A and B
    D. Neither A not B

37. 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

38. Ethernet is a means of implementing which of the following network topologies?
    A. Star
    B. Ring
    C. Bus
    D. Irregular

39. Which of the following is not a means of performing interprocess communication over a network?

A. Client/server
B. ICANN
C. Peer-to-peer
D. P2P

40. If the network identifier of a domain in the Internet is 115.48, how many unique IP addresses are available for identifying machines within the domain?

A. 4096
B. 16,384
C. 32,768
D. 65,536

41. Which of the following is not an application of the Internet?

A. FTP
B. Email
C. Telnet
D. CERT

42. Which of the following is not a means of referencing entities on the Internet?

A. URL
B. IP address
C. Anonymous FTP
D. Host address

43. Which of the following is not a means of connecting networks?

A. Gateway
B. Server
C. Router
D. Bridge

44. Which layer of the TCP/IP hierarchy decides the direction in which message segments are transferred across the Internet?

A. Application
B. Transport
C. Network
D. Link

45. Which layer of the TCP/IP hierarchy decides which application should receive an incoming message?

A. Application
B. Transport
C. Network
D. Link

46. Which of the following is an Internet application that is named after its underlying protocol?

A. Email
B. World Wide Web
C. FTP
D. UDP

47. Which of the following is not a means of implementing server-side activities?

A. CGI
B. JSP
C. ASP
D. Applets

48. Which of the following is not a protocol used in the basic TCP/IP software hierarchy?

A. POP3
B. UDP
C. TCP
D. IP

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49. Which of the following is an activity?
    A. Algorithm
    B. Program
    C. Process
    D. Memory

50. 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

51. 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 sequential search algorithm?
    A. Lewis
    B. Pat
    C. Tom
    D. Stan

52. In general, an algorithm in which of the following categories is considered more efficient?
    A. $\Theta(\lg n)$
    B. $\Theta(n)$
    C. $\Theta(n \lg n)$
    D. $\Theta(n^2)$

53. Under the assumption that X takes on only integer values, which of the following is the termination condition for the following loop?

```
while (X < 5) do
  (...)
```

A. $X < 5$
B. $X > 4$
C. $X < 4$
D. $X < 3$

54. Preconditions, postconditions, and loop invariants are examples of which of the following?

A. Pseudocode
B. Iterative structures
C. Assertions
D. Recursion

55. Which of the following is not a way of representing algorithms?

A. Stepwise refinement
B. Pseudocode
C. Flowchart
D. Programming language

56. Which of the following is an example of a language that is based on the object-oriented paradigm?

A. LISP
B. PROLOG
C. C
D. C++

57. Most machine languages are based on the

A. Imperative paradigm
B. Declarative paradigm
C. Functional paradigm
D. Object-oriented paradigm

58. 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

59. Which of the following is not a control statement?
    A. If-then-else statement
    B. While loop statement
    C. Assignment statement
    D. For loop statement

60. Which of the following is not a step in the process of translating a program?
    A. Executing the program
    B. Parsing the program
    C. Lexical analysis
    D. Code generation

61. Which of the following is not associated with object-oriented programming?
    A. Inheritance
    B. Resolution
    C. Encapsulation
    D. Polymorphism

62. Positions within arrays are identified by means of numbers called
    A. Indices
    B. Parameters
    C. Instance variables
    D. Constants

63. Which of the following is a means of nullifying conflicts among data types?
    A. Inheritance
    B. Parsing
    C. Coercion
    D. Code optimization

64. Which of the following is a means of defining similar yet different classes in an object-oriented program?

A. Inheritance
B. Parsing
C. Coercion
D. Code optimization

65. Which of the following is a notational system for representing object-oriented designs?

A. UML
B. Structure charts
C. Modular designs
D. Dataflow diagrams

66. 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

67. Which of the following is most likely an example of a one-to-one relationship?

A. Subscribers and magazines
B. Birth dates and people
C. Planets and their moons
D. Dinner guests and table settings

68. The use of design patterns in software engineering was adopted from what other field?

A. Business administration
B. Architecture
C. Biology
D. Chemistry

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69. Which of the following terms refers to an action that is not readily apparent from a written program?

A. Consequence
B. Side effect
C. Specification
D. Bug

70. Which of the following is a way of testing the design of a software system?

A. Entity-relationship diagram
B. Collaboration diagram
C. Structure chart
D. Structured walkthrough

71. Which of the following is a LIFO structure?

A. Array
B. Stack
C. Queue
D. Tree

72. Which of the following is a FIFO structure?

A. Array
B. Stack
C. Queue
D. Tree

73. Which of the following is static in the sense that it does not change size or shape as information is stored and retrieved?

A. Array
B. Stack
C. Queue
D. Tree

74. Suppose a binary tree contained the nodes W, X, Y, and Z. If W and X were children of Y, and Z had no children, which node would be the root?

A. W
B. X
C. Y
D. Z

75. Suppose a binary tree contained the nodes W, X, Y, and Z, and each node had at most one child. How many terminal nodes would be in the tree?

A. One
B. Two
C. Three
D. Undetermined

76. Which of the following relational operations combine data from more than one relation?

A. SELECT
B. PROJECT
C. JOIN
D. CAST

77. Which of the following relational operations extracts entire columns from a relation?

A. SELECT
B. PROJECT
C. JOIN
D. WHERE

78. Which of the following relational operations extracts entire rows from a relation?

A. SELECT
B. PROJECT
C. JOIN
D. COMBINE

79. Which of the following file structures is most efficient in cases in which the file is always processed in its entirety a predetermined order?

A. Sequential
B. Indexed
C. Hash
D. None of the above

80. Which of the following is a proposed means of testing the intelligence of a machine?

A. Turing test
B. Production system
C. Semantic analysis
D. Syntactic analysis