

臺灣綜合大學系統 115 學年度學士班轉學生聯合招生考試試題

科目名稱	計算機概論	類組代碼	A06
		科目碼	A0602

※本項考試依簡章規定所有考科均「不可」使用計算機。

本科試題共計 4 頁

Multiple Choice Question (2.5 points for each)

- In database, which relational operation is used to combine different relations into one new relation?
(A) Merge (B) Group (C) Join (D) Combine
- What term describes a variable declared within a specific function, meaning it can only be referenced within that function?
(A) Global variable (B) Local variable (C) Constant (D) Static variable
- Which type of network is normally used for short-range communications, such as between a wireless headset and a smartphone?
(A) Local area network (B) Metropolitan area network (C) Wide area network (D) Personal area network
- What efficiency class does the binary search algorithm fall into based on its worst-case analysis?
(A) $O(\log n)$ (B) $O(n)$ (C) $O(n^2)$ (D) $O(n \log n)$
- The CPU performs its job by continually repeating an algorithm known as the machine cycle. What are the three steps of this cycle?
(A) Read, write, and save (B) Input, process, and output (C) Fetch, decode, and execute (D) Load, store, and branch
- In object-oriented programming, what is the special method that is automatically invoked when a new object is created and initialized?
(A) Parser (B) Constructor (C) Thread (D) Token
- What phenomenon occurs when a program repeatedly allocates memory but fails to release storage that is no longer needed?
(A) Deadlock (B) Memory leak (C) Overflow (D) Starvation
- In Structured Query Language, what are the three primary clauses used to construct a typical query statement?
(A) Find, locate, display (B) Get, from, filter (C) Select, from, where (D) Choose, data, condition
- In a public-key encryption system (such as RSA), suppose Alice wants to send a secret message to Bob, which key is used to decrypt the ciphertext?
(A) Bob's public key (B) Alice's private key (C) Alice's public key (D) Bob's private key
- What is the primary purpose of an odd or even parity system?
(A) To compress numeric data (B) To detect communication errors (C) To encrypt sensitive information (D) To correct communication errors
- Which software development methodology insists on performing requirements analysis, design, implementation, and testing in a strictly sequential, one-directional manner?
(A) Incremental model (B) Iterative model (C) Waterfall model (D) Extreme programming

12. What is the fundamental unit of information inside a computer, represented as a 0 or 1?
(A) Byte (B) Bit (C) Cell (D) Sector
13. In a tree structure, what are the nodes at the extreme bottom (which have no children) called?
(A) Root nodes (B) Sibling nodes (C) Leaf nodes (D) Ancestor nodes
14. How do artificial neural networks typically learn to solve a particular problem?
(A) By being programmed in a traditional imperative language (B) By applying a search algorithm
(C) By randomly guessing until a goal state is found (D) By adjusting the weights associated with inputs through a training process
15. Which algorithm extends the best-first search algorithm by also considering the accumulated cost incurred to reach each leaf node when selecting the next node to expand?
(A) Breadth-first search (B) Depth-first search (C) A* algorithm (D) Genetic algorithm
16. What are the three main components that make up a computer's central processing unit (CPU)?
(A) Arithmetic logic unit, control unit, and registers (B) Main memory, mass storage, and arithmetic logic unit (C) Bus, microprocessor, and cache (D) Program counter, instruction register, and main circuit board
17. Which programming paradigm asks the programmer to describe the problem to be solved rather than outlining an algorithm to solve it?
(A) Imperative paradigm (B) Declarative paradigm (C) Functional paradigm (D) Object-oriented paradigm
18. In the Internet software hierarchy, which layer is responsible for segmenting messages and assigning sequence numbers?
(A) Transport layer (B) Application layer (C) Network layer (D) Link layer
19. What legal agreement grants the user certain permissions to use the software without transferring ownership rights?
(A) Software license (B) Software requirements specification (C) Copyright (D) Patent
20. What type of structure is a queue?
(A) Last-in, first-out (B) First-in, Last-out (C) Last-in, last-out (D) First-in, first-out
21. What generation of programming languages introduced mnemonic systems to represent instructions instead of numeric machine language?
(A) First-generation languages (B) Second-generation languages (C) Third-generation languages (D) Fourth-generation languages
22. Which of the following is an example of an NP-complete problem?
(A) Halting problem (B) Sorting problem (C) Traveling salesperson problem (D) Binary search problem
23. Where is the BIOS firmware stored?
(A) Random Access Memory (B) Read-Only Memory (C) The CPU cache (D) The instruction register
24. Which sorting algorithm repeatedly takes the next element from the unsorted portion and inserts it into its correct position in the sorted portion?

- (A) Selection sort (B) Merge sort (C) Bubble sort (D) Insertion sort
25. What is the collection of wires used to transfer bit patterns between a machine's CPU and main memory called?
(A) Bus (B) Port (C) Slot (D) BIOS
26. In a linked list, what special value is placed in the pointer field of the last node to indicate that no further entries exist?
(A) Constant pointer (B) Instruction pointer (C) Stack pointer (D) Null pointer
27. Which form of data mining deals with identifying properties that divide two groups?
(A) Class description (B) Class discrimination (C) Cluster analysis (D) Sequential pattern analysis
28. In human-machine interface design, what field focuses on designing systems that harmonize with the physical abilities of humans?
(A) Cognetics (B) Ergonomics (C) Economics (D) Kinetics
29. In the encoded version of a machine instruction, what is the field that indicates which elementary operation (such as STORE, SHIFT, or XOR) is being requested?
(A) Op-code field (B) Operand field (C) Mantissa field (D) Register field
30. Due to the transition from IPv4 to IPv6, how many bits does an IPv6 address contain?
(A) 32 bits (B) 64 bits (C) 128 bits (D) 256 bits
31. Assuming the root node is stored in cell 1, if a binary tree is stored in a single, contiguous block of memory cells without pointers, and a node is stored in cell n , in which cell is its left child stored?
(A) Cell $n+1$ (B) Cell $n-1$ (C) Cell $2n$ (D) Cell $2n+1$
32. When discussing programming primitives, what does the term "semantics" refer to?
(A) The grammatical structure of the program (B) The primitive's symbolic representation (C) The meaning of the primitive (D) The runtime behavior of the primitive
33. The technique of dividing CPU time into short intervals and switching among processes to create the illusion of simultaneous execution is known as:
(A) Time-sharing (B) Multiprogramming (C) Bootstrapping (D) Paging
34. Problems that can be solved by algorithms whose time complexities are bounded by a polynomial are classified in which collection?
(A) Class NP (B) Class CoNP (C) Class NP-Hard (D) Class P
35. In a bus network based on Ethernet standards, which protocol dictates that each machine waits until the bus is silent before transmitting and pauses if a collision is detected?
(A) CSMA/CD (B) CSMA/CA (C) TCP/IP (D) SMTP
36. What is the output of this code?
- ```
int main() {
 int a[] = {1, 2, 3};
 int *p = a;
 ++*p;
 printf("%d %d", a[0], a[1]);
}
```

(A) 1 2 (B) 2 2 (C) 1 3 (D) 2 3

37. What is the output of this code?

```
void move(int *p) {
 p++;
 *p = *p - 1;
}

int main() {
 int a[] = {1, 3, 5};
 int *p = a;
 move(p);
 printf("%d", *p + *(p+1) + (*p+2));
}
```

(A) 6 (B) 7 (C) 8 (D) 9

38. What is the output of this code?

```
int main() {
 char *s[] = {"APPLE", "NVIDIA", "TSMC"};
 printf("%c", *(s + 1) + 2);
}
```

(A) P (B) S (C) M (D) I

39. What is the output of this code?

```
int main() {
 int a[] = {1, 3, 5, 7};
 printf("%d", 2[a]);
}
```

(A) 1 (B) 3 (C) 5 (D) 7

40. What is the output of this code?

```
int main() {
 int a[] = {2, 4, 6, 8};
 int *p = a;
 for(int i=0; i<2; i++)
 p++;
 printf("%d", *(p+1));
}
```

(A) 2 (B) 4 (C) 6 (D) 8