

Computer Science definitions are marked on the technical distinction, and most of the lost marks come from pairs that sound similar and are not – compiler and interpreter, authentication and authorisation, latency and bandwidth. 定义题的分数在于区分相近概念。

Data representation

Bit / byte 位与字节 — a single binary digit; a group of eight bits

Two's complement 补码 — a representation of signed integers in which the most significant bit carries a negative place value, so addition and subtraction use the same circuitry

Floating-point representation 浮点表示 — a number stored as a mantissa and an exponent, trading precision for range

Normalisation 规格化 — adjusting a floating-point number so the mantissa begins with the digits 01 or 10, giving the greatest precision for the bits available

Character set 字符集 — an agreed mapping between characters and binary codes – ASCII uses 7 or 8 bits, Unicode encodes far more characters

Lossy / lossless compression 有损与无损压缩 — compression that discards data and cannot be exactly reversed; compression that preserves every bit and can be reversed exactly

Run-length encoding 行程编码 — a lossless method replacing a run of identical values with the value and a count

Hardware and architecture

Von Neumann architecture 冯·诺依曼架构 — a design in which program instructions and data share the same memory and the same bus

Fetch–decode–execute cycle 取指-译码-执行周期 — the repeated sequence by which the processor fetches the next instruction from memory, decodes it, and carries it out

Register 寄存器 — a very small, very fast store inside the processor used during instruction execution

Cache 高速缓存 — a small fast memory holding recently or frequently used data, reducing the average time to access main memory

Interrupt 中断 — a signal to the processor requesting attention, which causes the current program's state to be saved and a service routine to run

Bus 总线 — a set of parallel wires carrying data, addresses or control signals between components

Volatile memory 易失性存储器 — memory that loses its contents when power is removed – RAM is volatile, ROM is not

Software and programming

Compiler 编译器 — a translator that converts the whole source program into object code before execution, reporting all errors at the end

Interpreter 解释器 — a translator that converts and executes the source program one statement at a time, stopping at the first error

Assembler 汇编器 — a translator that converts assembly language into machine code, one instruction to one

Operating system 操作系统 — software that manages the hardware and provides an environment in which applications run

Scheduling 调度 — the operating system's allocation of processor time between competing processes

Virtual memory 虚拟内存 — the use of secondary storage as an extension of main memory, so programs larger than RAM can run

Abstraction 抽象 — removing detail that is not relevant to the problem, so the essential structure can be reasoned about

Decomposition 分解 — breaking a problem into smaller sub-problems that can each be solved separately

Data structures and algorithms

Stack 栈 — a last-in-first-out structure, with push and pop operating at the same end

Queue 队列 — a first-in-first-out structure, with items added at one end and removed at the other

Linked list 链表 — a sequence in which each node holds data and a pointer to the next, so insertion needs no shifting

Binary tree 二叉树 — a structure in which each node has at most two children, ordered so a search can discard half the remaining nodes at each step

Hash table 散列表 — a structure that computes a storage address from the key, giving near-constant access time; a collision occurs when two keys hash to the same address

Binary search 二分查找 — repeatedly halving a SORTED list by comparing the target with the middle item

Time complexity 时间复杂度 — how the number of operations grows with the size of the input, expressed in big-O notation

Recursion 递归 — a routine that calls itself, with a base case that stops the calls and a general case that moves towards it

Databases

Primary key 主键 — an attribute or set of attributes that uniquely identifies each record in a table

Foreign key 外键 — an attribute in one table that is the primary key of another, creating the link between them

Referential integrity 参照完整性 — the rule that a foreign key must match an existing primary key, so no record refers to something that does not exist

Normalisation (database) 数据库规范化 — organising tables to remove redundancy and update anomalies; third normal form requires every non-key attribute to depend on the key, the whole key, and nothing but the key

Transaction 事务 — a group of operations treated as a single unit, which either completes entirely or has no effect at all

Networks and security

Protocol 协议 — an agreed set of rules governing how devices communicate

Packet switching 分组交换 — dividing data into packets routed independently across the network and reassembled at the destination

Bandwidth / latency 带宽与延迟 — the amount of data transferable per unit time; the delay before a transfer begins. High bandwidth does not imply low latency

Encryption 加密 — converting plaintext into ciphertext so it is unintelligible without the key

Symmetric / asymmetric encryption 对称与非对称加密 — the same key encrypts and decrypts; a public key encrypts and a matching private key decrypts

Digital signature 数字签名 — a hash of a message encrypted with the sender's private key, which proves both origin and integrity

Authentication / authorisation 身份验证与授权 — establishing WHO a user is; establishing WHAT that user is permitted to do

Firewall 防火墙 — hardware or software that filters traffic between networks according to a set of rules