*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