

The multiple-choice section tests whether you can say precisely what a construct does, and the free-response section is graded against a rubric that names constructs by their proper terms. Learn these sentences; then, when tracing code, say the term aloud as you meet it. 选择题考的是对构造的精确理解, 简答题按术语给分。

Objects and classes

Class 类 — a blueprint that defines the state (instance variables) and behaviour (methods) shared by objects of that type

Object 对象 — an instance of a class, created with new, holding its own copy of the instance variables

Constructor 构造方法 — a special method with the class's name and no return type, run once when an object is created, to initialise its state

Instance variable 实例变量 — a variable declared in a class but outside any method, one copy per object

Static variable 静态变量 — a variable declared static, shared by every object of the class rather than copied per object

Encapsulation 封装 — keeping instance variables private and giving access through public methods, so an object controls its own state

Accessor and mutator 访问器与修改器 — an accessor returns a value without changing state; a mutator changes state and typically returns void

Inheritance and polymorphism

Inheritance 继承 — a subclass acquiring the accessible fields and methods of its superclass, declared with extends

Method overriding 方法重写 — a subclass providing its own implementation of a method with the same signature as one in the superclass

Method overloading 方法重载 — two methods in the same class sharing a name but differing in parameter list

Polymorphism 多态 — the ability of a superclass reference to hold a subclass object, so the overridden method actually run is chosen at RUN TIME by the object's type

Abstract class 抽象类 — a class that cannot be instantiated and may declare abstract methods that its subclasses must implement

super super 关键字 — a reference used to call the superclass's constructor or an overridden superclass method

Data, control and arrays

Primitive type 基本类型 — a type such as int, double or boolean holding a value directly, not a reference

Reference type 引用类型 — a type whose variable holds the address of an object; two references can point to the same object

Integer division 整数除法 — division of two ints, which discards the fractional part rather than rounding — $-7/2$ is 3

Short-circuit evaluation 短路求值 — `&&` and `||` stop evaluating as soon as the result is determined, so the right operand may never run

Array 数组 — a fixed-length, zero-indexed sequence of elements of one type, whose length is a field, not a method

ArrayList 动态数组 — a resizable list of object references whose size is a METHOD, and which stores objects rather than primitives

Enhanced for loop 增强 for 循环 — a loop that visits each element in turn; assigning to its variable does not change the underlying array

Correctness and analysis

Off-by-one error 差一错误 — a loop bound that runs one iteration too few or too many; with zero-indexing, valid indices run to $\text{length} - 1$

NullPointerException 空指针异常 — a run-time error from calling a method on a reference that is null

ArrayIndexOutOfBoundsException 数组越界异常 — a run-time error from using an index below 0 or at or above the array's length

Recursion 递归 — a method calling itself on a smaller input, requiring a base case that returns without recursing

Linear search 线性查找 — checking elements in order until the target is found or the list ends; it does not require sorted data

Binary search 二分查找 — repeatedly halving a SORTED range by comparing with its middle element