AP Computer Science A

Syllabus Checklist · 大纲自查表

Tick one box per statement: ☐ not yet ☐ nearly ☐ confident. 每条打一个勾：尚未掌握 / 快会了 / 有把握。

1. Using Objects and Methods 使用对象与方法

1.1 Introduction to Algorithms, Programming, and Compilers 算法、编程与编译器导论

- ☐☐☐ Represent patterns and algorithms found in everyday life using written language or diagrams.
- ☐☐☐ Explain the code compilation and execution process.
- ☐☐☐ Identify types of programming errors.

1.2 Variables and Data Types 变量与数据类型

- ☐☐☐ Identify the most appropriate data type category for a particular specification.
- ☐☐☐ Develop code to declare variables to store numbers and Boolean values.

1.3 Expressions and Output 表达式与输出

- ☐☐☐ Develop code to generate output and determine the result that would be displayed.
- ☐☐☐ Develop code to utilize string literals and determine the result of using string literals.
- ☐☐☐ Develop code for arithmetic expressions and determine the result of these expressions.

1.4 Assignment Statements and Input 赋值语句与输入

- ☐☐☐ Develop code for assignment statements with expressions and determine the value that is stored in the variable as a result of these statements.
- ☐☐☐ Develop code to read input.

1.5 Casting and Range of Variables 类型转换与变量取值范围

- ☐☐☐ Develop code to cast primitive values to different primitive types in arithmetic expressions and determine the value that is produced as a result.
- ☐☐☐ Describe conditions when an integer expression evaluates to a value out of range.
- ☐☐☐ Describe conditions that limit accuracy of expressions.

1.6 Compound Assignment Operators 复合赋值运算符

- ☐☐☐ Develop code for assignment statements with compound assignment operators and determine the value that is stored in the variable as a result.

1.7 Application Program Interface (API) and Libraries 应用程序接口（API）与库

- ☐☐☐ Identify the attributes and behaviors of a class found in the libraries contained in an API.

1.8 Documentation with Comments 用注释编写文档

- ☐☐☐ Describe the functionality and use of code through comments.

1.9 Method Signatures 方法签名

- ☐☐☐ Identify the correct method to call based on documentation and method signatures.

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- ☐☐☐ Describe how to call methods.

1.10 Calling Class Methods 调用类方法

- ☐☐☐ Develop code to call class methods and determine the result of those calls.

1.11 Math Class Math 类

- ☐☐☐ Develop code to write expressions that incorporate calls to built-in mathematical libraries and determine the value that is produced as a result.

1.12 Objects: Instances of Classes 对象：类的实例

- ☐☐☐ Explain the relationship between a class and an object.
- ☐☐☐ Develop code to declare variables to store reference types.

1.13 Object Creation and Storage (Instantiation) 对象的创建与存储（实例化）

- ☐☐☐ Identify, using its signature, the correct constructor being called.
- ☐☐☐ Develop code to declare variables of the correct types to hold object references.
- ☐☐☐ Develop code to create an object by calling a constructor.

1.14 Calling Instance Methods 调用实例方法

- ☐☐☐ Develop code to call instance methods and determine the result of these calls.

1.15 String Manipulation 字符串操作

- ☐☐☐ Develop code to create string objects and determine the result of creating and combining strings.
- ☐☐☐ Develop code to call methods on string objects and determine the result of calling these methods.

2. Selection and Iteration 选择与迭代

2.1 Algorithms with Selection and Repetition 带选择与重复的算法

- ☐☐☐ Represent patterns and algorithms that involve selection and repetition found in everyday life using written language or diagrams.

2.2 Boolean Expressions 布尔表达式

- ☐☐☐ Develop code to create Boolean expressions with relational operators and determine the result of these expressions.

2.3 if Statements if 语句

- ☐☐☐ Develop code to represent branching logical processes by using selection statements and determine the result of these processes.

2.4 Nested if Statements 嵌套 if 语句

- ☐☐☐ Develop code to represent nested branching logical processes and determine the result of these processes.

2.5 Compound Boolean Expressions 复合布尔表达式

☐☐☐ Develop code to represent compound Boolean expressions and determine the result of these expressions.

2.6 Comparing Boolean Expressions 比较布尔表达式

☐☐☐ Compare equivalent Boolean expressions.

☐☐☐ Develop code to compare object references using Boolean expressions and determine the result of these expressions.

2.7 while Loops while 循环

☐☐☐ Identify when an iterative process is required to achieve a desired result.

☐☐☐ Develop code to represent iterative processes using 'while' loops and determine the result of these processes.

2.8 for Loops for 循环

☐☐☐ Develop code to represent iterative processes using 'for' loops and determine the result of these processes.

2.9 Implementing Selection and Iteration Algorithms 实现选择与迭代算法

☐☐☐ Develop code for standard and original algorithms (without data structures) and determine the result of these algorithms.

2.10 Implementing String Algorithms 实现字符串算法

☐☐☐ Develop code for standard and original algorithms that involve strings and determine the result of these algorithms.

2.11 Nested Iteration 嵌套迭代

☐☐☐ Develop code to represent nested iterative processes and determine the result of these processes.

2.12 Informal Run-Time Analysis 非正式运行时间分析

☐☐☐ Calculate statement execution counts and informal run-time comparison of iterative statements.

3. Class Creation 类的创建

3.1 Abstraction and Program Design 抽象与程序设计

☐☐☐ Represent the design of a program by using natural language or creating diagrams that indicate the classes in the program and the data and procedural abstractions found in each class by including all attributes and behaviors.

3.2 Impact of Program Design 程序设计的影响

☐☐☐ Explain the social and ethical implications of computing systems.

3.3 Anatomy of a Class 类的结构剖析

☐☐☐ Develop code to designate access and visibility constraints to classes, data, constructors, and methods.

3.4 Constructors 构造方法

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☐☐☐ Develop code to declare instance variables for the attributes to be initialized in the body of the constructors of a class.

3.5 Methods: How to Write Them 方法：如何编写

☐☐☐ Develop code to define behaviors of an object through methods written in a class using primitive values and determine the result of calling these methods.

3.6 Methods: Passing and Returning References of an Object 方法：传递与返回对象引用

☐☐☐ Develop code to define behaviors of an object through methods written in a class using object references and determine the result of calling these methods.

3.7 Class Variables and Methods 类变量与类方法

☐☐☐ Develop code to define behaviors of a class through class methods.

☐☐☐ Develop code to declare the class variables that belong to the class.

3.8 Scope and Access 作用域与访问权限

☐☐☐ Explain where variables can be used in the code.

3.9 this Keyword this 关键字

☐☐☐ Develop code for expressions that are self-referencing and determine the result of these expressions.

4. Data Collections 数据集合

4.1 Ethical and Social Issues Around Data Collection 数据采集的伦理与社会问题

☐☐☐ Explain the risks to privacy from collecting and storing personal data on computer systems.

☐☐☐ Explain the importance of recognizing data quality and potential issues when using a data set.

☐☐☐ Identify an appropriate data set to use in order to solve a problem or answer a specific question.

4.2 Introduction to Using Data Sets 使用数据集导论

☐☐☐ Represent patterns and algorithms that involve data sets found in everyday life using written language or diagrams.

4.3 Array Creation and Access 数组的创建与访问

☐☐☐ Develop code used to represent collections of related data using one-dimensional (1D) array objects.

4.4 Array Traversals 数组遍历

☐☐☐ Develop code used to traverse the elements in a 1D array and determine the result of these traversals.

4.5 Implementing Array Algorithms 实现数组算法

☐☐☐ Develop code for standard and original algorithms for a particular context or specification that involves arrays and determine the result of these algorithms.

4.6 Using Text Files 使用文本文件

☐☐☐ Develop code to read data from a text file.

4.7 Wrapper Classes 包装类

☐☐☐ Develop code to use ‘Integer‘ and ‘Double‘ objects from their primitive counterparts and determine the result of using these objects.

4.8 ArrayList Methods ArrayList 方法

☐☐☐ Develop code for collections of related objects using ‘ArrayList‘ objects and determine the result of calling methods on these objects.

4.9 ArrayList Traversals ArrayList 遍历

☐☐☐ Develop code used to traverse the elements of an ‘ArrayList‘ and determine the results of these traversals.

4.10 Implementing ArrayList Algorithms 实现 ArrayList 算法

☐☐☐ Develop code for standard and original algorithms for a particular context or specification that involve ‘ArrayList‘ objects and determine the result of these algorithms.

4.11 2D Array Creation and Access 二维数组的创建与访问

☐☐☐ Develop code used to represent collections of related data using two-dimensional (2D) array objects.

4.12 2D Array Traversals 二维数组遍历

☐☐☐ Develop code used to traverse the elements in a 2D array and determine the result of these traversals.

4.13 Implementing 2D Array Algorithms 实现二维数组算法

☐☐☐ Develop code for standard and original algorithms for a particular context or specification that involves 2D arrays and determine the result of these algorithms.

4.14 Searching Algorithms 查找算法

☐☐☐ Develop code used for linear search algorithms to search for specific information in a collection and determine the results of executing a search.

4.15 Sorting Algorithms 排序算法

☐☐☐ Determine the result of executing each step of sorting algorithms to sort the elements of a collection.

4.16 Recursion 递归

☐☐☐ Determine the result of calling recursive methods.

4.17 Recursive Searching and Sorting 递归查找与排序

☐☐☐ Determine the result of executing recursive algorithms that use strings or collections.

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☐☐☐ Determine the result of each iteration of a binary search algorithm used to search for information in a collection.

☐☐☐ Determine the result of each iteration of the merge sort algorithm when used to sort a collection.