

2.9 Implementing Selection and Iteration Algorithms

Name: _____ Class: _____ Date: _____ Total: 9 marks

KEY WORDS running total 累加 • iteration 迭代 • selection 选择

Objective

Build the skills to answer exam questions on **implementing selection and iteration algorithms**.

You must be able to:

- combine **selection** and **iteration** to build a complete algorithm
- use a loop with an **if** inside to **count** or **filter** values
- accumulate a **running total** 累加 or track a **maximum**/minimum

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Loop with an if inside

To **count** values meeting a condition, loop over them and increment a counter inside an **if**:

```
int count = 0;
for (int x : nums) {
    if (x % 2 == 0) count++;    // count evens
}
```

■ Accumulate and track

A **running total** adds each value as the loop runs. To find a **maximum**, keep a “best so far” variable and update it whenever a larger value appears.

2 Practice

2.1 State how to count values meeting a condition inside a loop. [1]

2.2 Describe how to find the maximum of a list of numbers. [2]

2.3 State what a “running total” is. [1]

3 Exam-style questions

3.1 To count how many scores are above 50, you use a loop with [1]

- A

B

C

D
- A no condition

B an **if** inside it

C a cast

D a constructor

3.2 A variable that adds each value as a loop runs is a [1]

- A

B

C

D
- A counter of items

B running total

C loop control variable

D parameter

3.3 A loop goes through {4, 9, 2, 7} tracking the largest so far (starting with the first value).

- (a) State the maximum so far after seeing 4 and 9. [1]

(b) State the final maximum. [1]

(c) Name the technique of adding all the values together. [1]