AP COMPUTER SCIENCE A • EXERCISE SHEET

2.9 Implementing Selection and Iteration Algorithms

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

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** 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** 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]

4 Go further

- work through the **2.9 Implementing Selection and Iteration Algorithms** lesson on the **Learn** page;

- read the **Iteration** section of the AP Computer Science A handout on the **Know** page.

Solutions

2.1 loop over the values and increment a counter inside an `if` that tests the condition.

2.2 keep a ”maximum so far” variable, and update it whenever the current value is larger.

2.3 a variable that accumulates the sum of values as the loop runs.

3.1 B.

3.2 B.

3.3 (a) 9. (b) 9. (c) accumulating a running total.