AP COMPUTER SCIENCE A • EXERCISE SHEET

4.5 Implementing Array Algorithms

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

KEY WORDS array 数组

Objective

Build the skills to answer exam questions on **implementing array algorithms**.

You must be able to:

- find the **sum**, **average**, minimum, or maximum of an array
- **count** how many elements meet a condition
- determine whether an array **contains** a matching value

1 Worked examples

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

Sum and average

```
int sum = 0;
for (int x : a) sum += x;
double avg = (double) sum / a.length;
```

Minimum, maximum, and counting

Track a "best so far" variable for the min or max; use an `if` inside the loop to **count** elements that meet a condition, or to detect whether a value is present.

2 Practice

2.1 Describe how to find the sum of an array. [1]

2.2 For `int[] a = {2, 4, 6};`, find the sum and the average. [2]

2.3 State how to count the elements greater than 5. [1]

3 Exam-style questions

3.1 To find the maximum of an array, you [1]

- **A** add all the elements
- **B** track the largest value seen so far
- **C** sort then divide
- **D** count the elements

3.2 The average of `{4, 8, 12}` is [1]

- **A** `8`
- **B** `24`
- **C** `4`
- **D** `12`

3.3 `int[] a = {5, 10, 15, 20};`.

(a) Find the sum. [1]

(b) Find the average. [1]

(c) Count the elements greater than 10. [1]

Solutions

2.1 start a total at 0 and add each element as you loop through the array.

2.2 sum $= 2 + 4 + 6 = 12$; average $= 12/3 = 4$.

2.3 loop over the array and increment a counter inside an `if (x > 5)`.

3.1 B.

3.2 A.

3.3 (a) 50. (b) 12.5. (c) 2 (the values 15 and 20).