

# 4.5 Implementing Array Algorithms

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 9 marks

## Objective

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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

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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

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

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

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

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### 3 Exam-style questions

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

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

### 4 Go further

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- work through the **4.5 Implementing Array Algorithms** lesson on the **Learn** page;
- read the **Array** section of the AP Computer Science A handout on the **Know** page.

## Solutions

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

**2.2**  $\text{sum} = 2 + 4 + 6 = 12$ ;  $\text{average} = 12/3 = 4$ .

**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).