

Exercise walk-through

Developing Algorithms ■ 3.9

eXercise

You must be able to

- explain how an **algorithm** 算法 is a finite, step-by-step set of instructions
- express an algorithm using **sequencing** 顺序, selection, and iteration
- represent an algorithm as **pseudocode** 伪代码, a flowchart, or natural language
- refine an algorithm to be correct, clear, and **efficient** 高效

Method — What an algorithm is

A **finite**, step-by-step set of instructions to complete a task, built from three building blocks: **sequencing**, **selection**, and **iteration**.

Method — Representations

The same algorithm can be written as **pseudocode**, drawn as a **flowchart**, or described in **natural language**.

Method — Different algorithms, same result

Two different algorithms can solve the same problem correctly; we compare them by clarity and **efficiency**.

Practice 2.1 ■ 1 mark

Define an algorithm.

Solution 2.1

Worked steps

a finite, step-by-step set of instructions to complete a task **B1**.

Practice 2.2 ■ 2 marks

Name the three building blocks of an algorithm.

Solution 2.2

Method: What an algorithm is

Worked steps

sequencing, selection, iteration **B1** **B1** *for any two; for all three.*

Practice 2.3 ■ 1 mark

Name two ways to represent an algorithm.

Solution 2.3

Worked steps

any two of: pseudocode, a flowchart, natural language **B1**.

Exam-style 3.1 ■ 1 mark

An algorithm must be

- A** infinite
- B** finite and step-by-step
- C** random
- D** written without any words

Solution 3.1

- A infinite
- B finite and step-by-step**
- C random
- D written without any words



Worked steps

B.

Exam-style 3.2 ■ 1 mark

Which of these is **not** a way to represent an algorithm?

A pseudocode

B a flowchart

C natural language

D an overflow

Solution 3.2

A pseudocode

B a flowchart

C natural language

D an overflow



Worked steps

D.

Exam-style 3.3 ■ 1 mark

Two students write different programs that both correctly sort a list.

- (a) State whether both can be valid algorithms.
- (b) Name one quality by which to compare them.
- (c) Name the three building blocks of algorithms.

Solution 3.3

Method: Different algorithms, same result

Worked steps

(a) yes **B1**. (b) efficiency (or clarity) **B1**. (c) sequencing, selection, iteration **B1**.