

Exercise walk-through

Data Abstraction ■ 3.2

eXercise

You must be able to

- explain how **data abstraction** 数据抽象 hides detail to manage complexity
- describe how a **list** 列表 groups many values under one name
- explain how using a list makes a program more **general** 通用
- relate data abstraction to real-world **modeling** 建模

Method — Data abstraction

Data abstraction hides detail so the programmer can manage complexity. A **list** is an abstract data type that groups many values under **one name**.

Method — More general

Storing scores as one list — `scores = [85, 90, 78]` — instead of three separate variables lets a single loop handle **any** number of values.

Method — Modeling

Like real-world modeling, abstraction simplifies detail to focus on the essentials.

Practice 2.1 ■ 1 mark

State what data abstraction does.

Solution 2.1

Method: Data abstraction

Worked steps

it hides detail to manage complexity in a program **B1**.

Practice 2.2 ■ 1 mark

State how a list makes a program more general.

Solution 2.2

Method: More general

Worked steps

one list and one loop can handle any number of values **B1**.

Practice 2.3 ■ 1 mark

State one benefit of using a list instead of many separate variables.

Solution 2.3

Method: More general

Worked steps

it is easier to store, name, and process many values together **B1**.

Exam-style 3.1 ■ 1 mark

A list is an example of

A a data abstraction

B a syntax error

C a Boolean

D a byte

Solution 3.1

A a data abstraction



B a syntax error

C a Boolean

D a byte

Worked steps

A.

Exam-style 3.2 ■ 1 mark

Grouping many values under a single name is

- A** iteration
- B** data abstraction
- C** an event
- D** compression

Solution 3.2

Method: Data abstraction

- A iteration
- B data abstraction 
- C an event
- D compression

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A program must store 100 test scores.

- (a) State whether to use 100 separate variables or one list.
- (b) State one benefit of the choice in (a).
- (c) Name the general idea of hiding detail to manage complexity.

Solution 3.3

Worked steps

(a) one list **B1**. (b) all scores can be processed with a single loop **B1**. (c) (data) abstraction **B1**.