

3.2 Data Abstraction

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

KEY WORDS abstraction 抽象 • list 列表 • data abstraction 数据抽象 • general 通用
• modeling 建模

Objective

Build the skills to answer exam questions on **data abstraction**.

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

1 Worked examples

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

■ 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**.

■ 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.

■ Modeling

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

2 Practice

2.1 State what data abstraction does. [1]

2.2 State how a list makes a program more general. [1]

2.3 State one benefit of using a list instead of many separate variables. [1]

3 Exam-style questions

3.1 A list is an example of [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** a data abstraction
B a syntax error
C a Boolean
D a byte

3.2 Grouping many values under a single name is [1]

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

3.3 A program must store 100 test scores.

(a) State whether to use 100 separate variables or one list. [1]

(b) State one benefit of the choice in (a). [1]

(c) Name the general idea of hiding detail to manage complexity. [1]