AP COMPUTER SCIENCE PRINCIPLES • EXERCISE SHEET

2.4 Using Programs with Data

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

Objective

Build the skills to answer exam questions on **using programs with data**.

You must be able to:

- explain how a program **processes** 处理 data to produce new information
- use **iteration** 迭代 to examine each element of a data set
- apply a **filter** 筛选 to select records that meet a condition
- describe how **cleaning** data improves reliability

1 Worked examples

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

■ Iteration and filtering

A program uses **iteration** to look at each element of a data set in turn. A **filter** keeps only the records that meet a condition (e.g. "age < 20").

■ Combining and cleaning

A program can **combine or transform** data from more than one source to answer a question, and **cleaning** the data first (removing errors) makes the results more reliable.

2 Practice

2.1 State what a filter does to a data set. [1]

2.2 State why a program uses iteration on a data set. [1]

2.3 State how cleaning data improves the results. [1]

3 Exam-style questions

3.1 A filter applied to a data set [1]

- **A** deletes all the data
- **B** selects the records that meet a condition
- **C** sorts the data randomly
- **D** adds random noise

3.2 Looping through every record in a list is an example of [1]

- **A** a filter
- **B** iteration
- **C** a variable
- **D** metadata

3.3 A program reads 10 000 survey records and keeps only those from teenagers.

(a) Name the operation used to keep only teenagers. [1]

(b) Name the process of looping over all the records. [1]

(c) State one reason to clean the data first. [1]

4 Go further

- work through the **2.4 Using Programs with Data** lesson on the **Learn** page;
- read the **Data** section of the AP Computer Science Principles handout on the **Know** page.

Solutions

2.1 it selects the subset of records that meet a given condition.

2.2 to examine or process each element in turn.

2.3 it removes errors and inconsistencies, so the results are more reliable.

3.1 B.

3.2 B.

3.3 (a) a filter. (b) iteration. (c) to remove errors or duplicates for reliable results.