AP COMPUTER SCIENCE A • EXERCISE SHEET

3.2 Impact of Program Design

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

Objective

Build the skills to answer exam questions on **the impact of program design**.

You must be able to:

- explain that design choices affect how **reliable** 可靠 and **maintainable** 可维护 a program is
- describe how a program can have unintended consequences for users
- understand the value of testing with a wide range of inputs

1 Worked examples

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

■ Why design matters

Good design makes a program more **reliable** (it works correctly) and **maintainable** (it is easy to change). Poor design can cause **unintended consequences** for its users.

■ Testing widely

Testing with a **wide range of inputs**, including edge cases, reveals defects that a few simple tests would miss.

2 Practice

2.1 State one quality that good program design improves. [1]

2.2 State why you should test with a wide range of inputs. [1]

2.3 State what it means for a program to be ”maintainable”. [1]

3 Exam-style questions

3.1 Good program design improves a program's [1]

- **A** speed only
- **B** reliability and maintainability
- **C** file size
- **D** colour

3.2 Testing with a wide range of inputs helps to [1]

- **A** slow the program down
- **B** find defects
- **C** add bias
- **D** compress data

3.3 A poorly designed program is hard to change and often breaks.

(a) State one quality it lacks. [1]

(b) State one way to catch its bugs. [1]

(c) State one risk that poor design poses to users. [1]

4 Go further

- work through the **3.2 Impact of Program Design** lesson on the **Learn** page;
- read the **Writing Classes** section of the AP Computer Science A handout on the **Know** page.

Solutions

2.1 reliability or maintainability (any one).

2.2 to find defects that only appear on some inputs.

2.3 it is easy to understand and change.

3.1 B.

3.2 B.

3.3 (a) reliability (or maintainability). (b) test it with many varied inputs. (c) unintended consequences.