AP COMPUTER SCIENCE A • EXERCISE SHEET

3.6 Methods: Passing and Returning References of an Object

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **passing and returning references of an object**.

You must be able to:

- understand that object **references** 引用 are passed to and returned from methods
- explain that changing an object through a reference affects the **original** object
- distinguish passing a **primitive value** from passing an object reference

1 Worked examples

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

■ Passing references

When an object is passed to a method, the method receives a **reference** to it —not a copy. So if the method **changes the object** through that reference, the **original** object changes too.

■ Primitives vs references

A **primitive** (`int`, `double`, `boolean`) is passed **by value** —the method gets a copy, so changing the parameter does **not** affect the original.

2 Practice

2.1 State what a method receives when an object is passed to it. [1]

2.2 State what happens if a method changes an object through its reference. [1]

2.3 State the difference between passing a primitive and passing an object reference. [2]

3 Exam-style questions

3.1 When an object is passed to a method, the method receives [1]

- **A** a full copy of the object
- **B** a reference to the object
- **C** nothing
- **D** the class

3.2 Changing a primitive parameter inside a method [1]

- **A** changes the original value outside
- **B** does not change the original value outside
- **C** is illegal
- **D** deletes the value

3.3 A method sorts an array object passed to it.

(a) State whether the original array is changed. [1]

(b) State what was passed to the method. [1]

(c) State whether an `int` passed the same way would change outside. [1]

4 Go further

- work through the **3.6 Methods: Passing and Returning References of an Object** lesson on the **Learn** page;
- read the **Writing Classes** section of the AP Computer Science A handout on the **Know** page.

Solutions

2.1 a reference to the object.

2.2 the original object is changed too.

2.3 a primitive is passed by value (a copy), so changes do not affect the original; an object reference lets the method change the actual object.

3.1 B.

3.2 B.

3.3 (a) yes. (b) a reference to the array. (c) no.