AP COMPUTER SCIENCE A • EXERCISE SHEET

1.1 Introduction to Algorithms, Programming, and Compilers

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

Objective

Build the skills to answer exam questions on **algorithms, programming, and compilers**.

You must be able to:

- describe an **algorithm** 算法 as a finite set of clear, ordered steps
- explain how **source code** 源代码 is written in Java
- describe how a **compiler** 编译器 translates Java into a runnable form
- distinguish a **syntax error** 语法错误 from a **logic error** 逻辑错误

1 Worked examples

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

■ Algorithm and program

An **algorithm** is a finite, ordered set of clear steps that solves a problem. A **program** carries out an algorithm; its **source code** is written in a language such as Java and its statements run in a defined order.

■ Compiler

A **compiler** translates Java source code into a form the computer can run.

■ Two kinds of error

- **Syntax error** —breaks the language's rules (e.g. a missing semicolon); the program will not compile.
- **Logic error** —compiles and runs, but gives the **wrong result**.

2 Practice

2.1 Define an algorithm. [1]

2.2 State what a compiler does. [1]

2.3 State the difference between a syntax error and a logic error. [2]

3 Exam-style questions

3.1 A compiler translates [1]

- **A** machine code into Java
- **B** Java source code into a runnable form
- **C** nothing at all
- **D** data into bits

3.2 A program that runs but produces the wrong answer has a [1]

- **A** syntax error
- **B** logic error
- **C** compiler error
- **D** case with no error

3.3 A Java statement is missing its semicolon.

(a) Name the type of error. [1]

(b) State whether the program will compile. [1]

(c) State the order in which a program's statements run. [1]

4 Go further

- work through the **1.1 Introduction to Algorithms, Programming, and Compilers** lesson on the **Learn** page;
- read the **Primitive Types** section of the AP Computer Science A handout on the **Know** page.

Solutions

2.1 a finite set of clear, ordered steps that solves a problem.

2.2 it translates Java source code into a form the computer can run.

2.3 a syntax error breaks the language's rules so it will not compile; a logic error compiles and runs but gives the wrong result.

3.1 B.

3.2 B.

3.3 (a) a syntax error. (b) no. (c) in the order written (top to bottom).