Programming Activity 4

Using a two-dimensional array to store names and test results

(Unit 2 Data structures: pages 62–69)

Learning objectives

- Describe the structure of one- and two-dimensional arrays and give examples of their use
- Create and use one- and two-dimensional arrays in programs

Assessment objectives

AO2, AO3

Spec alignment

Page 12, Sections 2.3.1, 2.3.2, 2.3.4

Task

Write a pseudocode program that will read in students' names and test scores from the keyboard. It should store this information in a two-dimensional array. Once all the names and scores have been entered it will display the information along with an average test score for the class.

Misconceptions/barriers

Students often forget that arrays start with an index value of 0 rather than 1. Students also quite often forget how to access the individual elements within a two-dimensional array. This can be overcome by drawing a diagram like the below on the board:

	0	1
0	Jan	40
1	Jim	90
2	Sheena	27

Differentiation

Low ability:

- Students often find working with one-dimensional arrays much simpler than two-dimensional arrays. So for students struggling with getting started on the task ask them to initially write a program that will just read in student names. When they have completed this to your satisfaction then they can add in the extra dimension of the array.
- On page 66 of the student book there is an example of how to output the information contained within a two-dimensional array.

High ability:

- Expand the program so that it reads in more than one test result per student. Each test result should go in a new column of the array.

- Ask students to validate the input for the test scores. The test score should be a percentage, so they must only accept data in the range 0 to 100.
- Ask students to implement their pseudocode solution to the task in the programming language they are doing. After completing this they can discuss with a partner what changes they had to make and why they needed to make them.