

1.4 DATA TYPES & STRUCTURES · 1.4.2

Arrays, tuples & records

Original practice questions · 30 marks · about 40 minutes · spec 1.4.2(a)

Instructions. Answer all questions. Marks are shown in brackets []. Pseudocode may be written in any clear, consistent style.**1** Total: 6 marks

This question is about arrays.

(a) State what is meant by an *array*. [2]

(b) Write a statement to declare a 2-D array called `seats` with 6 rows and 4 columns. [2]**(c)** Write the reference that accesses the element in row 3, column 1 of `seats`. [1]

(d) State the index of the first element of a 1-D array. [1]

2 Total: 7 marks

A program stores information about members of a gym: each member has a name, an age and a monthly fee.

(a) State the most suitable data structure for storing the details of one member. [1]

(b) Explain why this is more suitable than an array for storing one member's details. [2]

(c) Complete the pseudocode below to declare a record type called `Member` with the three fields described, choosing a suitable data type for each. [4]

3

Total: 6 marks

A program uses both lists and tuples.

(a) Describe one difference between an array and a list. [2]

(b) State how a tuple is different to a list. [1]

(c) Give one situation in which a tuple would be a more suitable choice than a list. [1]

(d) State **two** built-in operations that a list typically provides. [2]

4

Total: 5 marks

A 2-D array `sales[3, 4]` stores the sales of 3 shops (rows) over 4 quarters (columns).

(a) Write a pseudocode algorithm that calculates and prints the total sales for shop 0 (row 0) across all four quarters. [3]

(b) Describe how you would change your algorithm to total a **column** (one quarter across all shops) instead. [2]

5

Total: 6 marks

(a) A weather station records the temperature every hour, for every day, for a year. Name the data structure best suited to storing all these values together, and justify your choice. [2]

(b) A program must store the (x, y) coordinates of a fixed landmark that must never change. State the most suitable structure and explain why. [2]

(c) Explain why a record is a suitable structure for one row of a database table. [2]

END OF QUESTIONS