"3-a-day" A-Level Exam Practice Unit 1 (001)

Question 1

2   Atlas Airlines runs flights across cities in Europe. It stores the prices of different flights in its computer system.

(a)   State a data structure that would be suited to represent the data above.

....**[1]**

Question 2

(b)   A function `tripCost` has been written that takes in two cities and returns the price of a direct flight between them.

e.g. `tripCost("Dublin", "London")` returns 90.

A journey is represented by an array called cities. An example of a trip from Dublin to Rome is shown below:

Dublin
London
Paris
Rome

(i)   Write a program in the language or pseudocode of your choice that uses the cities array to calculate and output the cost of a given journey as a monetary value. In the case above this would be £950.

Question3

(ii)   Rather than storing cities in an array you could use a linked list.

Describe a difference between an array and a linked list.

....

....

....

....**[2]**

Answer 1

2	(a)		• Graph (1).	1	For 1 mark.
				AO1.1 (1)	Accept 2D array.

Answer 2

	(b)	(i)	• Creates a variable to represent total cost and initialises it to 0 (1). • Iterates up to the penultimate item of array (1). • Adds to the total cost… (1). • …Uses the correct arguments in the tripCost function (1). • Outputs the total cost formatted with a £ prefix (1).	5 **AO3.2 (5)**	For 5 marks – 1 mark for each correct step in process. Any program that has the functionality specified in the question should receive full marks. Example:

```
totalCost=0
for i=0 to cities.Length-2
totalCost=totalCost+
tripCost(cities[i],cities[i+1])
next i
print("£"+totalCost)
```

Answer 3

		(ii)	• A linked list is a dynamic data structure (1) whereas an array is static (1). • An array can have any element accessed directly (i.e. random access) (1) whereas a linked list needs to be traversed until the desired element is found (1). • Contents of an array are stored contiguously in memory (1) whereas the contents of a linked list may not be (1).	2 **AO1.2 (2)**	Up to 2 marks for a valid description.