

Revision Sheet

A-Level Computer Science · Unit 10 Data Types and Structures

10 vocabulary items · 32 marks of exam questions (4 questions)

Part 1 · Vocabulary review (10 items). The terms this unit is examined on most. Mark it yourself from the answer key.

Section A · Chinese to English

Write the English word.

1.

[1]
2.

[1]
3.

[1]
4.

[1]
5.

[1]
6.

[1]
7.

[1]
8.

[1]
9.

[1]
10.

[1]

Part 2 · Exam questions (32 marks, 4 questions) begins on the next page. They are ordered easy to difficult and none of them has been set before.

11 The following diagram represents an Abstract Data Type (ADT).



- (a) Identify this type of ADT.

..... [1]
- (b) Give the technical term for the item labelled **A** in the diagram.

..... [1]
- (c) Give the technical term for the item labelled **B** in the diagram.

Explain the meaning of the value given to this item.

Term

Meaning

..... [2]
- (d) Complete the diagram to show the ADT after the data has been sorted in alphabetical order.



12 (a) A program uses a global 1D array of type string and a text file.

An algorithm that forms part of the program is expressed as follows:

- copy the first line from the file into the first element of the array
- copy the second line from the file into the second element of the array
- continue until all lines in the file have been copied into the array.

Stepwise refinement is applied to the algorithm.

Outline **five** steps for this algorithm that could be used to produce pseudocode.

Assume there are more elements in the array than lines in the file.

Do **not** use pseudocode statements in your answer.

Step 1

.....

Step 2

.....

Step 3

.....

Step 4

.....

Step 5

.....

[5]

(b) Sequence is one programming construct.

Identify **one other** programming construct that will be required when the algorithm from part (a) is converted into pseudocode **and** explain its use.

Construct

.....

Use

.....

[2]

13 An algorithm will output the **last** three lines from a text file `Result.txt`

The lines need to be output in the same order as they appear in the file.

Assume:

- Three variables `LineX`, `LineY` and `LineZ` will store the three lines. These are of type string and all three variables have been initialised to an empty string.
- The file exists and contains **at least** three lines.

(a) The algorithm to output the lines is expressed in eight steps.

Complete the steps.

1. Open the file

2. Loop until

3. and store in `ThisLine`

4. Assign `LineY` to `LineX`

5. Assign `LineZ` to `LineY`

6. Assign `ThisLine` to `LineZ`

7. After the loop,

8. Output `LineX`, `LineY`, `LineZ`

[4]

(b) Explain the purpose of steps 4, 5 and 6 in the algorithm from part (a).

.....

.....

..... [1]

- (c) The requirement changes, and the algorithm will now output three lines from the file, starting from a **given** line number.

The modified algorithm will be implemented as a function which will:

- be called with an integer parameter representing the given line number
- output three lines, starting at the given line
- return `TRUE` if the 3 lines are output, or `FALSE` if it was not possible to output the 3 lines.

Describe the changes that need to be made to **steps 2 to 8** of the algorithm given in part (a).

[4]

- 14 (a) A concert venue uses a program to calculate admission prices and store information about ticket sales.

A number of arrays are used to store data. The computer is switched off overnight and data has to be input again at the start of each day before any tickets can be sold. This process is very time consuming.

- (i) Explain how the program could use text files to speed up the process.

..... [2]

- (ii) State the characteristic of text files that allow them to be used as explained in **part (a)(i)**.

[1]

- (iii) Information about ticket sales will be stored as a booking. The booking requires the following data:

- name of person booking
- number of people in the group (for example a family ticket or a school party)
- event type.

Suggest how data relating to each booking may be stored in a text file.

..... [2]

(b)

-

W

[5]