

2.3 ALGORITHMS · 2.3.1(A)(B)

Analysis & design of algorithms

Original practice questions · 30 marks · about 40 minutes · spec 2.3.1(a)(b)

Instructions. Answer all questions. Marks are shown in brackets []. Justify suitability choices with reference to the data set.**1** Total: 6 marks**(a)** State the difference between the *analysis* and the *design* of an algorithm. [2]

(b) State what is meant by *success criteria*. [2]

(c) Name **two** ways an algorithm design can be expressed. [2]

2 Total: 6 marks**(a)** State **two** things that are identified during the analysis of a problem. [2]

(b) Describe the **three** types of test data used to check a solution. [3]

(c) State why test data is planned during analysis. [1]

3 Total: 6 marks

A program must repeatedly search a large database of records that is kept sorted by ID.

(a) State **two** factors used to judge whether an algorithm is suitable for a task. [2]

(b) Explain why a binary search is more suitable than a linear search here. [2]

(c) State the precondition for using a binary search. [1]

(d) State one situation where a linear search would be the better choice. [1]

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Total: 6 marks

- (a) State what is meant by the *time complexity* of an algorithm. [2]

- (b) State what is meant by the *space complexity* of an algorithm. [1]

- (c) Explain the *time–space trade-off*, using an example. [3]

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Total: 6 marks

You must design an algorithm to find the highest score in a list of scores.

- (a) State the input and the output of the algorithm. [2]

- (b) Give one success criterion for the solution. [1]

- (c) Describe the design of the algorithm (in words or pseudocode). [3]

END OF QUESTIONS