

2.3 ALGORITHMS · 2.3.1(E)

Graph traversals: DFS & BFS

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

Instructions. Answer all questions. Marks are shown in brackets []. Take neighbours in alphabetical order and never revisit a node.

1 Total: 6 marks

- (a) State what is meant by a graph *traversal*. _____ [1]
- (b) State how a depth-first traversal works and which data structure it uses. [2]
- _____
- _____
- (c) State how a breadth-first traversal works and which data structure it uses. [2]
- _____
- _____
- (d) State which traversal finds the shortest path in an unweighted graph. [1]
- _____

2 Total: 7 marks

Edges: P–Q, P–R, Q–S, R–S, R–T, S–T (start at P)

- (a) Give the order nodes are visited in a **depth-first** traversal from P. _____ [3]
- (b) Give the order nodes are visited in a **breadth-first** traversal from P. _____ [3]
- (c) State the data structure used by the breadth-first traversal. _____ [1]

3

Total: 5 marks

- (a) Give **two** uses of a depth-first traversal. [2]
-
- (b) Give **two** uses of a breadth-first traversal. [2]
-
- (c) State why breadth-first finds the path with the fewest edges. [1]
-

4

Total: 6 marks

An app must find the route with the fewest "hops" between two computers on an unweighted network.

- (a) State which traversal should be used. [1]
-
- (b) Explain why that traversal is the right choice. [2]
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-
- (c) State the data structure it uses. [1]
-
- (d) Explain why a depth-first traversal would not reliably give the fewest-hops route. [2]
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-

5

Total: 6 marks

- (a) State the difference between the visit pattern of DFS and BFS. [2]
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-
- (b) For a binary tree, state what OCR calls the depth-first traversal. [1]
-
- (c) Explain why each node must be marked as visited during a traversal. [2]
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- (d) State one disadvantage of breadth-first traversal on a very wide graph. [1]
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END OF QUESTIONS