

Question		Marks									
1	1	Mark is for AO2 (analyse) <table border="1"> <tr><td>I</td><td>E</td><td>H</td></tr> <tr><td>C</td><td>A</td><td>B</td></tr> <tr><td>G</td><td>D</td><td>F</td></tr> </table>	I	E	H	C	A	B	G	D	F
I	E	H									
C	A	B									
G	D	F									
1	2	Mark is for AO1 (knowledge) Removing (unnecessary) details;									
1	3	Mark is for AO1 (knowledge) Grouping by common characteristics // a hierarchical / 'kind-of' relationship;									
1	4	Mark is for AO2 (analyse) (If there is a relationship between two cells is still represented but) if the relationship is because two cells are in the same row/column/two-by-two block is no longer represented // the nature of the link between the two cells is not represented; A. the location of a cell is not represented									
1	5	All marks for AO1 (understanding) Adjacency matrix appropriate when there are many edges between vertices // when graph/matrix is not sparse; when edges frequently changed; when presence/absence of specific edges needs to be tested frequently; Max 2 marks A Alternative words which describe edge, eg connection, line									
1	6	Mark is for AO1 (understanding) Directed (graph) // digraph;									

Question			Marks										
2	1	All marks AO1 (understanding) <table><thead><tr><th></th><th>True or False?</th></tr></thead><tbody><tr><td>Calculates the shortest path between a node and other nodes in a graph</td><td>True</td></tr><tr><td>Can be used to prove the Halting Problem cannot be solved</td><td>False</td></tr><tr><td>Can be used with both directed and undirected graphs</td><td>True</td></tr><tr><td>Can be used with both weighted and unweighted graphs</td><td>False</td></tr></tbody></table> Mark as follows: 1 mark: three rows correct 2 marks: all rows correct.		True or False?	Calculates the shortest path between a node and other nodes in a graph	True	Can be used to prove the Halting Problem cannot be solved	False	Can be used with both directed and undirected graphs	True	Can be used with both weighted and unweighted graphs	False	2
	True or False?												
Calculates the shortest path between a node and other nodes in a graph	True												
Can be used to prove the Halting Problem cannot be solved	False												
Can be used with both directed and undirected graphs	True												
Can be used with both weighted and unweighted graphs	False												
2	2	Mark is for AO1 (knowledge) A subroutine that calls itself;	1										
2	3	All marks AO2 (apply) <table><thead><tr><th>Count</th><th>Value returned</th></tr></thead><tbody><tr><td>0</td><td></td></tr><tr><td>1</td><td>False</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></tbody></table> Mark as follows: 1. Column for Count is correct 1. repeated consecutive instances of values 1. blank cells 2. Value returned is False Max 1 if any errors	Count	Value returned	0		1	False					2
Count	Value returned												
0													
1	False												

2	4	Mark is for AO2 (analyse)	1																									
<table><tr><td></td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>1</td><td></td><td>0</td><td>0</td><td>1</td></tr><tr><td>2</td><td></td><td></td><td>0</td><td>0</td></tr><tr><td>3</td><td></td><td></td><td></td><td>0</td></tr></table>					0	1	2	3	0	0	1	1	1	1		0	0	1	2			0	0	3				0
	0	1	2	3																								
0	0	1	1	1																								
1		0	0	1																								
2			0	0																								
3				0																								
A. any suitable indicators used instead of 0 and 1 A. blank cell instead of 0 R. if usage inconsistent																												

2

5

All marks AO2 (apply)

6

		Visited					
Subroutine call	V	P	[0]	[1]	[2]	[3]	N
			False	False	False	False	
G(0, -1)	0	-1	True				1
G(1, 0)	1	0		True			0
							3
G(3, 1)	3	1				True	0
G(1, 0)							
G(0, -1)							
Final value returned:	True						

Mark as follows:

1. Visited[0] set to True and then not changed
2. Visited[1] set to True and then not changed, Visited[3] set to True and then not changed, Visited[2] always has value of False
3. Second subroutine call is G(1, 0) **I.** repeated consecutive instances of this call
4. Third and final subroutine call is G(3, 1) **I.** repeated consecutive instances of this call **I.** missing calls G(1, 0) and G(0, -1)
5. Value returned is True
6. N column contains correct values **A.** values of 3 in 2nd last cell for N and value of 1 in last cell for N, instead of the two blank cells

Max 5 if any errors

2	6	Mark is for AO2 (analyse) Determine if a graph contains a cycle or not;	1
2	7	Mark is for AO2 (analyse) Depth-first search;	1
2	8	Mark is for AO2 (analyse) The graph is a tree;	1