"3-a-day" A-Level Exam Practice Unit 2 (010)

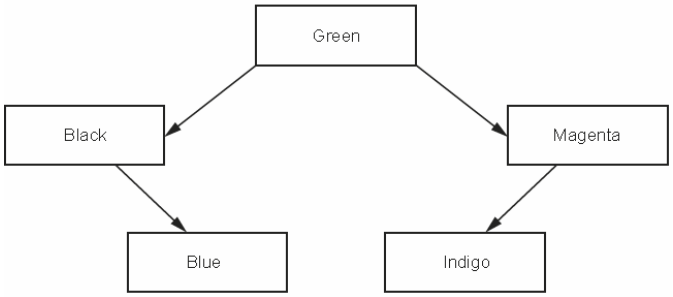
Question 1

A programmer has been given a set of data as a 2D array:
Write an algorithm in pseudocode, which will print each item of the array on separate lines on the screen.

34	54	22	32
63	23	41	23
62	42	16	45
35	54	44	45

Question 2

The current contents of `colour` are shown.



Add the following colours to the tree above in the order written:

Brown White Orange Purple

[4]

Question3

(d) Fig 6.3 is a graph representation of the places that the travelling salesman visits. Using this graph, show how Dijkstra's algorithm would find the shortest path from place A to place F.

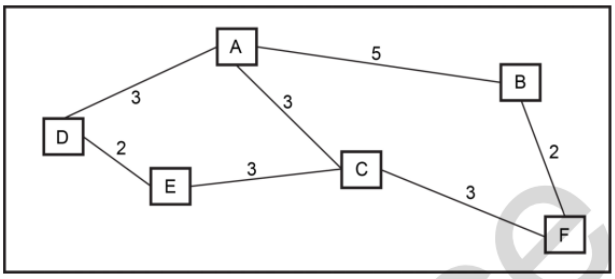


Fig 6.3

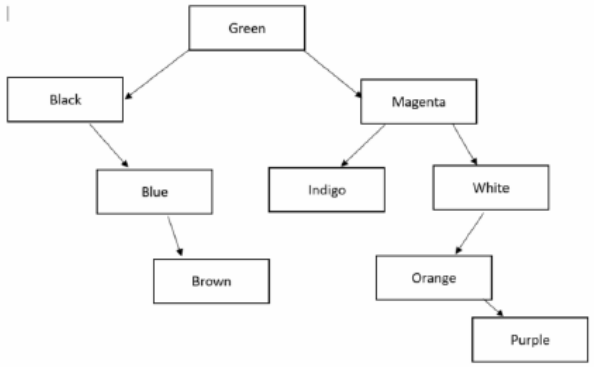
[6]

Answer 1

```
FOR row 1 to 4:
    FOR column 1 to 4:
        OUTPUT array[row, column]
```

Answer 2

1 mark for each node as a correct sub-node



Answer 3

(d) Fig 6.3 is a graph representation of the places that the travelling salesman visits. Using this graph, show how Dijkstra's algorithm would find the shortest path from place A to place F.

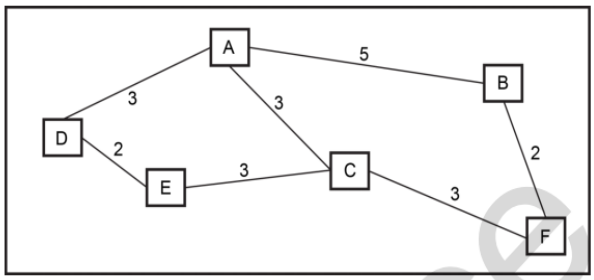


Fig 6.3

[6]

A=0	B=∞	C=∞	D=∞	E=∞	F=∞
B=5	C=3	D=3	E=∞	F=∞	
D=3	C=3	B=5	E=∞	F=∞	
D=3	B=5	E=6	F=6		
B=5	E=5	F=6			
E=5	F=6				
F=6					

Max 6.
1 mark for final solution, max 5 for showing the stages

- Mark A as the current node(1)
- Record B is 5, C is 3, D is 3(1)
- Mark A as visited(1)
- C is shortest distance from A(1)
- (C as current) Record E as 6, F as 6(1)
- Mark C as visited(1)
- (D as current) Record E as 5(1)
- Mark D as visited(1)
- (B as current) Record F as 7, do not update table as longer(1)
- Mark B as visited(1)
- (E as current) Record D as 8, do not update table as longer and E as visited(1)
- A-C-F found as shortest(1)

Visited:

A=0	C=3	D=3	B=5	E=5	F=6

A-C-F is shortest route