Tutorial NO-8

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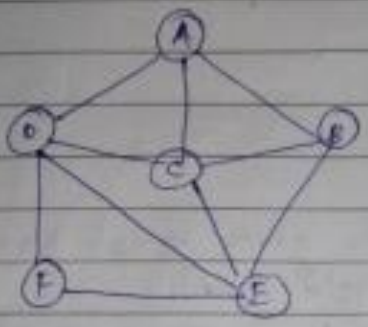
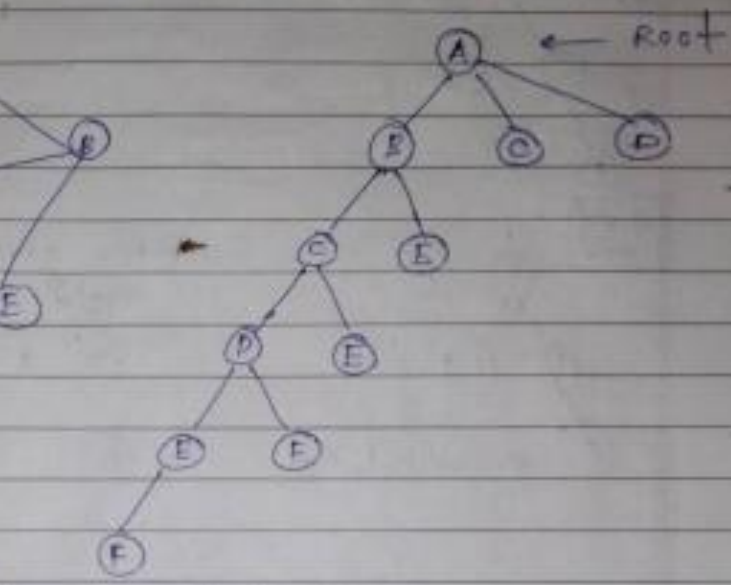
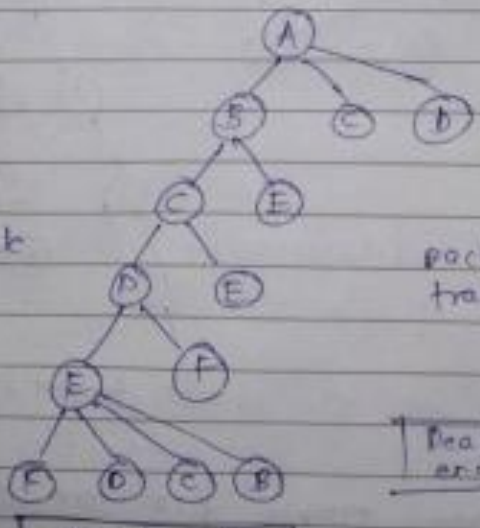
Q consider the graph shown below & find out the hamiltonian cycle if it exists.

i)



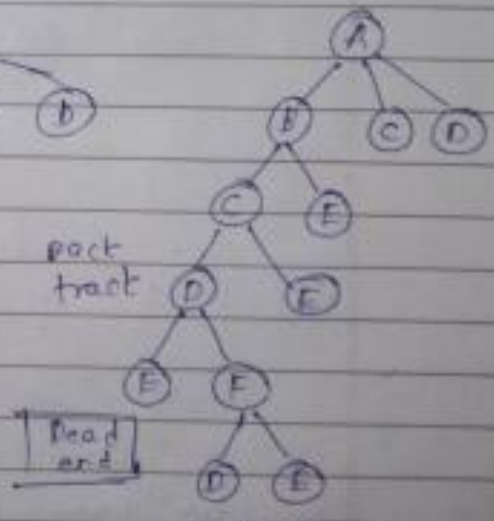


Dead end



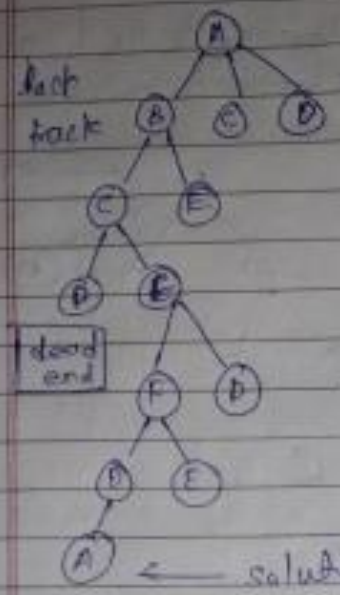
Backtrack

Dead end



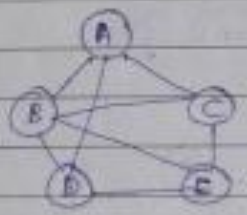
back track

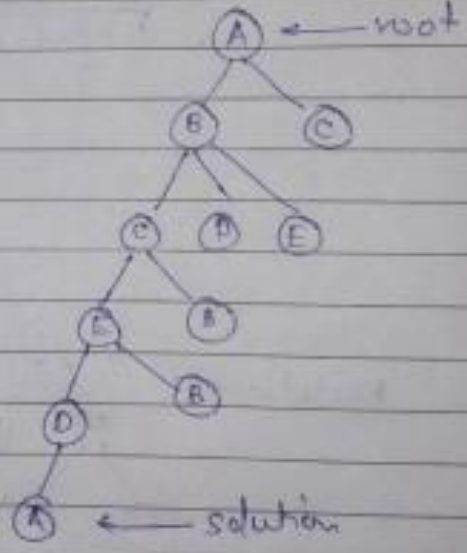
dead end



for given graph hamilton cycle exists
ie. A → B → C → E → F → D → A

ii)





for given graph hamilton cycle exists
ie. A → B → C → E → D → A.

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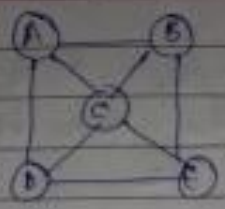
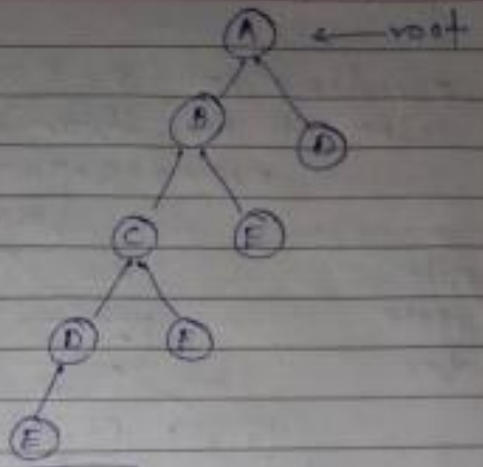
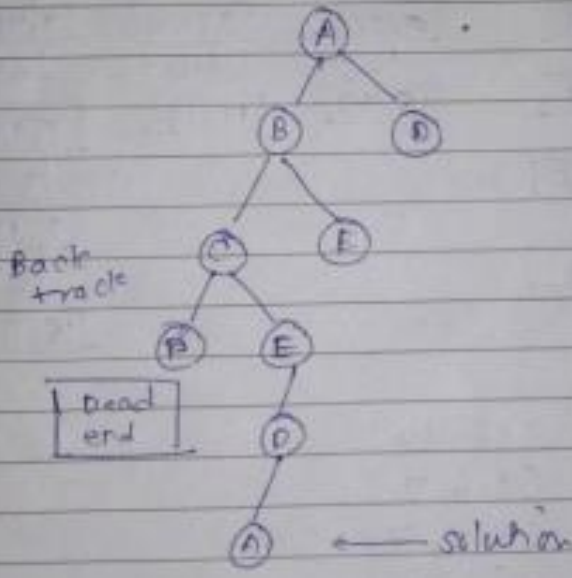
(i)







for given graph hamilton cycle exists
i.e. A → B → C → E → D → A

Q. consider a set $S = \{2, 3, 5, 6, 7, 9, 10\}$ & $M = 15$ solve it for obtaining the sum of subset.

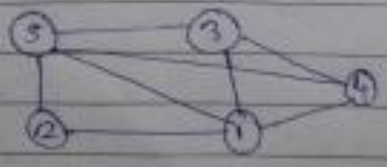
→ $2+3+5+6+7+9+10 = 42$

state space tree

subsets → (2, 3, 10)
(2, 6, 7)
(3, 5, 7)
(6, 9)
(5, 10)

Q. what is chromatic no. of the given graph

i)



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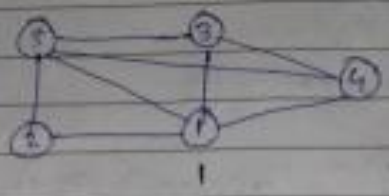
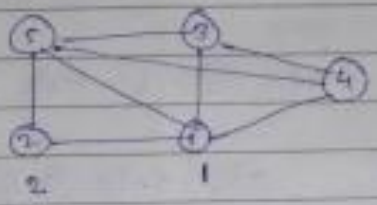
- ~~First~~ color 1 for node ①



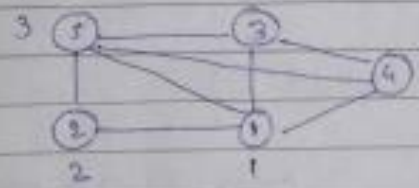
as all other nodes are connected to node 1, we can't use color 1 to any other node.

- color 2 for node ②



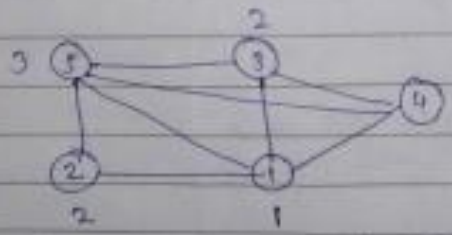
color 2, can't be use for node ⑤

- color 3 for node ~~③~~ ⑤



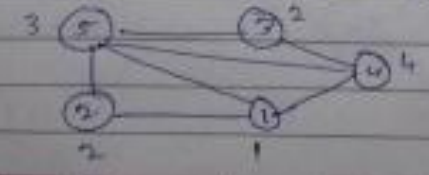
color 3, can't be use for node ③

- color 2 for node ③



as, node ② is not direct connect with node ③, so we can use color 2 for node ③

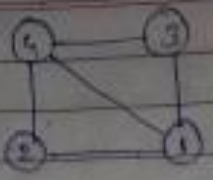
- color 4 for node ④



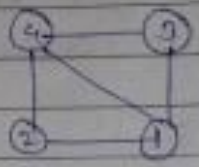
as, node ④ is directly connected with node ①, ⑤, ③ so we can't use color 1, 2, 3 we need color 4.

chromatic number = 4

ii)

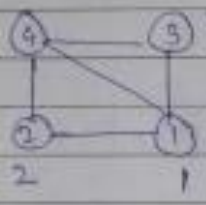


- color 1 for node ①



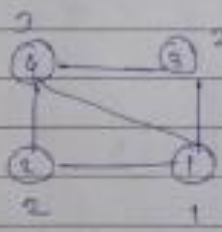
as, node ① connected with every other node directly we can't use color 1 for other nodes.

- color 2 for node ② & node ③



as, node ② & node ③ are not connected directly we can use color 2 for these two nodes

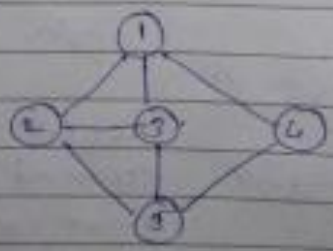
- color 3 for node ④



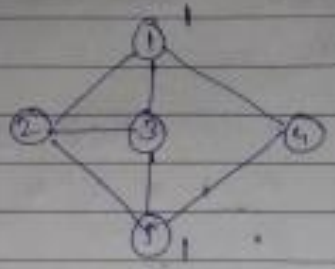
color 3, use for node ④

chromatic number = 3

iii)

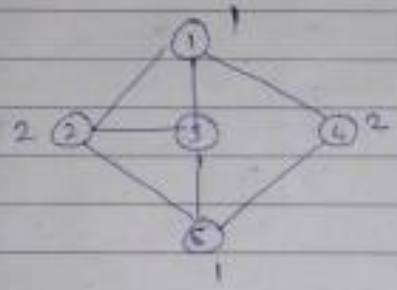


- color 1 for node ① & node ⑤



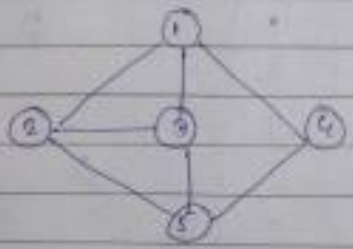
color 1 for node ① & node ⑤, as they are not directly connected.

- color 2 for node ② & node ④



color 2, for node ② & node ④ as they are not connected directly.

- color 3 for node ③



color 3, for node ③ as we can't use color 1 & color 2 for node ③.

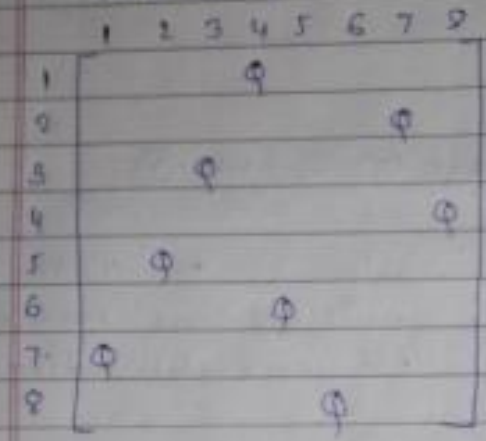
chromatic number = 3

Q. Give the all possible solutions for 8-queen problem?

→ The eight queens puzzle has 92 distinct solutions. If solutions that differ only by the

symmetry operations of rotation and reflecting at the board are counted as one, the puzzle has 12 solutions. These are called fundamental solutions

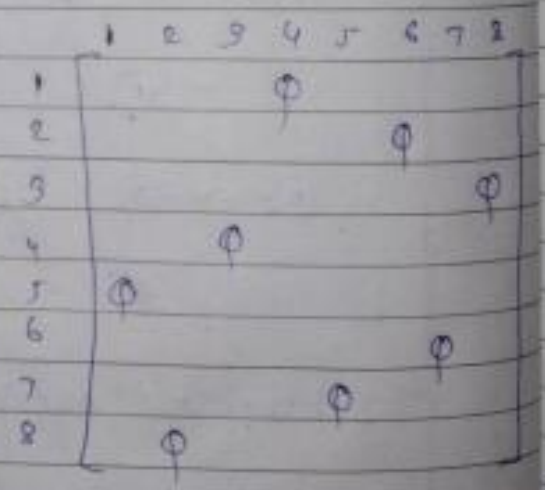
solution 1



solution 2

solution 3

solution 4



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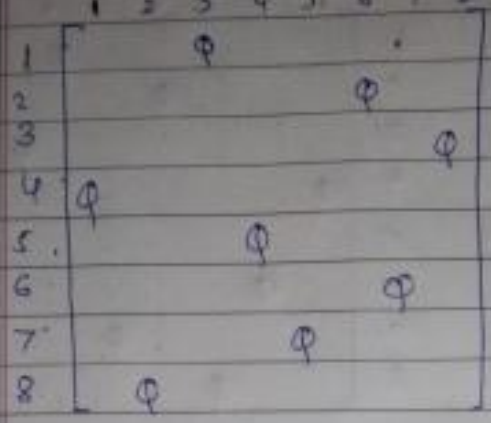
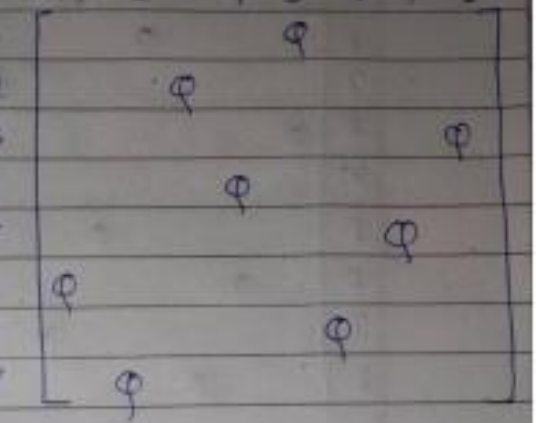
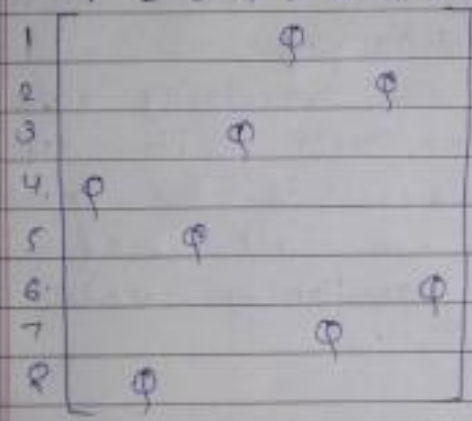
solution 5



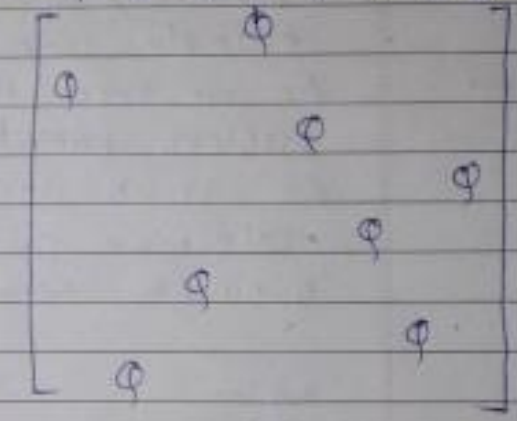
solution 6



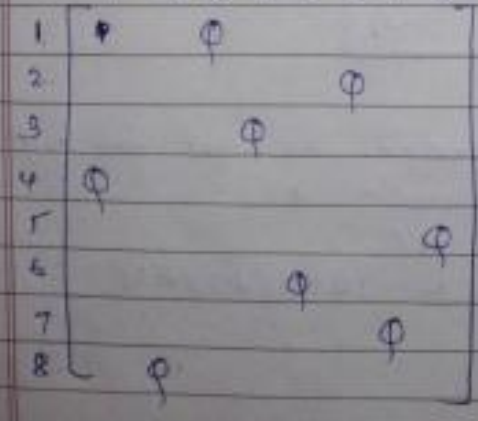
solution 7



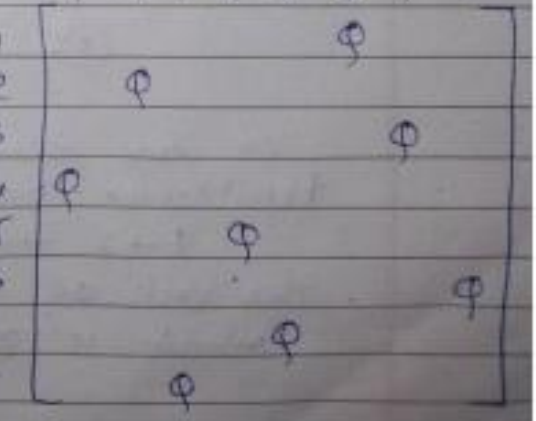
solution 8



solution 9

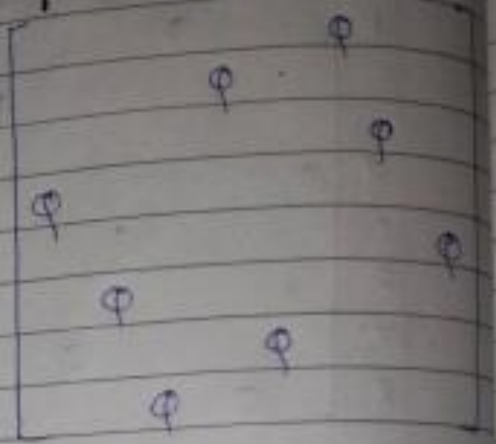


solution 10



solution 11

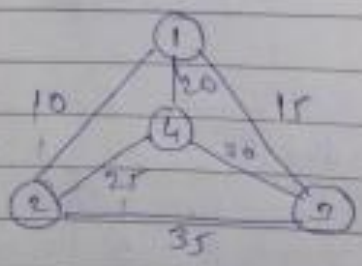
solution 12



Q. Explain travelling salesman problem with example using backtracking.

→ As we know that for travelling salesman problem hamiltonian cycle exists. So for backtracking ~~we~~ method for travelling salesman problem we will find minimum weight hamiltonian cycle.

eg:-



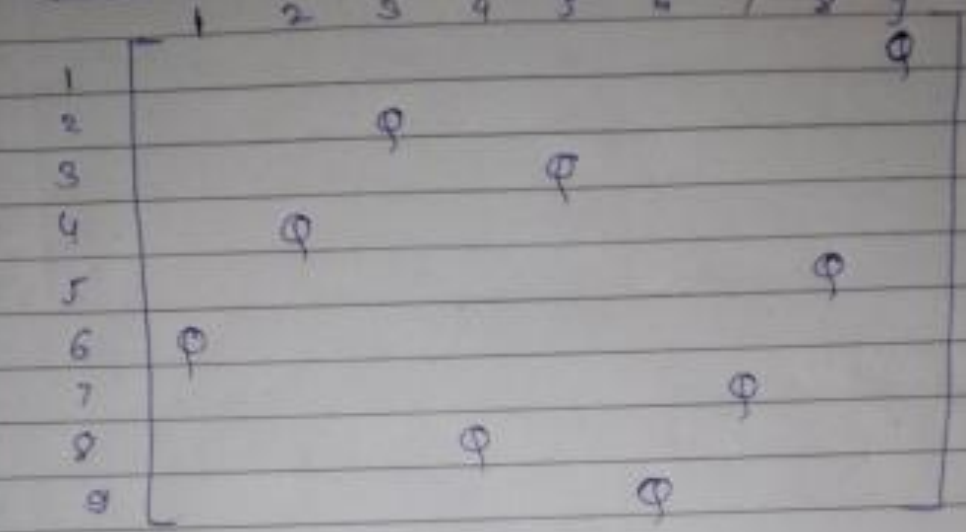
so for above graph we get ~~to~~ minimum hamiltonian weight cycle as,

$1 \to 2 \to 4 \to 3 \to 1$

The cost of tour is $10+25+30+15$ which is 80.

obtain at least two solution of 9-queen problem.

solution 1:-



solution 2:-