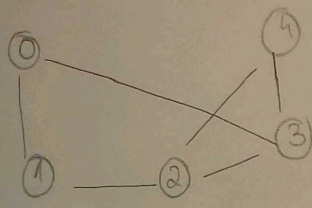
Practical Work 5. Find a Hamiltonian cycle in an undirected graph. If it exists.



vertices Imput file

5 6 ← edges

0 1 25 ← cost

1 2 3

2 3 0

3 4 2

4 2 0

0 3 1

Adjacency matrix

	0	1	2	3	4
0	0	1	0	1	0
1	1	0	1	0	0
2	0	1	0	1	1
3	1	0	1	0	1
4	0	0	1	1	0

HamiltonianCycle(N, adj_matrix, path, current_position)

N=5; path=[0,-1,-1,-1,-1], current_position=1

HamiltonianCycle(5, adj_matrix, [0,-1,-1,-1,-1], 1)

current_position=N <=> 1=5 (False)

for vertex in range(1,5):

vertex=1

isNext(adj_matrix, [0,-1,-1,-1,-1], 1, 1) = true

path[1]=1

HamiltonianCycle(5, adj_matrix, [0,1,-1,-1,-1], 2)

2=5 (False)

for vertex in range(1,N)

vertex=1

isNext(adj_matrix, [0,1,-1,-1,-1], 2, 1) = false

vertex=2

isNext(adj_matrix, [0,1,-1,-1,-1], 2, 2) = true

path[2]=2

HamiltonCycle(5, adj_matrix, [0,1,2,-1,-1], 3)

3=5 (False)

for vertex in range(1,5):

vertex=1

isNext(adj_matrix, [0,1,2,-1,-1], 3, 1) = false

vertex=2

isNext(adj_matrix, [0,1,2,-1,-1], 3, 2) = false

vertex=3

isNext(adj_matrix, [0,1,2,-1,-1], 3, 3) = true

path[3]=3

HamiltonCycle(5, adj_matrix, [0,1,2,3,-1], 4)

4==5 (False)

for vertex in range(1,5):

vertex=1

isNext(adj_matrix, [0,1,2,3,-1], 4, 1)=false

vertex=2

isNext(adj_matrix, [0,1,2,3,-1], 4, 2)=false

vertex=3

isNext(adj_matrix, [0,1,2,3,-1], 4, 3)=false

vertex=4

isNext(adj_matrix, [0,1,2,3,-1], 4, 4)=true

path[4]=4

HamiltonCycle(5, adj_matrix, [0,1,2,3,4], 5)

5==5 (True)

adj_matrix[0][4]=0 (False)

HamiltonCycle(5, adj_matrix, [0,1,2,3,4], 5)=false

path[4]=-1

HamiltonCycle(5, adj_matrix, [0,1,2,3,-1], 4)=false

vertex=4

isNext(adj_matrix, [0,1,2,-1,-1], 3, 4)=true

path[4]=4

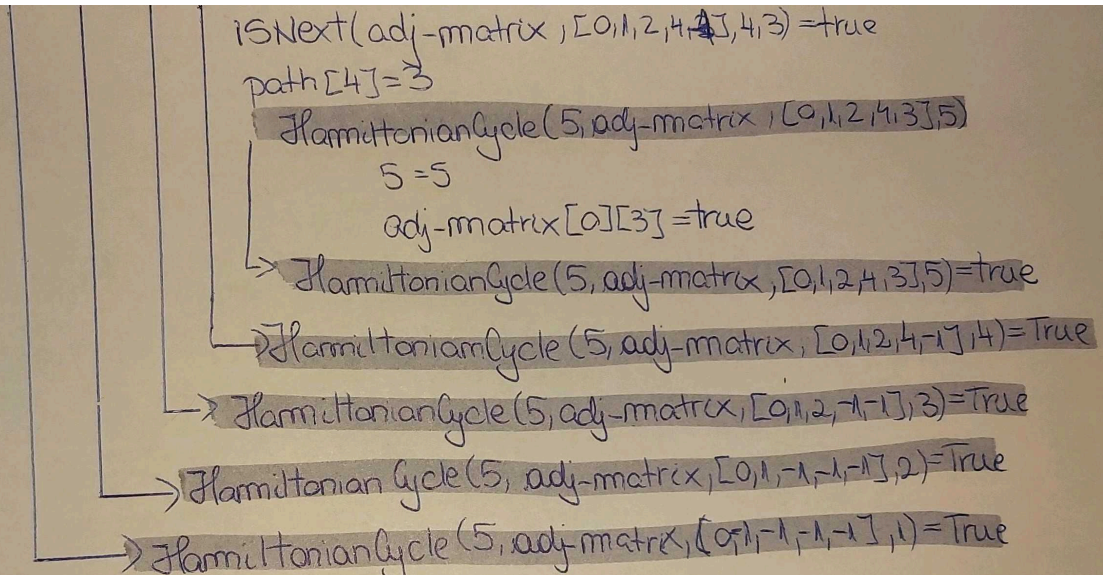
HamiltonCycle(5, adj_matrix, [0,1,2,4,-1], 4)

4==5 (false)

for vertex in range(1,5)

isNext(adj_matrix, [0,1,2,4,-1], 4, 1)=false

isNext(adj_matrix, [0,1,2,4,-1], 4, 2)=false



⇒) A Hamiltonian cycle ~~contin~~ contained in the Graph is: 0 1 2 4 3 0