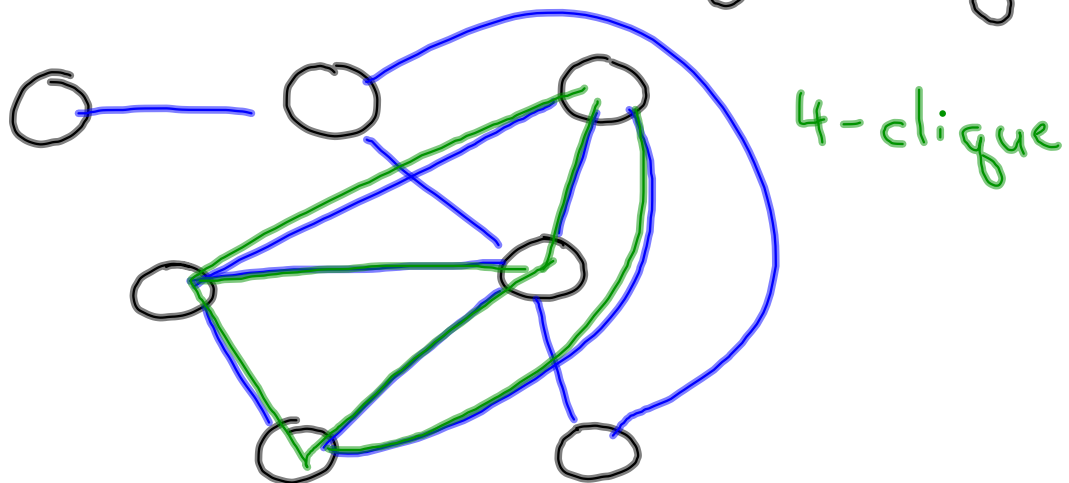


NP - polynomial time  
non-det. TM

- verified in poly-time  
by det. TM

CLIQUE in an undirected graph is a subgraph, wherein every two nodes are connected by an edge.



CLIQUE =  $\{ \langle G, k \rangle \mid G \text{ is an undir. graph w/ a } k\text{-clique} \}$

CLIQUE is in NP.

Proof (1. construct non-det TM)

$M$  on input  $\langle G, k \rangle$

1. non-deterministically select a subset  $c$  of  $k$  nodes of  $G$ .
2. Test if  $G$  contains all edges connecting nodes in  $c$ .
3. If yes, accept else reject.

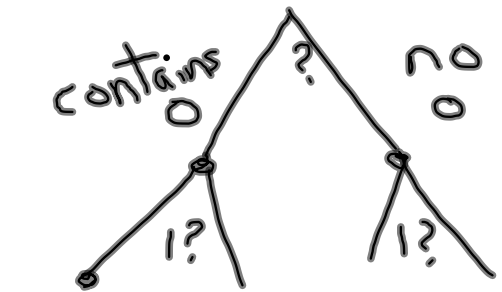
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Proof (2. construct a  $\nu$  verifier)  
poly-time

$V$  on input  $\langle \langle G, k \rangle, c \rangle$

- $O(c \cdot n)$
1. Test if  $c$  is a set of  $k$  nodes in  $G$ .
  2. Test if  $G$  contains all edges connecting nodes in  $c$ .
  3. If both tests pass, accept else reject.

$\{0, 1, 2, 3\}$



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