

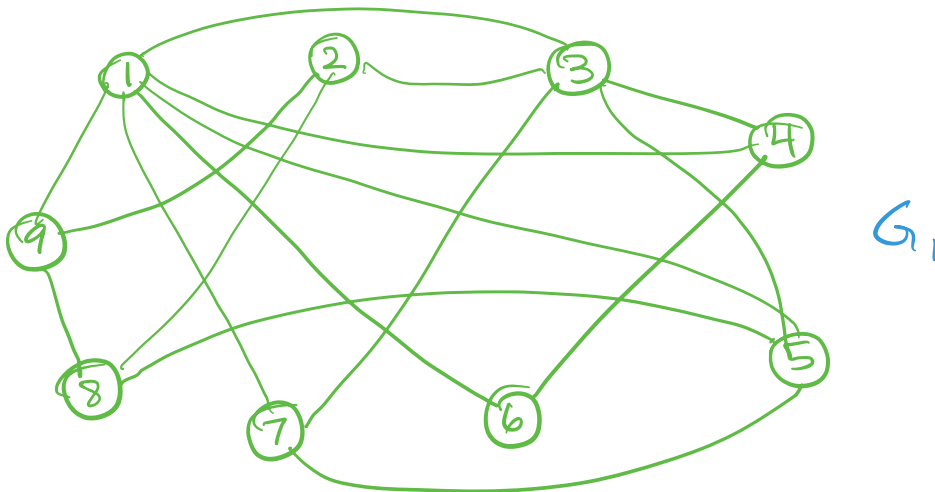
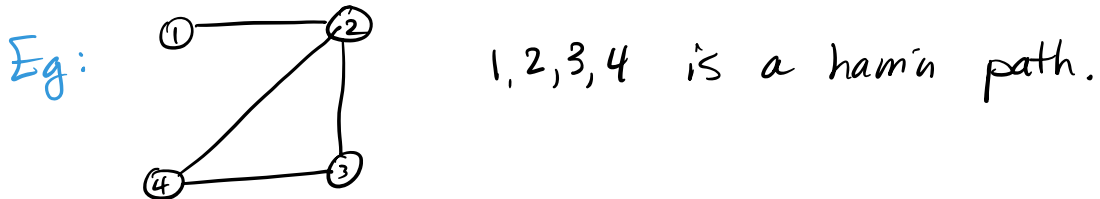
Tutorial April 1

1. $\text{PalH}_{\text{TM}} = \{ \langle M \rangle \mid M \text{ is a TM that halts on all palindromes} \}$

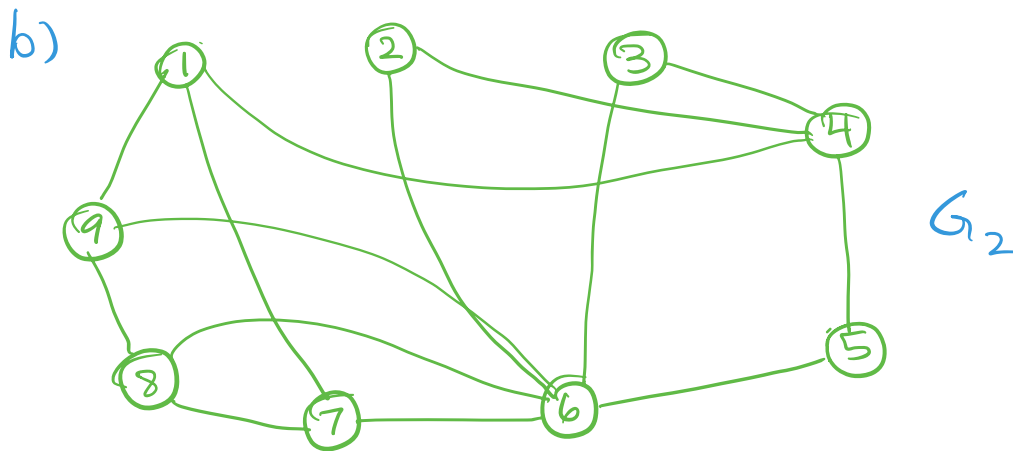
Show that PalH_{TM} is undecidable.

2. $\text{HamPath} = \{ \langle G \rangle \mid G \text{ is an undirected graph, and } G \text{ has a hamilton path} \}$

hamilton path = a path that visits every vertex exactly once.



a) Prove that G_1 has a ham'n path.
 What fast, non-det algorithm can recognize
 Ham Path?

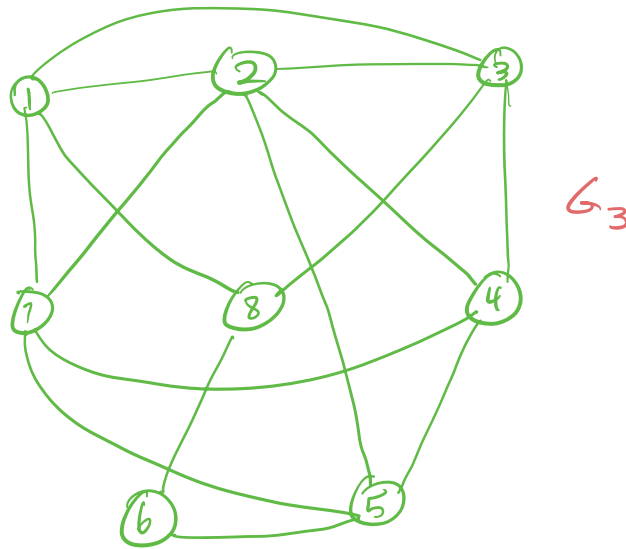


Prove that G_2 has no ham'n path.

Can you propose a fast non-det algorithm for
 recognizing $\text{NoHamPath} = \{ \langle G \rangle \mid G \text{ is an undirected} \\ \text{graph and } G \text{ has no ham'n path} \}$

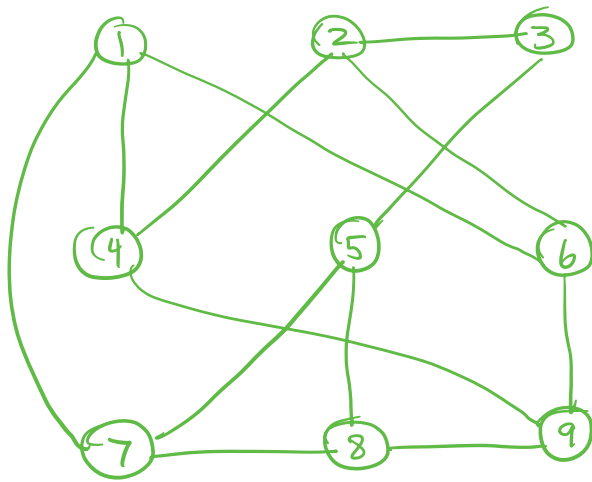
3. $\text{Clique} = \{ \langle G, k \rangle \mid G \text{ is an undirected graph and } G \text{ contains a clique of size } k \}$.

Defn: A clique of size k is a set of k vertices that are all pairwise adjacent.



$\langle G_3, 4 \rangle \in \text{Clique}?$

4. $\text{Path} = \{ \langle G, s, t, k \rangle \mid G \text{ is an undirected graph, } s, t \in V(G), \text{ and } \exists \text{ an } s\text{-}t \text{ path of length } \leq k \}$



$\langle G_4, 1, 5, 2 \rangle \in \text{Path}?$