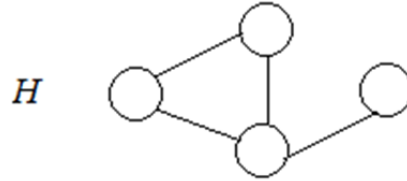Assume you have access to a **decision** procedure LONGESTSIMPLECYCLE?(G, k) which decides in polynomial time if the longest simple cycle of graph G is of length k. For graph

H

LONGESTSIMPLECYCLE?(H, 4) would return false, and LONGESTSIMPLECYCLE?(H, 3) would return true. Write a polynomial time procedure to accept as input a graph G and either return a Hamilton Cycle of G (it must actually construct the cycle) or return false if a Hamilton Cycle does not exist.

SOLUTION: **if** LONGESTSIMPLECYCLE?(G, $|V(G)|$) = false **then return** false

/* We now know that G is Hamiltonian, so we have to compute a Hamilton cycle */

for each $e \in E$ **if** LONGESTSIMPLECYCLE?(G-{e}, $|V(G)|$) = true   /* e is not critical */

then $E \leftarrow E - \{e\}$

return E