HW 5 CSE 541

Qn.1

If we have a graph G as a ham-graph, which means that there is a ham-circle in this graph G.
Then let's choose any vertex v from G (the graph), and consider all the possibilities of deleting all but two of the edges passing through that vertex.
One as go into this vertex and one go out of this vertex.
And the resulting graph must still be ham-graph since the ham-circle that existed originally only used two edges (for three vertices). Since the degree of a vertex is bounded by
(the number of vertices -1), so we only less than $(\text{number})^2$ by go through all pairs which is $O(n^2)$.
So, we can see that we are only running the polynomial tester polynomial many independent times, so the running time is polynomial.
Once we have some pair of vertices where deleting all the others coming off v still results in a ham-graph, we should remember those as special, and ones that we will never again try to delete. We repeat the process with both vertices that are now next to v, testing ham of each way of picking a new vertex to save, we can continue in this process until we are left with only |V| edge, and then, we just show listing the vertices of a ham-cycle is polynomial-time.