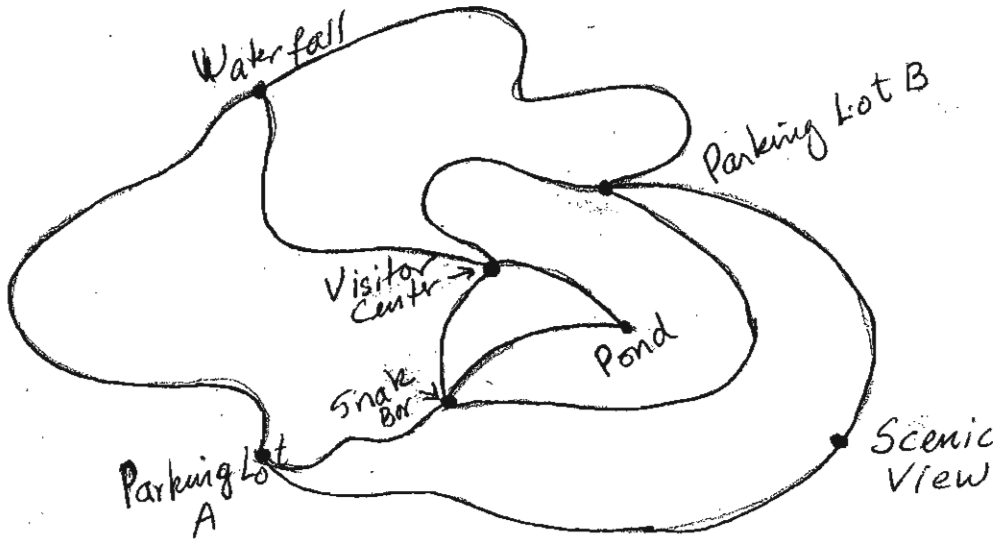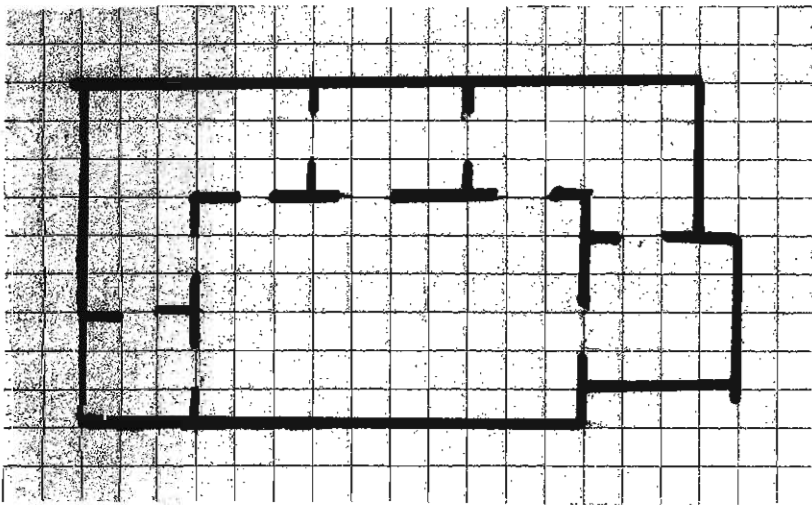1. A group of people want to hike through the trails of a national park whose map is shown below. They will be dropped off in the morning and picked up in the evening. If they want to walk through **all the trails** in the park, where should they be dropped? Should they ask to be picked up at the same spot? State in what order they should walk the trails so that they don't walk any of them more than once.

2. The floor plan of a museum is shown bellow. During his shift, the security guard must walk **every room** and return to the starting point (he must make his walk as efficient as possible, so he cannot visit any room more than once).

a) Draw a graph to represent the floor plan, where vertices correspond to rooms and edges correspond to hallways.

b) State the order in which he should walk the museum rooms to ensure that he visits each room just once and returns to the starting point.
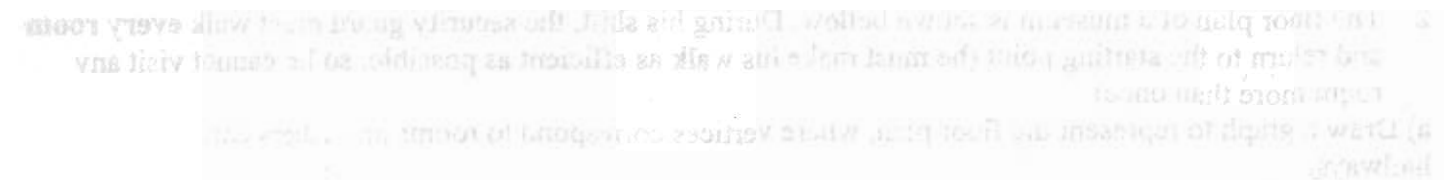
c) If we change the assignment and now we tell the guard that he must walk the museum so that he passes though each and every doorway exactly once, can he do that? If no, explain why. If yes, state how to do it.
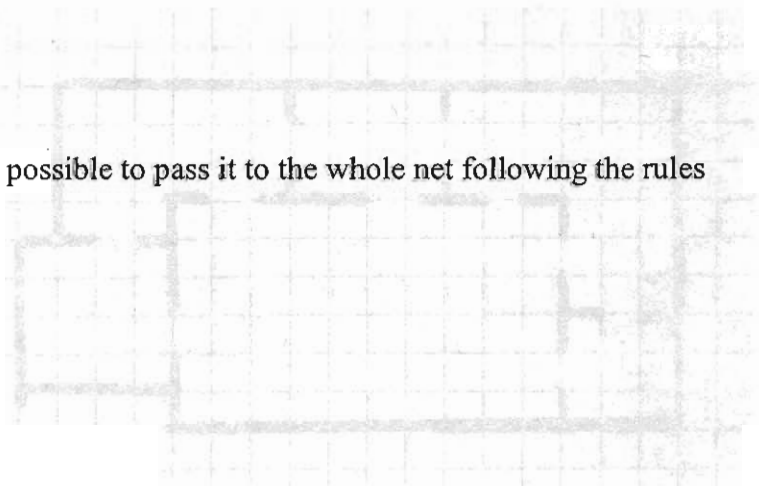
3. Jack works for an international secret service agency. He has a message that he needs to communicate to all the agencies in his net. For security reasons each agency can communicate to another one only once, and agencies communicate with each other only in the following way.

Amsterdam with Dublin and Geneva
Berlin with Calcutta and Geneva
Calcutta with Berlin, Dublin, and Geneva
Dublin with Amsterdam, Calcutta, and Geneva
Geneva with Amsterdam, Berlin Calcutta, and Dublin

a) Draw a graph to model this situation. What should the edges represent? What should the vertices represent?

b) Where should Jack send the message first so that is it possible to pass it to the whole net following the rules above, or can he start with any of his agents?

c) In what order should the message be distributed so that it reaches every agent in the net exactly once.