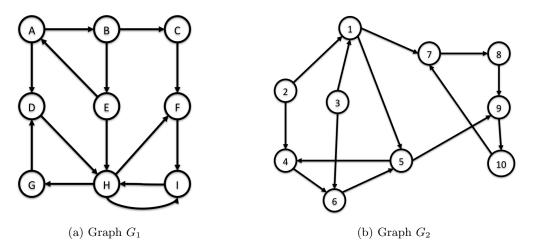
- 1. Show that any strongly connected undirected graph with n vertices and (n-1) edges is a tree.
- 2. We know that the strongly connect components in any directed graph form a partition of vertices in the graph. So, the strongly connected components in a given graph can be represented as a partition of vertices. Consider the directed graphs G_1 and G_2 below and answer the questions that follow:



(a) _____

- (a) Give the strongly connected components of graph G_1 .
- (b) Give the strongly connected components of graph G_2 .
 - (b) _____
- 3. Given a directed graph G = (V, E) and an edge $(u, v) \in E$, you want to determine if G has a cycle that contains this edge (u, v). Design an algorithm for this problem. Give pseudocode, discuss running time, and give proof of correctness.
- 4. You are given a directed acyclic graph G = (V, E) in which each node $u \in V$ has an associated *price*, denoted by price(u), which is a positive integer. The *cost* of a node u, denoted by cost(u), is defined to be the price of the cheapest node reachable from u (including u itself). Design an algorithm that computes cost(u) for all $u \in V$. Give pseudocode, discuss running time, and give proof of correctness.