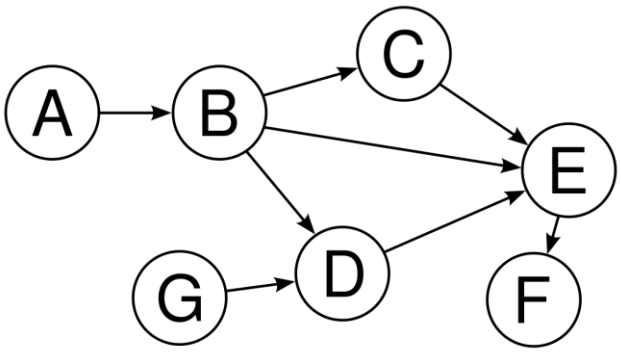
Lab 12

1. Perform the General Topological Sort algorithm on the following graph.



Solution: f(F) = 7, f(E) = 6, f(C) = 5, f(D) = 4, f(B) = 3, f(A) = 2, f(G) = 1;
Topological sort: G, A, B, D, C, E, F
Note: there are other possible sorting outcome.

2. Devise an algorithm for the following problem. Then give the asymptotic running time of your algorithm, including an explanation of how you arrived at this running time.

   Algorithm: IsReachableFrom(G, u, v)
   Input: A directed graph G, vertices u, v in G
   Output: TRUE if there is a directed path from u to v in G, false otherwise.

   Solution:
   - Perform directed DFS starting at u, store each visited vertex in a set V_0, and stop when the stack is empty.
   - Return TRUE if v is in V_0, FALSE otherwise.

   Running Time of Your Algorithm: O(m+n)

   Explanation: This is just a simple variation of (directed) DFS