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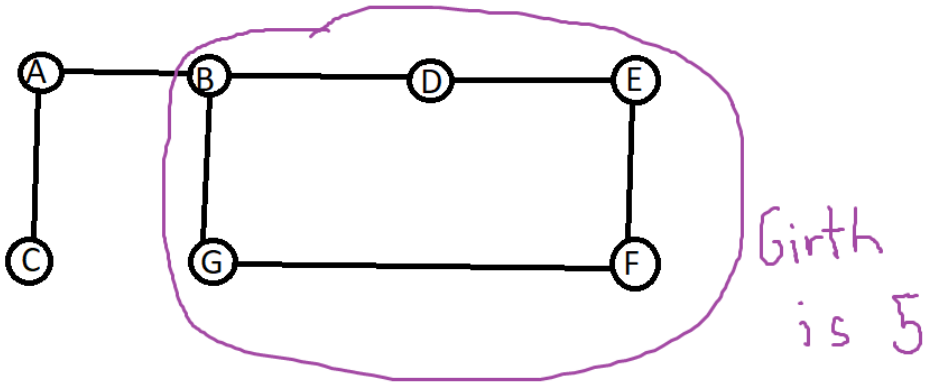
Exercise 4.1.18:: The girth of a graph is the length of its shortest cycle. If a graph is acyclic, then its girth is infinite. Add a method girth() to GraphProperties that returns the girth of the graph. Hint : Run BFS from each vertex. The shortest cycle containing s is a shortest path from s to some vertex v, plus the edge from v back to s.

Solution:



BFS can find/detect a cycle as it goes down a layer. It see/checks if something previously has been marked. If so, then cycle is formed.

BFS_cycle: Detect and calculate length of cycle.

OUT: A

Queue: $A_\phi, B_A, C_A, D_B, G_B, E_D, F_G$

Dequueing E, we find already marked but not yet Dequeued. So we know $E - F$ is part of the cycle