Given an adjacency matrix and find out pendant vertices and edges for directed and undirected graph.

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Pendant vertex: A vertex of a graph is said to be pendant if

its neighborhood contains exactly one vertex.

Pendant edge: An edge of graph is said to be pendant if one

of its vertices is a pendant vertex.

MOTIVATION

Pendant vertex is basically a leaf node of a graph with constraint that it has degree exactly equal to one.It is important to find Pendant vertex and Pendant edge to know the end of a graph. Pendant vertex is basically a leaf node of a graph with constraint that it has degree exactly equal to one.It is important to find Pendant vertex and Pendant edge to know the end of a graph..

ALGORITHM

For Undirected Graph

FindPendantVertices(M)

Input : An adjacency matrix M.

Output : A set of pendant Vertex V.

for i := 1 upto N

    count := 0

    for j := 1 upto N

        if M[i][j] = 1

count := count + 1;

For Undirected Graph

FindPendantEdges(M, V)

Input : An adjacency matrix M and set of pendant Vertex V.

Output : A set of pendant edges E

for i := AllElementOf(V)

for j := 1 upto N

If M[i][j] = 1

E.insert(i, j) , Break

ALGORITHM

For Directed Graph

FindPendantVertices(M) Input : An adjacency matrix M.

Output : A set of pendant Vertex V.

for i := 1 upto N

for j := 1 upto N

if M[i][j] = 1

outdegree[i] = outdegree[i] + 1

Indegree[j] = indegree[j] + 1

For Directed Graph

FindPendantEdges(M, V)

Input : An adjacency matrix M and set of pendant Vertex V.

Output : A set of pendant edges E

for i := 1 upto N

for j := 1 upto N If M[i][j] = 1 and (i V or j V)

E.insert(i, j)

To find the pendant vertex in directed as well as undirected graph , every vertex needs to be visited. If the adjacent neighbour has one and only vertex, insert it into set V.
In Algorithm II to find pendant vertex of undirected graph need to traversed each node(i) and find the degree. If the degree of node(i) is 1, insert that node(i) in set V.
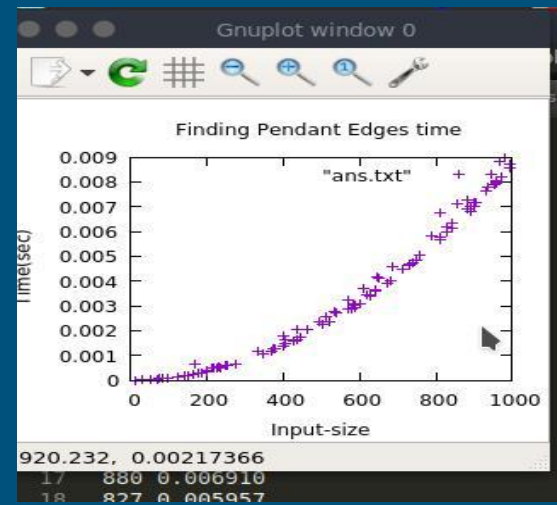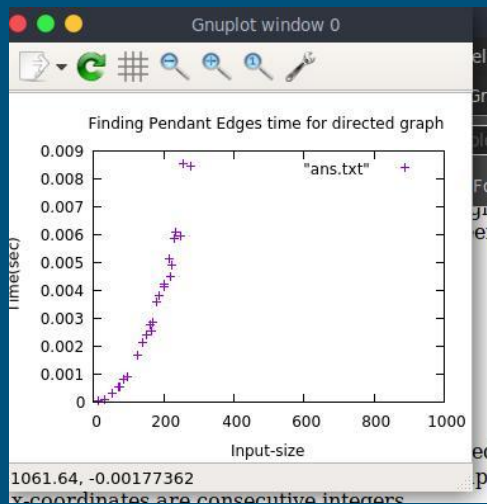To find pendant edges, check the adjacency of every pendant vertex(i) in set V with other vertex(j) in graph. If there is an edge, insert the pair(i,j) in the set E.
To find pendant vertex in directed graph, Indegree as well as out degree of every vertex need to be calculated. Now, if for every vertex(i) if the sum of indegree and outdegree is equals to 1, insert the vertex(i) to set V.
For pendant edges in directed graph, we check edges from every vertex. If there is an edge and any of the vertex lies in Set V, then the edge is called Pendant edge.
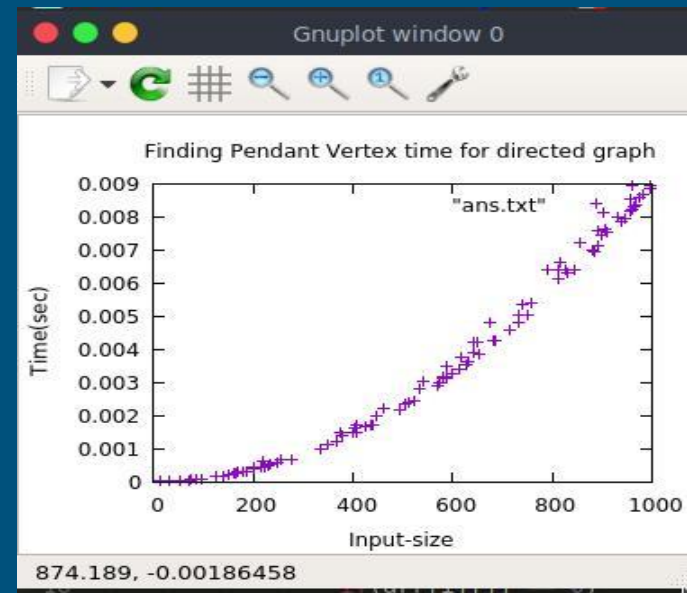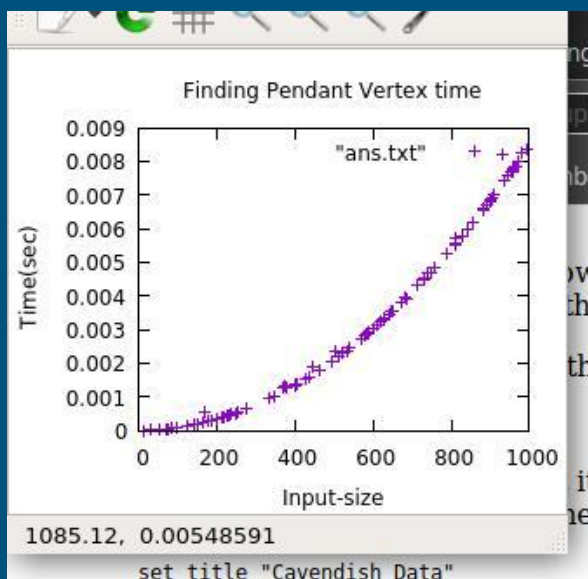
Finding Pendant Vertex time

Finding Pendant Edges time