

Coding project: Intersection graphs of subtrees of a tree

Group #5

Grader: Ma, Chao

Members:

1. Pundamalli, Venkata Sai
2. Sreerama, Kishore Kumar
3. Sukhavasi, Abilash Choudary
4. Tallapu Reddy, Venkateswara Reddy
5. Vennamaneni, Ajitesh
6. Vulisetty, Siva Varun

Programs:

1. Create a random tree (Pundamalli, Venkata Sai)

Input: Interactively input number of vertices “n”.

Method: Create a tree with one vertex. Each next n-1 iterations, ask the user to identify a vertex in the current tree and add a new vertex adjacent to only that vertex.

Output: a txt file giving an adjacency list of the generated tree.

n, m
1: 4,6,7
2: 3,4,8,9
...

2. Path graphs (Sreerama, Kishore Kumar)

Input: a txt file giving an adjacency list of a tree with n nodes.

Method: Ask the user to input the number of vertices “N” in a chordal graph to be constructed ($N < n$). Iteratively input N paths of the tree by asking the user to give two end nodes of each path in the tree.

Output: a txt file giving an adjacency list of the intersection graph of those N paths.

3. Intersection graph of neighborhood-subtrees (Sukhavasi, Abilash Choudary)

Input: a txt file giving an adjacency list of a tree with n nodes.

Method: Ask the user to input the number of vertices “N” in a chordal graph to be constructed ($N < n$). Ask the user to input the names of N nodes in the tree.

Output: a txt file giving an adjacency list of the intersection graph of closed neighborhoods in the tree of those N nodes.

4. Intersection graph of k-neighborhood-subtrees (Tallapu Reddy, Venkateswara Reddy)

Input: a txt file giving an adjacency list of a tree with n nodes.

Method: Ask the user to input the number of vertices “N” in a chordal graph to be constructed ($N < n$) and a radius k (between 1 and 5). Ask also the user to input the names of N nodes in the tree.

Output: a txt file giving an adjacency list of the intersection graph of closed k-neighborhoods in the tree of those N nodes. The closed k-neighborhood of a node v is $N^k[v] = \{x \text{ in } T: \text{dist}_T(x, v) \leq k\}$.

5. List all maximal cliques of a chordal graph (Vennamaneni, Ajitesh)

Input: a txt file giving an adjacency list of the graph and its perfect elimination ordering.

Output: the list of all maximal cliques and the vertices in each maximal clique of the graph.

n, m
1: 4,6,7
2: 3,4,8,9
...
PEO: 4,2,7, ...

6. Build a clique tree of a chordal graph (Vulisetty, Siva Varun)

Input: a txt file giving an adjacency list of the graph G and its perfect elimination ordering.

Output: a txt file giving an adjacency list of a clique tree of G; for each node in the tree give the vertices of a maximal clique of G that the node represents.