Title : Design & implement Parallel BFS and DFS based on existing algorithms using OpenMP, Use a tree or an undirected graph for BFS & DFS.

Objectives : To design & implement Parallel BFS & DFS based on existing algorithm using OPENMP.

Outcome : Acheive parallelization of DFS and BFS algorithms leveraging OpenMp directives, enabling efficient exploration of tree or graph.

Theory : Depth First Search (DFS) -

DFS is a graph traversal algorithm that exploves as far as possible along each branch before backtracking. It uses a stack data structure to maintain vertices to be visited.

OpenMP directives such as 'parallel', 'task', 'taskwait' and 'critical' can be utilized to parallelize DFS, ensuring thread safety & efficient workload distribution.

Breadth - First Search (BFS)

BFS is a graph traversal algorithm that explores all the vertices at the present depth before moving to the next level. It uses a queue data structure to maintain vertices to be visited.

Parallelization of BFS also be realized using OpenMP by dividing the workload among multiple threads to explore vertices at different levels concurrently.

Tree or undirected Graph Representation -

Both DFS & BFS can be applied to tree structures & undirected graphs where nodes are connected by edges without any directionality.

Tree and undirected graphs provide natural structures for demonstrating the parallelization of DFS & BFS algorithms using OPENMP.

Conclusion : Executed the parallel computing techniques in optimising graph traversal algorithms.