1.3 Organization of the Thesis

The remainder of the thesis is organized as follows.

Chapter 2 provides brief discussions on the works related to our research work.

In **Chapter 3**, we present the algorithms for switching from a BFS tree to a DFS tree. The first protocol presented is not crash-tolerant. This is then modified so that arbitrary crash faults can be tolerated. The proof of correctness of the switching protocol is given. The different broadcast properties that can be guaranteed under various failure conditions are studied.

Chapter 4 contains the algorithms for switching from a DFS tree to a BFS tree. Again the first protocol presented is not crash-tolerant. This is then modified so that arbitrary crash faults can be tolerated. The proof of correctness of the switching protocol is given. The different broadcast properties that can be guaranteed under various failure conditions are discussed.

Chapter 5 presents the self-stabilizing distributed algorithms for switching between two spanning tree based broadcast protocols. Initially the two spanning trees are assumed to be fixed. Later this assumption is relaxed and we assume that they are obtained by some self-stabilizing algorithms. The proof of correctness of the switching protocols are given. The different broadcast properties that can be guaranteed under various failure conditions are discussed.

Chapter 6 presents an adaptive mutual exclusion scheme that dynamically switches between Raymond's algorithm and Martin's algorithm based on load. In either form of switching, it is shown that no more than one process is inside the critical section at any time. Also it is proved that there is no deadlock.

Finally in **Chapter 7**, we summarize the work done, highlight the contributions, and suggest directions for possible future work.