PES University

Computer Science and Engineering Department

Generic Programming Elective Course Project

Topic: Red Black Tree Implementation using Iterators

-Kashish Oberoi PES1201700113

-Sagar Ratan Garg PES1201700913

Abstract

In this project, we have implemented a generic approach on Red Black Trees, which are an optimization of binary search trees, they are self-balancing trees which is taken care by the colouring scheme and rotation policies of the data structure. The main advantage of Red-Black trees is that in both insertions and deletions a single top-down pass may be used. Red Black trees offer worst-case guarantees for all insertion time, deletion time, and search time. We have used the concept of iterators to perform operations on the Red Black Tree. Iterators play a critical role in connecting algorithms and operations with the Red-Black Tree Structure along with the manipulation of data stored inside. We have used bidirectional iterators to move to the predecessor or ancestor as well as the successor of the given node. The use of iterators, improves readability and usability of the code, it is easier to build over to add more features. For generic implementation, we have used typename to declare the contents of the node in the Red Black Tree.