Red-black trees are the binary search trees that guarantee logarithmic complexity also in the worst case. In order to speed up the response time of the operations and to allow a high degree of concurrency in parallel environment, relaxed balancing was introduced. The main idea is to uncouple the rebalancing from the updating. The aim of the diploma thesis is experimental comparison of standard red-black trees and three relaxed balanced versions in non-parallel environment while working with large data.