In theory, AVL trees are best for search heavy operations since they are strictly balanced but because of that they have slower insertions and deletions speed , RB trees are best for insertions and deletions since they are less strictly balanced (less rotations and rebalancing). BST's are best for small data sets where performance is not of high priority. If I have unsorted data and I have a insert heavy operation I would go with the RB Tree, if I have a search heavy operation I will go with AVL Tree, if I plan on deleting often I will go with RB Tree. If my data is sorted and I have a insert heavy operation I would go with the AVL Tree, if I have a search heavy operation I will go with AVL Tree, if I plan on deleting often I will go with RB Tree. Worst case height scenarios for them would be; AVL O(log2(n+1)), BST O(n), RB O(2log2(n+1).

Based on my programs I discovered that for the unsorted data the insertion was fastest for the RB Tree, followed closely by the AVL tree, and trailing from afar was the BST. For search, the AVL tree was faster than the RB tree and the BST was about significantly slower than the other trees. For removal the quickest was the RB tree, followed by the BST, and the AVL tree came in last. For removal the margin was not as significant as the rest of the operations.

For the sorted data, with insertion, the BST was the quickest, followed by the RB, and then the AVL Tree. There wasnt a massive jump from first to last place. The RB tree was slightly faster for search than the AVL tree and the BST was way slower than them (over 10x). For removal the BST was the fastest followed by the AVL tree and the RB tree (massive jump from first to last place).

The results that came surprising to me was the deletion in the RB tree being slow because theoretically that should've been the quickest out of the three, outside of that everything went as expected. Also the BST surprised me in my program by being faster with sorted data, this could be because the data set was not the biggest or due to my implementation of the trees.