

- What is the worst case algorithmic asymptotic complexity i.e. $O(?)$ of each of the operations that you have

implemented. (10 points)

a. Add a book to the AVL tree (`void AVL::addBook(Book*)`).

- Due to the tree's self balancing nature we can guarantee $O(\log n)$ complexity for addition and search operations.
- Since the tree is balanced we can find the place to add and add the node to the tree in $O(\log n)$ time

b. Search a book in AVL tree (`Book* AVL::search(int)`).

- Since the tree is balanced search is guaranteed to run with $O(\log n)$ complexity.

- Is the average case complexity equal to the worst case complexity for AVL tree for the operations in a. and

b.? Give a brief explanation.

- Yes! Even is averaged over many input we can still do the operations mentioned in $O(\log n)$ time. Again this is due to the self balancing nature of the tree.