

### **Testing Strategy**

In this program, the `insert_at_root()` and `remove()` function did not work.

First, test unsigned int type for key, and char for value.

1. When the tree is empty, test `search()`, `is_empty()`, `size()`, `print()` functions. `search()` and `print()` will throw exceptions. The `print()` function will be used for other tests, so I have to make sure it is correct.
2. Test `insert()` function. It will randomly generate a number, if it equals to 0, it will insert at root, otherwise, it will insert at leaf. However, the `insert_at_root()` does not work, so I set the random number to 30 to make sure it will call the `insert_at_leaf` all the time for testing. I inserted to function.
3. Now the list is not empty, test the `is_empty()`, `size()` again, and test `capacity()`, `load()`.
4. Test `search()` with one in the map, and the other not in the map.
5. Test the `clear()` function, and use `size()` function to check.

Second test double for key and value. However, in the search function, a reference was passed, and it doesn't work for double.