

Programming assignment 2

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The structure that I used for this programming assignment (struct Town) includes the information of town ID, name of the town, direction (x,y), amount of tax, a pointer to its master town and a vector containing the IDs of its vassal towns:

```
struct Town
{
    TownID town_id;
    std::string name;
    int x;
    int y;
    int tax;
    Town* master_pointer;
    vector<TownID> vassalsID_vec;
};
```

I used three STL containers in this assignment which are:

- 1) unordered_map<TownID, Town*> town_main_map,
- 2) multimap<string, TownID> map_alpha_sorted,
- 3) multimap<int, TownID> map_dist_sorted.

The main container that I used to store the towns information is an unordered_map in which the keys are the towns' ID and the values are the pointer to the struct Town. Using this container, I can have easily access to each town information by means of the operations with reasonable complexity. Here I did not need any sorted information, therefore I used unordered_map.

To have the town's information in alphabetical and distance order, I think it is efficient to have two different multimap containers, one with the keys of string name (for alphabetically sorted) and another with the keys of distance from origin (0,0) (for distance increasing order). These keys are paired with the TownID.