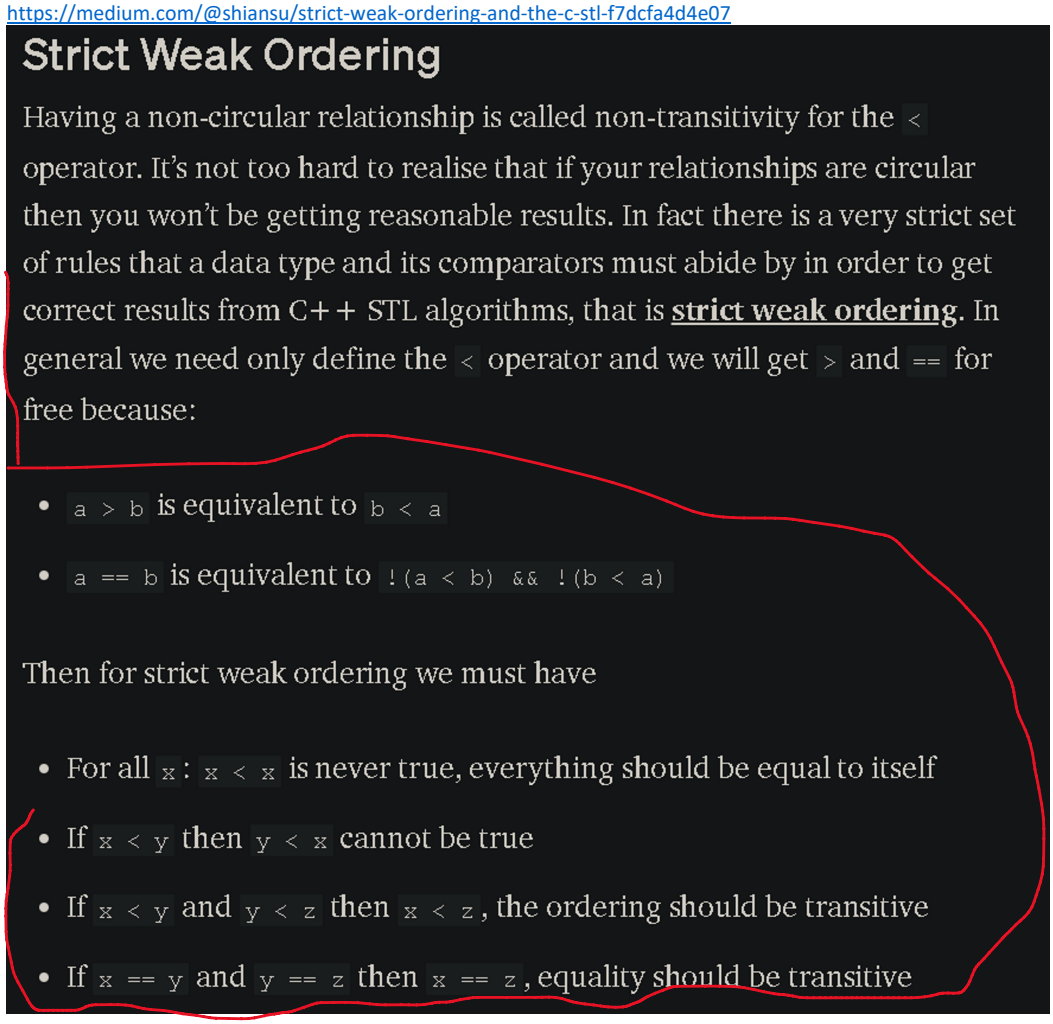
C++ Algorithm

09 June 2021 07:07

1. Strict weak ordering rule

Inorder to expect correct results from STL C++ algos, set of rules are defined for data-type of sequence and comparators used.
https://medium.com/@shiansu/strict-weak-ordering-and-the-c-stl-f7dcfa4d4e07

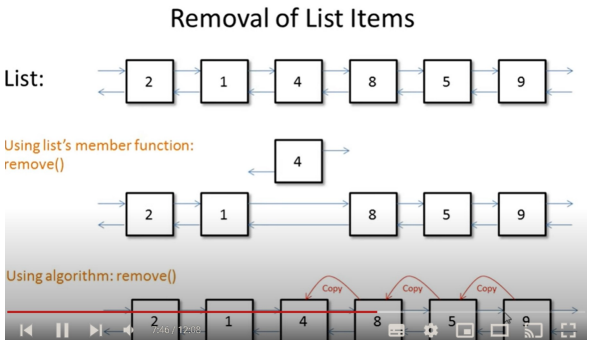


2. Algo functions less efficient in general compared to member methods

Eg

```
unordered_set<int> s = {2,4,1,8,5,9};  // Hash table
unordered_set<int>::iterator itr;

// Using member function
itr = s.find(4);                       // O(1)

// Using Algorithm
itr = find(s.begin(), s.end(), 4);     // O(n)
```

```
// How about map/multimap?
map<char, string> mymap = {{'S',"Sunday"}, {'M',"Monday"}, {'W', "Wendesday"},
..};


// Using member function
itr = mymap.find('F');                                          // O(log(n))

// Using Algorithm
itr = find(mymap.begin(), mymap.end(), make_pair('F', "Friday")); // O(n)
```



3. std::all_of(itr1, itr2, unary_predicate) -> true if unary_predicate returns 1/true for all elements in sequence
   std::any_of is similar.. Range is [itr1, itr2)
   O(n)

4. std::binary_search(itr1, itr2, value, comparator) -> true if value is present else false
   Uses < (uses relational equation above to find equivalence) or comparison function
   Expectation is sequence is already sorted using < or comparator.
   Comparator can be function pointer returning bool

   itrmatch = std::find(itr1, itr2, value)
   itrmatch = std::find_if(itr1, itr2, pred)
   oitrmatch = std::search(itr1, itr2, oitr1, oitr2, pred) .. Search for first occurrence of oitr1-oitr2 in itr1-itr2.. Equivalence using == or pred
5. oitr2 = std::copy(itr1, itr2, oitr1)
   I
6. oitr2 = std::copy_if(itr1, itr2, oitr1, unary_pred).. copies elements for which unary_pred is true

7. oitr2 = std::copy_n(itr1, n, oitr1) .. Copies n elements from itr1 to oitr1
   I
8. count = std::count(itr1, itr2, val).. Uses == to compare
   count = std::count_if(itr1, itr2, val, pred)

9. bool std::equal(itr1, itr2, jitr1, pred) .. Compares itr1-itr2 range to jitr1-range of elements using == or predicate
   I
10. std::fill(itr1, itr2, val), std::fill_n(itr1, n, val)
    I
11. std::for_each(itr1, itr2, funcptr) .. For each element in sequence execute funcptr
    I
12. std::unique(itr1, itr2).. Removes all but first element of equal valued groups
    I
13. std::swap(i, j) .. or std::swap<type, size>(refofseq1, refofseq2)
    I
14. F
    I
15. F
    I
16. F
    I
17. F
18. F
    I
19. F
    I
20. F
    I
21. F
    I
22. F
    I
23. F
    I

24. D
    I
25. F
    I
26. F
    I
27. F
    I
28. F
29. F
    I
30. F
    I
31. F
    I
32. F
    I
33. F
    I
34. F
    I
35. D
    I
36. F
    I
37. F
    I
38. F
    I
39. F
40. F
    I
41. F
    I
42. F
    I
43. F
    I
44. F
    I