

## Friendship Recommendation Algorithm

In this people you may know algorithm, Hadoop uses Map-Reduce in order to find the recommended friends for each particular user in non-increasing order of their mutual friends.

### Map Phase

In this phase, key-value pairs are created in form of <User1:<User2,mutualFriend>>

Here 2 types of key-value pairs are generated-

1. User1 to all of their friends with value mutualFriend=-1

Example : 1                      2,3,4  
=> (1,[2,-1]) ; (1,[3,-1]) ; (1,[4,-1])

2. All combinations of two, of friends corresponding to each User1

=> (2,[3,1]) ; (3,[2,1]) ; (2,[4,1]) ; (4,[2,1]) ; (3,[4,1]) ; (4,[3,1])

### Reduce Phase

In this phase, we have a combined for each particular User.

Example: 1:{[2,-1],[3,-1],[4,-1],[5,2],[5,3],[6,3]}

- Now there will be a map in which the entry of the pair (like [5,2]) is done if mutual friend is not -1, else entry will be with null i.e. [2,null]. And if another pair comes which is not directly friend(i.e. mutualFriend=-1) then the map value appends the mutual friend.
- Another TreeMap DataStructure is used to sort the map on the basis of the non-increasing length of each list of mutual friends from the map.
- Output is then converted to string for only top 10 recommended friends, and then the User1 with string is written back to context and the output is given.

### Output:

924	439,2409,6995,11860,15416,43748,45881
8941	8493,8488,8489,8490,8492,8494,8499,8501,8503,8504
8942	8939,8940,8943,8944
9019	9022,317,9023
9020	9021,9016,9017,9022,317,9023
9021	9020,9016,9017,9022,317,9023
9022	9019,9020,9021,317,9016,9017,9023
9990	13134,13478,13877,34299,34485,34642,37941
9992	9987,9989,35667,9991
9993	9991,13134,13478,13877,34299,34485,34642,37941