# CSE 222 Homework 8: Report
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**Note:** The clusters shows the creation dates of people which can be used for other methods for date inputs. Also, the program comes with some demo program.

1. **Add Person**
   User enters a name, age and hobby values for person and a person object is created based on these values with the creation date value. Then, this created person object is added to people and friendship maps in SocialNetworkGraph.

2. **Remove Person**
   User enters the name and creation date of the person which will be removed from network. Within the method, the name is searched in people map later the date will be checked based on the input. If valid person is found, that person will be removed from people and friendship maps. Also, that person will be removed from other people's friendship lists.

3. **Add Friendship**

   User enters the names and creation dates of two person that will be added to their friendship lists. After the names and dates is checked, if the selected people are found, they will be added to their friendship lists, else , an error message will be printed.

4. **Remove Friendship**

   User enters the names and creation dates of two person that will be removed to their friendship lists. After the names and dates is checked, if the selected people are found and there is a friendship link between them, they will be removed from their friendship lists, else , an error message will be printed.

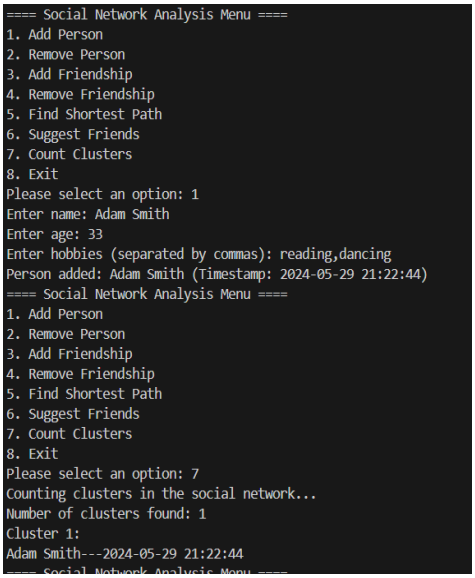
5. **Find Shortest Path**
   User enters two name and creation date values for two person. If the inputs are valid and people are found, implementing a breadth first search logic implemented. Visited nodes will be held in visited Set and the people will be visited held in queue Queue. By iterating the queue elements, we try to find selected person and in the prev Map the path is held from start to end iterating through friends layers. When, the end person is found, the path will be created by reversing prev Map entries. At the end, the path will be printed or if a path isn't found then an error message printed.

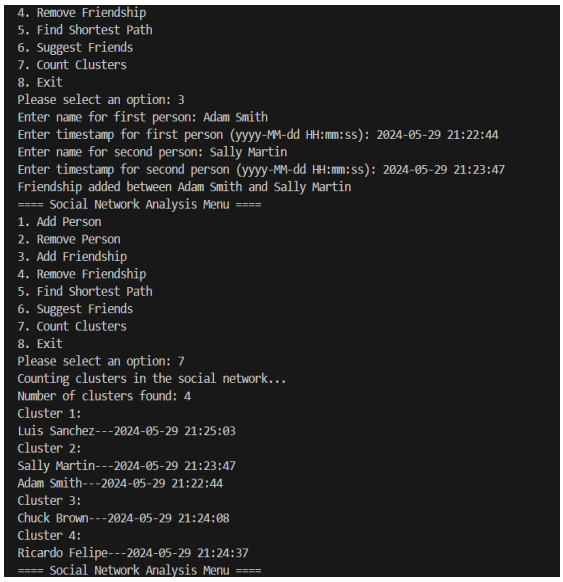
6. **Suggest Friends**
   User enters the name and creation date of the person with the count of wanted friend size. Firstly, checks the name and creation date of the person. If they are valid, every people's (except of the person itself and its current friends) score will be calculated based on common friends and hobbies. Later, the potential friends is sorted based on their scores and at the end, the selected number of higher ranked friends printed with their scores.

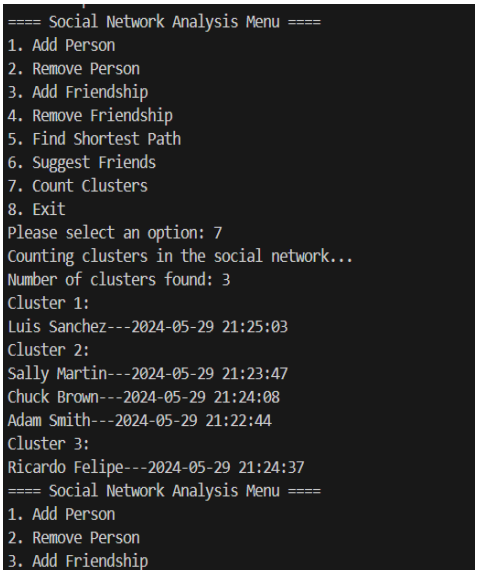
## 7. Count Clusters

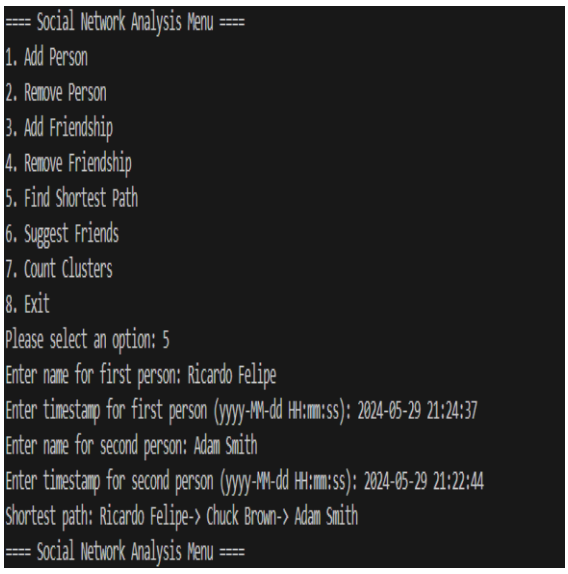
To find clusters, a set for visited people and list of sets for clusters is initialized. Then, every person within people map is iterated one by one and if selected person isn't visited then a breath first search is made starting with that person and during the bfs method, there will be a search through the people within queue until there is no person in the queue while clusters is created one by one with the queue elements. At the end, all the clusters is printed to the terminal. Even a person without friend printed as single cluster.

### Output Images



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==== Social Network Analysis Menu ====
1. Add Person
2. Remove Person
3. Add Friendship
4. Remove Friendship
5. Find Shortest Path
6. Suggest Friends
7. Count Clusters
8. Exit
Please select an option: 6
Enter name: Adam Smith
Enter timestamp (yyyy-MM-dd HH:mm:ss): 2024-05-29 21:22:44
Enter maximum number of friends to suggest: 2
Top 2 suggested friends for Adam Smith:
Ricardo Felipe (Score: 2.0)
Luis Sanchez (Score: 1.5)
==== Social Network Analysis Menu ====
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==== Social Network Analysis Menu ====
1. Add Person
2. Remove Person
3. Add Friendship
4. Remove Friendship
5. Find Shortest Path
6. Suggest Friends
7. Count Clusters
8. Exit
Please select an option: 4
Enter name for first person: Luis Sanchez
Enter timestamp for first person (yyyy-MM-dd HH:mm:ss): 2024-05-29 21:25:03
Enter name for second person: Chuck Brown
Enter timestamp for second person (yyyy-MM-dd HH:mm:ss): 2024-05-29 21:24:08
Friendship removed between Luis Sanchez and Chuck Brown
==== Social Network Analysis Menu ====
1. Add Person
2. Remove Person
3. Add Friendship
4. Remove Friendship
5. Find Shortest Path
6. Suggest Friends
7. Count Clusters
8. Exit
Please select an option: 7
Counting clusters in the social network...
Number of clusters found: 2
Cluster 1:
Luis Sanchez---2024-05-29 21:25:03
Cluster 2:
Sally Martin---2024-05-29 21:23:47
Chuck Brown---2024-05-29 21:24:08
Adam Smith---2024-05-29 21:22:44
Ricardo Felipe---2024-05-29 21:24:37
==== Social Network Analysis Menu ====
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==== Social Network Analysis Menu ====
1. Add Person
2. Remove Person
3. Add Friendship
4. Remove Friendship
5. Find Shortest Path
6. Suggest Friends
7. Count Clusters
8. Exit
Please select an option: 2
Enter name: Luis Sanchez
Enter timestamp (yyyy-MM-dd HH:mm:ss): 2024-05-29 21:25:03
Person removed: Luis Sanchez (Timestamp: 2024-05-29 21:25:03)
==== Social Network Analysis Menu ====
1. Add Person
2. Remove Person
3. Add Friendship
4. Remove Friendship
5. Find Shortest Path
6. Suggest Friends
7. Count Clusters
8. Exit
Please select an option: 7
Counting clusters in the social network...
Number of clusters found: 1
Cluster 1:
Sally Martin---2024-05-29 21:23:47
Chuck Brown---2024-05-29 21:24:08
Adam Smith---2024-05-29 21:22:44
Ricardo Felipe---2024-05-29 21:24:37
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