

CSE222 / BİL505
Data Structures and Algorithms
Homework #8 – Report

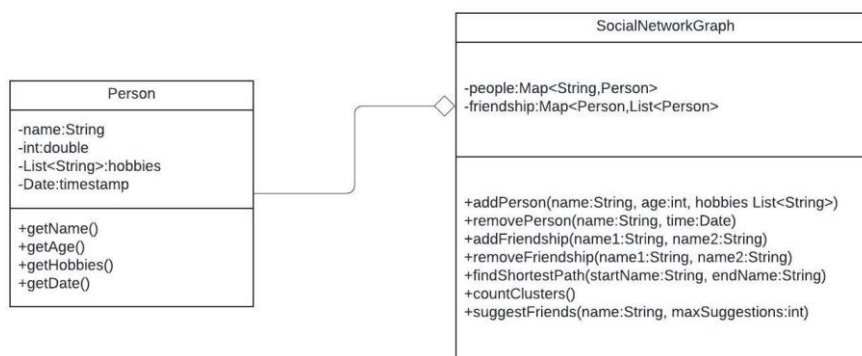
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- **INTRODUCTION**

This assignment involves the comprehensive implementation of a social network analysis system using graph data structures and algorithms. The objective is to simulate a social network and perform extensive analyses on the network, such as suggesting friends and counting clusters.

- **METHODOLOGY**

I have implemented a **Person** class to store a person's information. Additionally, I have implemented a **SocialNetworkGraph** class to simulate a social network. Below is the UML class diagram for my implementation.



I have also used **Breadth-First Search** algorithm for 'findShortestPath' and 'countCluster' methods.

- **OUTPUTS**

```
==== 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
9. Test
> █
```

```
> 1
Enter name: John Wilson
Enter age: 23
Enter hobbies (comma-seperated): cooking,camping,gaming
The Person added: John Wilson (Age: 23, Hobbies: [cooking, camping, gaming])
```

```
> 2
Enter name: John Wilson
Person removed: John Wilson (Age: 23, Hobbies: [cooking, camping, gaming])
```

```
> 3
Enter first person's name: Bob Brown
Enter second person's name: John Wilson
Friendship added between Bob Brown and John Wilson
```

```
> 4
Enter first person's name: Bob Brown
Enter second person's name: John Wilson
Friendship removed between Bob Brown and John Wilson
```

```
> 9
The Person added: John Doe (Age: 25, Hobbies: [reading, hiking, cooking])
The Person added: Jane Smith (Age: 22, Hobbies: [swimming, cooking])
The Person added: Alice Johnson (Age: 27, Hobbies: [hiking, painting])
The Person added: Bob Brown (Age: 30, Hobbies: [reading, swimming])
The Person added: Emily Davis (Age: 28, Hobbies: [running, swimming])
The Person added: Frank Wilson (Age: 26, Hobbies: [reading, hiking])
Friendship added between John Doe and Jane Smith
Friendship added between John Doe and Alice Johnson
Friendship added between Jane Smith and Bob Brown
Friendship added between Emily Davis and Frank Wilson

Suggested friends for Alice Johnson:
Jane Smith

The Shortest path is: John Doe->Jane Smith->Bob Brown
Number of clusters found: 2
Cluster 1:
Emily Davis
Frank Wilson

Cluster 2:
Alice Johnson
John Doe
Jane Smith
Bob Brown
```