

# CSE222 HW#8 Report

## Add Person John Doe

```
o /usr/bin/env /usr/lib/jvm/jdk-21-oracle-x64/bin/jaksoy@bedirhan:~$ /usr/bin/env /usr/lib/jvm/jdk-21-oracle
-x64/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /tmp/vscodesws_b885b/jdt_ws/jdt.ls-java-project/bi
n Main
===== 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: 1
Enter name: John Doe
Enter age: 25
Enter hobbies (comma-separated): reading,hiking,cooking
Person added: John Doe (Age: 25, Hobbies: [reading, hiking, cooking]) (Timestamp: Wed May 29 20:42:31 TRT 20
24)
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
```

## Add Person Jane Smith

```
Enter hobbies (comma-separated): reading,hiking,cooking
Person added: John Doe (Age: 25, Hobbies: [reading, hiking, cooking]) (Timestamp: Wed May 29 20:42:31 TRT 20
24)
===== 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: 1
Enter name: Jane Smith
Enter age: 23
Enter hobbies (comma-separated): biking,chess,badminton
Person added: Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]) (Timestamp: Wed May 29 20:43:15 TRT
2024)
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
```

## Add Person Willy Wonka

```
Enter hobbies (comma-separated): biking,chess,badminton
Person added: Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]) (Timestamp: Wed May 29 20:43:15 TRT 2024)
===== 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: 1
Enter name: Willy Wonka
Enter age: 34
Enter hobbies (comma-separated): chocolate,enterprenure
Person added: Willy Wonka (Age: 34, Hobbies: [chocolate, enterprenure]) (Timestamp: Wed May 29 20:43:39 TRT 2024)
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
```

## Add Friendship Willy Wonka - John Doe

```
Enter hobbies (comma-separated): chocolate,enterprenure
Person added: Willy Wonka (Age: 34, Hobbies: [chocolate, enterprenure]) (Timestamp: Wed May 29 20:43:39 TRT 2024)
===== 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: 3
Enter first person's name: Willy Wonka
Enter second person's name: John Doe
Friendship added between Willy Wonka and John Doe
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
4. Remove friendship
```

## Add Friendship John Doe - Jane Smith

```
Please select an option: 3
Enter first person's name: Willy Wonka
Enter second person's name: John Doe
Friendship added between Willy Wonka and John Doe
===== 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: 3
Enter first person's name: John Doe
Enter second person's name: Jane Smith
Friendship added between John Doe and Jane Smith
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
```

## Add Person Ilya Ilyich

```
Enter second person's name: Jane Smith
Friendship added between John Doe and Jane Smith
===== 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: 1
Enter name: Ilya Ilyich
Enter age: 43
Enter hobbies (comma-separated): fishing,hiking
Person added: Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking]) (Timestamp: Wed May 29 20:44:51 TRT 2024)
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
4. Remove friendship
```

## Add Friendship Jane Smith - Ilya Ilyich

```
7. Count clusters
8. Exit
Please select an option: 3
Enter first person's name: John Doe
Enter second person's name: Jane Smith
Friendship added between John Doe and Jane Smith
===== 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: 3
Enter first person's name: Jane Smith
Enter second person's name: Ilya Ilyich
Friendship added between Jane Smith and Ilya Ilyich
===== Social Network Analysis Menu =====
1. Add person
```

## Find Shortest Path Between Willy Wonka - Ilya Ilyich

```
Enter first person's name: Jane Smith
Enter second person's name: Ilya Ilyich
Friendship added between Jane Smith and Ilya Ilyich
===== 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: 5
Enter first person's name: Willy Wonka
Enter second person's name: Ilya Ilyich
Shortest path: Willy Wonka -> John Doe -> Jane Smith -> Ilya Ilyich ->
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
4. Remove friendship
```

## Suggest Friend to John Doe

```
===== 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 person's name: John Doe
Enter maximum number of friends to suggest: 3
Ilya Ilyich (Score: 1.5)
===== 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
```

## Suggest Friend Function fixed and now shows the parameters that contributes to the total score

```
===== 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 person's name: Ahmet
Enter maximum number of friends to suggest: 2
Mehmet (Score: 1.5, 1 mutual friends, 1 common hobbies)
===== Social Network Analysis Menu =====
1. Add person
```

## Count Clusters (Currently its 1, everyone is friend like a chain)

```
7. Count clusters
8. Exit
Please select an option: 6
Enter person's name: John Doe
Enter maximum number of friends to suggest: 3
Ilya Ilyich (Score: 1.5)
===== 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
Cluster 1: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship]), Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]), Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 1
===== Social Network Analysis Menu =====
1. Add person
```

## Add Person Ahmed Muhsin

```
Please select an option: 7
Cluster 1: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship]), Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]), Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 1
===== 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: 1
Enter name: Ahmed Muhsin
Enter age: 16
Enter hobbies (comma-separated): league of legends,counter strike 2
Person added: Ahmed Muhsin (Age: 16, Hobbies: [league of legends, counter strike 2]) (Timestamp: Wed May 29 21:02:34 TRT 2024)
===== Social Network Analysis Menu =====
1. Add person
```

## Add Person Can Sengun

```
Enter name: Ahmed Muhsin
Enter age: 16
Enter hobbies (comma-separated): league of legends,counter strike 2
Person added: Ahmed Muhsin (Age: 16, Hobbies: [league of legends, counter strike 2]) (Timestamp: Wed May 29
21:02:34 TRT 2024)
===== 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: 1
Enter name: Can Sengun
Enter age: 23
Enter hobbies (comma-separated): playing guitar,travelling
Person added: Can Sengun (Age: 23, Hobbies: [playing guitar, travelling]) (Timestamp: Wed May 29 21:03:31 TR
T 2024)
===== Social Network Analysis Menu =====
1. Add person
```

## Add Friendship Ahmed Muhsin - Can Sengun

```
Enter name: Can Sengun
Enter age: 23
Enter hobbies (comma-separated): playing guitar,travelling
Person added: Can Sengun (Age: 23, Hobbies: [playing guitar, travelling]) (Timestamp: Wed May 29 21:03:31 TR
T 2024)
===== 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: 3
Enter first person's name: Ahmed Muhsin
Enter second person's name: Can Sengun
Friendship added between Ahmed Muhsin and Can Sengun
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
```

Count Clusters (Currently 2, after creating two new person and make them friend)

```
Enter first person's name: Ahmed Muhsin
Enter second person's name: Can Sengun
Friendship added between Ahmed Muhsin and Can Sengun
===== 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
Cluster 1: [Ahmed Muhsin (Age: 16, Hobbies: [league of legends, counter strike 2]), Can Sengun (Age: 23, Hobbies: [playing guitar, travelling])]
Cluster 2: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship]), Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]), Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 2
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
```

Remove Friendship John Doe - Jane Smith

```
Cluster 2: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship]), Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]), Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 2
===== 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 first person's name: John Doe
Enter second person's name: Jane Smith
Friendship removed between John Doe and Jane Smith
===== Social Network Analysis Menu =====
1. Add person
2. Remove person
3. Add friendship
4. Remove friendship
```

Count Clusters (Currently 3. After removing friendship between John Doe and Jane Smith, other persons relation is ended)

```

8. Exit
Please select an option: 4
Enter first person's name: John Doe
Enter second person's name: Jane Smith
Friendship removed between John Doe and Jane Smith
===== 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
Cluster 1: [Ahmed Muhsin (Age: 16, Hobbies: [league of legends, counter strike 2]), Can Sengun (Age: 23, Hobbies: [playing guitar, travelling])]
Cluster 2: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship])]
Cluster 3: [Jane Smith (Age: 23, Hobbies: [biking, chess, badminton]), Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 3
===== Social Network Analysis Menu =====

```

## Remove Person Jane Smith and Count Clusters

```

===== 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: Jane Smith
Person removed: Jane Smith
===== 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
Cluster 1: [Ahmed Muhsin (Age: 16, Hobbies: [league of legends, counter strike 2]), Can Sengun (Age: 23, Hobbies: [playing guitar, travelling])]
Cluster 2: [John Doe (Age: 25, Hobbies: [reading, hiking, cooking]), Willy Wonka (Age: 34, Hobbies: [chocolate, entrepreneurship])]
Cluster 3: [Ilya Ilyich (Age: 43, Hobbies: [fishing, hiking])]
Number of clusters found: 3
===== Social Network Analysis Menu =====
1. Add person
2. Remove person

```

addPerson(String name, int age, List<String> hobbies)



It adds new person to social network. It creates a new Person object with the provided name, age, and hobbies, then adds this person to people map with using the person's name as the key. It initializes an empty list of friends for new person in the graph map and logs addition of the person with timestamp.

`removePerson(String name)`

It removes a person from social network. It first finds the person by their name in people map and then removes person from both people map and their entry from the graph map. It removes the person from all friends lists in graph to ensure that no references remain. It logs the removal of the person.

`addFriendship(String name1, String name2)`

It makes a friendship between two people in the social network. It gets the Person objects for both names from the people map and then adds each person to the other's list of friends in graph map. After establishing the mutual friendship, the method logs the addition of the friendship.

`removeFriendship(String name1, String name2)`

It removes friendship between two people in the social network. It retrieves the Person objects for both names from the people map and then removes each person from other's list of friends in graph

map. It ensures the mutual friendship severed and logs the removal of friendship.

`findShortestPath(String startName, String endName)`

This method finds the shortest path between two people using Breadth-First Search (BFS). It checks if both persons exist in the people map, then initializes BFS structures queue, prev, and visited set. The method performs BFS to find shortest path and, if a path is found, calls `printPath` to display it. If no connection is found, it logs this result.

`printPath(Person start, Person end, Map<Person, Person> prev)`

This method prints the shortest path found by BFS. It constructs the path from end person to start person using the prev map, then reverses the path and prints it in the correct order of the shortest path.

`suggestFriends(String name, int maxFriends)`

It suggests friends to a person based on mutual friends and common hobbies. It checks if the person exists in people map, then calculates scores for all potential friends (excluding those already friends or person itself).

`countClusters()`

The method counts the number of clusters (connected components) in the social network using BFS. It initializes visited set and cluster counter, iterates through each person in graph, and performs BFS for unvisited persons to mark all persons in the same cluster. It logs each cluster and increments the cluster counter, providing a final log of the total number of clusters.

bfs(Person start, Set<Person> visited, List<Person> cluster)

This method performs BFS from a start person to find all persons in the same cluster. It initializes BFS structures queue and marks the start person as visited. The method explores the network level by level, adds each visited person to cluster list and continues until all connected persons are visited.

Bedirhan

Ömer Aksoy  
200104004074