

CS2023 - Data Structures and Algorithms

In Class Lab Exercise

Week 10

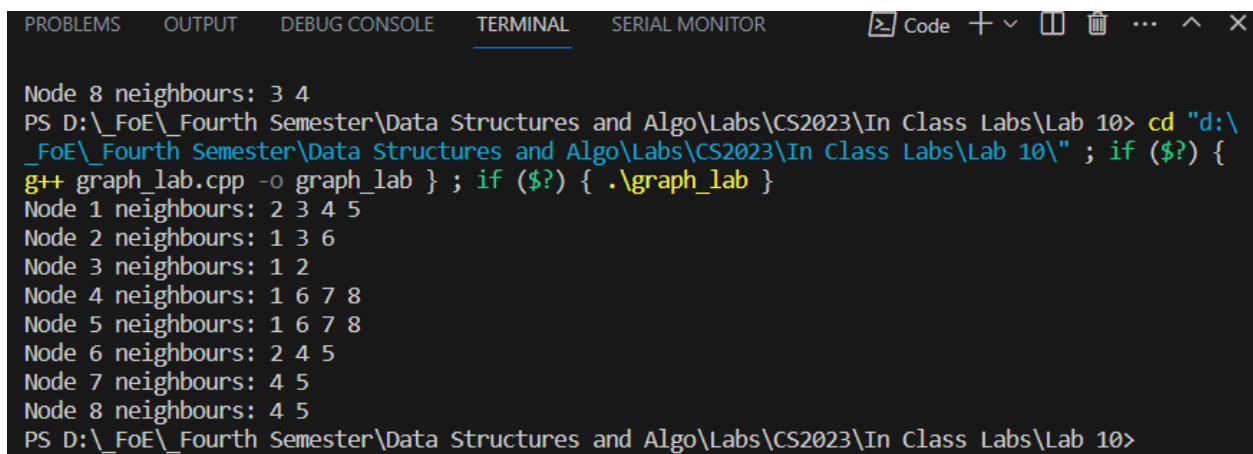
Index Number: 200105F

GitHub Link: <https://github.com/UlinduP/CS2023/tree/main/In%20Class%20Labs/Lab%2010>

Section 1 : Implementing Graph ADT

1. [1] -> [2, 3, 4, 5]
[2] -> [1, 3, 6]
[3] -> [1, 2]
[4] -> [1, 6, 7, 8]
[5] -> [1, 6, 7, 8]
[6] -> [2, 4, 5]
[7] -> [4, 5]
[8] -> [4, 5]

4.



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL SERIAL MONITOR
Node 8 neighbours: 3 4
PS D:\_FoE\_Fourth Semester\Data Structures and Algo\Labs\CS2023\In Class Labs\Lab 10> cd "d:\_FoE\_Fourth Semester\Data Structures and Algo\Labs\CS2023\In Class Labs\Lab 10\" ; if ($?) {
g++ graph_lab.cpp -o graph_lab } ; if ($?) { .\graph_lab }
Node 1 neighbours: 2 3 4 5
Node 2 neighbours: 1 3 6
Node 3 neighbours: 1 2
Node 4 neighbours: 1 6 7 8
Node 5 neighbours: 1 6 7 8
Node 6 neighbours: 2 4 5
Node 7 neighbours: 4 5
Node 8 neighbours: 4 5
PS D:\_FoE\_Fourth Semester\Data Structures and Algo\Labs\CS2023\In Class Labs\Lab 10>
```

5.

If the direction is from “u” to “v” then we are only adding “u” to “v” creating a direct edge and not adding “v” to “u” like done before.

```
void addEdge(int u, int v){
    nodes[u].neighbours.push_back(v);
}
```

Section 2 : Working out link prediction

$$Sim(4, 2) = \frac{4 \cap 2}{4 \cup 2} = \frac{2}{5} = 0.4$$

$$Sim(4, 3) = \frac{4 \cap 3}{4 \cup 3} = \frac{1}{5} = 0.2$$

$$Sim(4, 5) = \frac{4 \cap 5}{4 \cup 5} = \frac{4}{4} = 1$$

I can suggest Node 5 for Node 4. Node 5 is a neighbor of Node 1. All the neighbors of Node 4 are neighbors of Node 5. Therefore there is a high probability of Node 4 and Node 5 knowing each other and establishing a connection.