UNIVERSITY OF CALOOCAN CITY
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 10

Intro to Graphs

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I. Objectives

Introduction

A graph is a visual representation of a collection of things where some object pairs are linked together. Vertices are the points used to depict the interconnected items, while edges are the connections between them. In this course, we go into great detail on the many words and functions related to graphs.

An undirected graph, or simply a graph, is a set of points with lines connecting some of the points. The points are called nodes or vertices, and the lines are called edges.

A graph can be easily presented using the python dictionary data types. We represent the vertices as the keys of the dictionary and the connection between the vertices also called edges as the values in the dictionary.

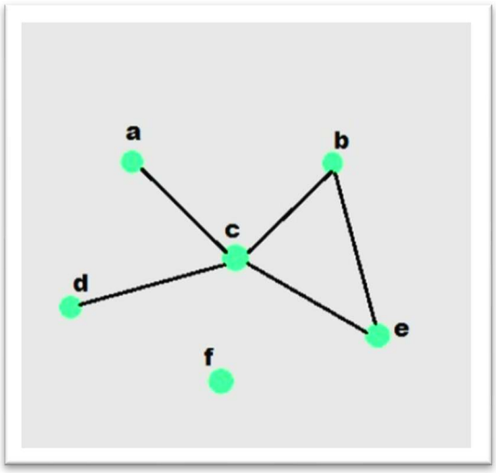

Figure 1. Sample graph with vertices and edges

This laboratory activity aims to implement the principles and techniques in:

- To introduce the Non-linear data structure – Graphs
- To discuss the importance of Graphs in programming

II. Methods

A. Discuss the following terms related to graphs:

1. Undirected graph
2. Directed graph
3. Nodes
4. Vertex
5. Degree
6. Indegree
7. Outdegree
8. Path
9. Cycle
10. Simple Cycle

III. Results

1. It is a type of graph where edges have no direction. The connection between two vertices goes both ways. If there is an edge between A and B, it means A is connected to B and B is also connected to A.
2. It is a graph where edges have a specific direction, meaning connections go one way only. If there is an edge from A to B, it does not automatically mean there is an edge from B to A.
3. The individual points or objects in a graph that represent entities or items.
4. A single point or node within a graph.
5. The total number of edges connected to a vertex.
6. In a directed graph, it is the number of incoming edges to a vertex.
7. In a directed graph, it is the number of outgoing edges from a vertex.
8. A sequence of vertices connected by edges that show a route between two points in the graph.
9. A path that starts and ends at the same vertex without repeating any edges.
10. A cycle that does not repeat any vertices or edges except for the starting and ending vertex.

IV. Conclusion

In this activity, I learned the basic concepts of graphs, including vertices, edges, and their connections. I understood the difference between directed and undirected graphs and how degrees, paths, and cycles describe relationships between nodes. Overall, this activity helped me understand how graphs represent data connections in programming.

References

[1] Co Arthur O.. “University of Caloocan City Computer Engineering Department Honor Code,” UCC-CpE Departmental Policies, 2020.