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.

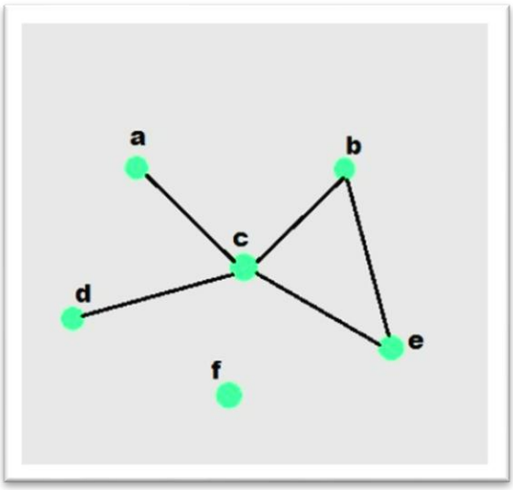

Figure 1. Sample graph with vertices and edges

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

Undirected Graph: A graph in which edges have no direction. The relationship between vertices is bidirectional (e.g., a friendship on a social network).

Directed Graph (Digraph): A graph where edges have a direction, pointing from one vertex to another (e.g., a one-way street in a road network).

Nodes/Vertices: The fundamental units of a graph that represent entities (e.g., a person, a computer, a city).

Edge: A connection between two vertices that represents a relationship.

Degree: The number of edges incident to a vertex. In a directed graph, this is split into indegree and outdegree.

Indegree: In a directed graph, the number of edges coming into a vertex.

Outdegree: In a directed graph, the number of edges going out of a vertex.

Path: A sequence of vertices where each adjacent pair is connected by an edge.

Cycle: A path that starts and ends at the same vertex, with no repeated edges or vertices (except the start/end vertex).

Simple Cycle: A cycle with no repeated vertices or edges (other than the starting and ending vertex).

IV. Conclusion

In this laboratory i was able to learn that graphs are the visual representations of a collection of things where some pairs are linked together. Meanwhile the vertices are the points used to depict interconnected things. Undirected graph,Directed graph, Nodes, Vertex, Degree, Indegree, Outdegree, Path, CycleSimple, and Cycle are the Non-Linear data structures- Graph.

References

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