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.

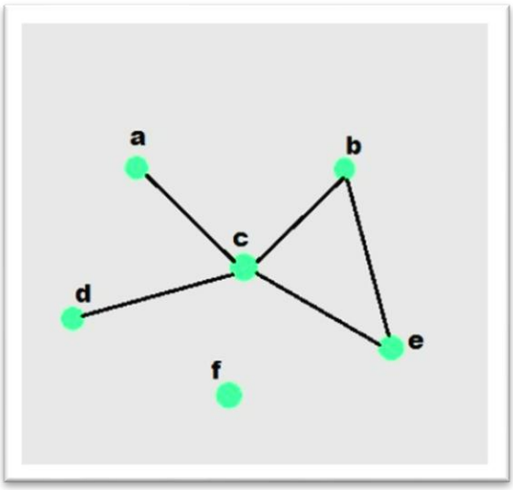

Figure 1. Sample graph with vertices and edges

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. Undirected graph

- An undirected graph is a type of graph where the edges have no direction. This means if two nodes are connected, you can move between them both ways.

2. Directed graph

- A directed graph has edges that show direction. Each edge points from one node to another, so you can only move in the direction of the arrow.

3. Nodes

- Nodes are the points or places in a graph. They represent the objects or data in the graph.

4. Vertex

- A vertex is just another word for a node. They mean the same thing.

5. Degree

- The degree of a node is the number of edges connected to it.

6. Indegree

- Indegree is the number of edges coming into a node in a directed graph.

7. Outdegree

- Outdegree is the number of edges going out from a node in a directed graph.

8. Path

- A path is a way to move from one node to another by following the edges.

9. Cycle

- A cycle happens when a path starts at a node and ends at the same node without breaking the rules of movement.

10. Simple Cycle

- A simple cycle is a cycle where no node (except the start/end) repeats in the path.

IV. Conclusion

From this lesson, I learned that a graph is a way to show how things are connected using points called vertices or nodes and lines called edges. I also learned the difference between undirected graphs, where connections go both ways, and how we can represent graphs in Python using dictionaries. Using a dictionary makes it easy to show which nodes are connected to each other. Overall, graphs are useful for organizing and understanding connections between different items.