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.

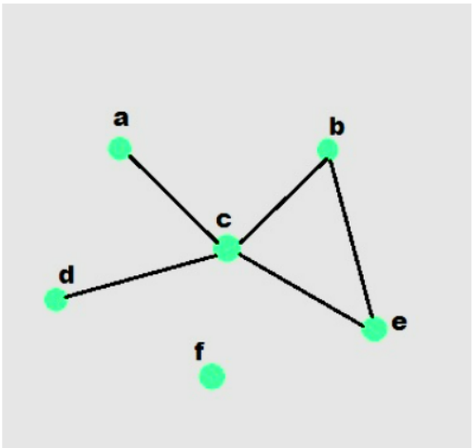

Figure 1. Sample graph with vertices and edges

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 And Directed Graph

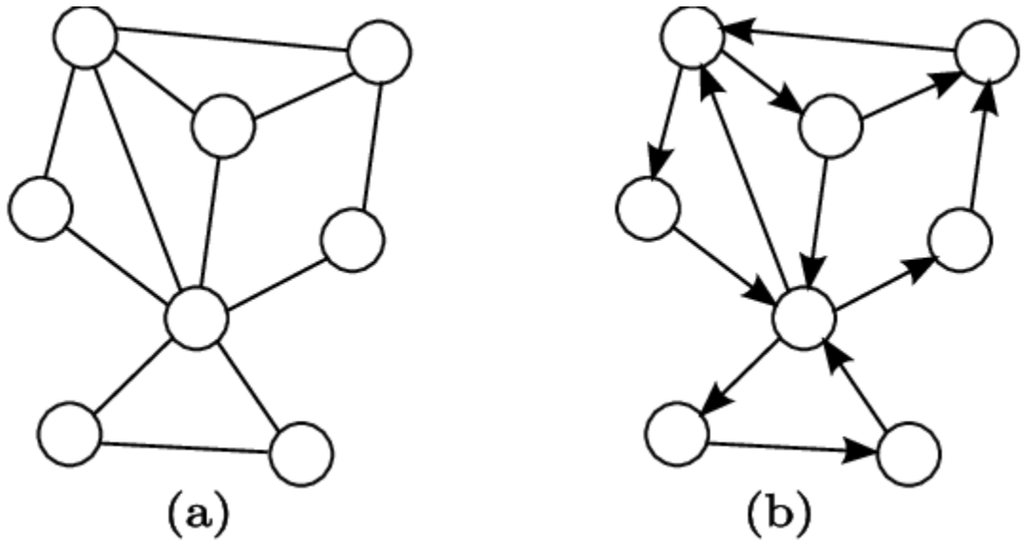

Figure 2: Undirected and Directed Graph

Undirected Graph - Type of graph that contains unordered pair of vertices

Directed Graph - Type of graph that contains ordered pair of vertices

Nodes

Nodes are also called vertices, these are objects that represent an object or entity

Vertex

A vertex(plural:vertices) is the same as node - it's one point or position in a graph

Degree

The degree of a vertex** is the number of edges connected to it**. It shows how many direct connections a vertex has.

Indegree

In a directed graph, the indegree of a vertex is the number of incoming edges — edges that point toward the vertex.

Path

A path in a graph is a sequence of vertices connected by edges. It shows a way to travel from one vertex to another.

Cycle

A cycle is a path that starts and ends at the same vertex, with at least one other vertex in between. It forms a closed loop.

Simple Cycle

A simple cycle is a cycle where no vertex is repeated except the starting and ending vertex. It means you don’t visit the same vertex more than once in the loop.

IV. Conclusion

In conclusion, graphs are one of the tools in data structures to make efficient programs. Being able to represent relationships efficiently. Graphs, as a data structure, play a significant role in deep learning, particularly in two main areas: representing data with complex relationships and modeling the computational flow of deep learning models themselves.

References

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

[2]V. Fionda and L. Palopoli, “(a) An example of undirected graph and (b) an example of directed graph,” in *Biological Network Querying Techniques: Analysis and Comparison*, 2011.

[3]“Graphs (DSA Theory),” *w3schools*, [Online]. Available: https://www.w3schools.com/dsa/dsa_theory_graphs.php. Accessed: Oct. 11, 2025.