UNIVERSITY OF CALOOCAN CITY
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 10

Intro to Graphs

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October, 11, 2025

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.

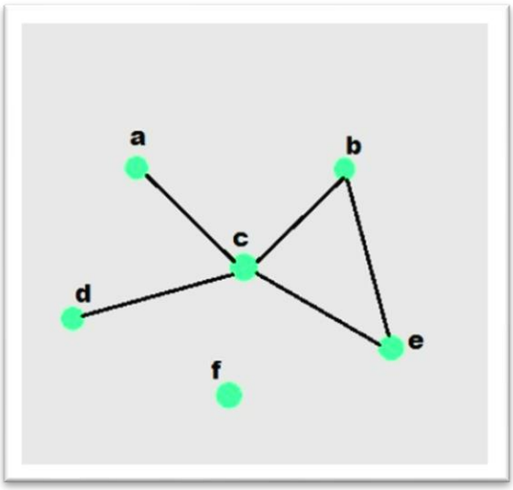

Figure 1. Sample graph with vertices and edges

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

A. Discuss the following terms related to graphs:

1. Undirected graph

- An **undirected graph** is a type of graph where the edges have no specified direction assigned to the them.

Figure 1 Screenshot of program

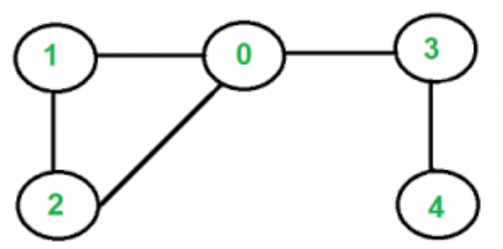

Figure 1 Screenshot of undirected graph

2. Directed graph

- A **directed graph** is defined as a type of graph where the edges have a direction associated with them.

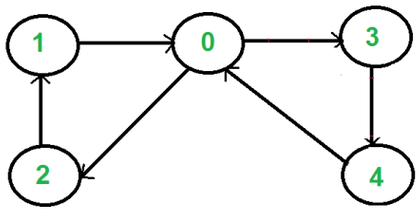

Figure 2 Screenshot of directed graph

3. Nodes

- A **node** or **vertex** is a item of information plus the branches to other items

4. Vertex

- a **vertex** or **node** is the fundamental unit of which graphs are formed:
an undirected graph consists of a set of vertices and a set of edges while a directed graph consists of a set of vertices and a set of arcs.

5. Degree

- The **degree** of a vertex is the number of edges that connect to it. In a directed graph, the in-degree of a vertex is the number of edges that point to it, and the out-degree is the number of edges that start from it.

6. Indegree

- **Indegree** of a vertex is defined as the number of incoming edges incident on a vertex in a directed graph.

7. Outdegree

- **Outdegree** of a vertex is defined as the number of outgoing edges from a vertex in a directed graph.

8. Path

- A **path** is a sequence of vertices that are connected by edges. A simple path does not contain any repeated vertices or edges.

9. Cycle

- A **cycle** is a path that starts and ends at the same vertex. A simple cycle does not contain any repeated vertices or edges.

10. Simple Cycle

- A simple cycle is a cycle in a Graph with no repeated vertices (except for the beginning and ending vertex)

IV. Conclusion

In conclusion, this activity I discuss graph and terminologies, I am already familiar of it because its already tackled this from past lesson. A graph is a structure of nodes or vertices connected by edges. An undirected graph has bidirectional connections, where the degree counts a node's total links. In contrast, a directed graph has one-way edges ,with indegree and outdegree tracking incoming and outgoing connections, respectively. A sequence of connected nodes forms a path, and a path that starts and ends at the same node is a cycle. A simple cycle is a special cycle that does not repeat any nodes or edges except the start and end point.

References

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