GRAPH THEORY VISUALIZER

**A RESEARCH PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR DEGREE IN**

**COMPUTER SCIENCE**

**SCHOOL OF SCIENCE AND AEROSPACE STUDIES**

**MOI UNIVERSITY**

**2023**



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## GRAPH THEORY VISUALIZER

## 1.1 Background Information

Graph theory is a branch of mathematics that deals with the study of graphs, which are mathematical structures used to model pairwise relationships between objects. In computer science, graph theory is used to model a wide variety of problems, including network flow, data compression, and algorithms for searching and sorting. Graphs can be used to represent many different types of information, including networks of roads, relationships between people, and interactions between proteins in a cell. Graph algorithms are used to analyze and manipulate these structures, and are an important tool in many areas of computer science, such as artificial intelligence, databases, and computer networks.

## 1.2 Problem statement

The goal is to visualize operations that can be done in a graph, such as Breadth First Search, Depth First Search, Kruskal and Dijkstra which will have a continuous display of the various operations, so that if the graph changes while the operation is in progress, the display changes too.

## 1.3 Objectives

To explore graph theory I will create a web application using JavaScript that can be used to visualize graphs and graph algorithms. By altering the systems initial conditions drastic effects can then be illustrated and understood.

## 1.4 Justification

I will be demonstrating the behavior of graph algorithms as opposed to the expectations of the untrained mind. The objective of the project is to demonstrate the use of efficient algorithms and data structures and knowledge in algorithmic analysis using Big O notation. It will also implement user interface design principles with interactive user experience design.