Presentation Outline

1. Title Slide
    a. Swarm Robotics Mapping and Path Planning
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2. Introduction
    a. Objectives and Goals
        i. Develop efficient mapping algorithms for swarm robots to map graphs
        ii. Implement optimized path planning strategies
        iii. Generating a graphical representation of an explorable environment
    b. Project Scope
        i. The aim of this project is to develop a system for generating graph environments for swarm robots to traverse and map, so they can then retrieve various objects throughout the graph.
3. Literature Review
    a. Summary of relevant existing work
    b. Relate current work to previous work

4. Methodology
    - **Description of Methods and Techniques Used**
        - Controller - handles controlling the robots and storing and sending data to and from while the robots are mapping. Also generates the path planning for robots after they have mapped the graph.
        - Graph - generates a fully-connected, bidirectional graph with a specified number of nodes that are each designated as CLEAR, OBSTACLE, or OBJECT, with one node designated as CONTROLLER.
        - Node- the objects that make up a graph. Each node has a state that is either clear, obstacle, object, and control. Also stores the neighbors of each node.
        - Robot - represents a “robot” object that will traverse the graph by moving from node to node, communicating with the Controller to discover new nodes and relay the information about those nodes as well as “retrieving” objects.
    - **Pseudo Code for Techniques Used**
    - **Time Complexity Estimation**
    - **Data Structures Utilized**
        - Graphs with Nodes and Neighbors for the environment
        - Vectors to store nodes for the graphs
5. Analysis and Results
    - **Hours spend in this project per week and month**
        - 20 hours a week for 3 weeks
    - **Key Findings Presentation**
    - Use **Charts, Graphs, and Tables** to Illustrate Results
    - **Interpretation of Results**
6. Discussion
    a. Implications of Findings

    b. Project Limitations
7. Conclusion
    a. Conclusions from project
    b. recommendations for future work