

Graph-Based Adversarial Thinking Assignment

****Title:**** Navigating El Paso: Minimizing Stop Signs in Local Routes

****Introduction:****

Graph theory is a mathematical concept used to model relationships and routes in a network. It involves the use of nodes (representing locations) and edges (representing paths) to map out paths and solve problems. Adversarial thinking, on the other hand, involves critically analyzing and understanding potential challenges or inefficiencies within systems. In this assignment, you'll apply these concepts to understand and optimize routes within your local area of El Paso, focusing on minimizing stop signs for efficiency.

****Task:****

Using the graph data provided for various points of interest around El Paso, your task is to identify and map out routes with the least number of stop signs. These routes should connect the locations provided: Rainbow Painting & Drywall, Lonestar Builders and Roofing, Arc Electric Co Inc, The Garick Group, Inc., Five Star Painting of El Paso, Badach Parking, and Lone Star Title. Demonstrate how these connections can be optimized for stop sign avoidance, and analyze potential challenges to this approach by considering real-world constraints (e.g., traffic laws, construction zones).

****Student Expectations:****

- Develop a graphical representation of the local network using nodes for locations and edges for roads.
- Analyze the potential paths between each location and determine which path has the minimal stop signs.
- Recognize and explain the adversarial factors that might affect route efficiency, such as traffic patterns or city planning restrictions.

****Guidelines:****

To align with the "Understanding" level of Bloom's Taxonomy, students should:

- Demonstrate comprehension by organizing and interpreting the graph data.
- Explain their reasoning for the chosen paths and the impact of stop signs on travel efficiency.
- Provide a visual or model representation of their findings.

****Critical Thinking Prompts:****

- How do the locations' types (e.g., business, residential) impact the network's efficiency in terms of

stop signs?

- What strategies can be utilized to mitigate the adversarial factors identified?
- Considering the real-world context, how would you propose modifications to current city infrastructure to improve travel efficiency?

****Submission Guidelines:****

Prepare a detailed report that outlines your analysis, including:

- A graph or diagram visualizing the chosen routes with annotations for stop signs.
- A written analysis explaining the logic behind your chosen routes following the "Understanding" framework.
- A reflection on the adversarial thought process involved in identifying challenges and proposing improvements.