

Graph-Based Adversarial Thinking Assignment

****Title:**** Designing Safe Routes: An Exploration of El Paso's Local Network

****Introduction:****

Graph theory allows us to model and solve complex problems involving interconnected systems. By treating locations as nodes and the paths between them as edges with weights reflecting the "dangerousness" of each route, we can analyze and propose alternatives for safer travel. In this assignment, you'll engage with adversarial thinking to creatively address potential safety issues in your neighborhood's network of familiar places.

****Task:****

Utilizing the locations provided and the concept of least dangerous routes, construct a graph representing these paths and their respective weights illustrating travel safety concerns. Your task is to creatively design a new safer route network through these locations.

****Student Expectations:****

- Translate the provided location data into a graph structure in your preferred software, using edges and nodes.
- For each edge, assign a weight representing its relative safety based on hypothetical crime data and traffic reports.
- Analyze the current structure for potential vulnerabilities or high-risk paths.
- Design a new route schema that enhances safety, taking into account alternative pathways, strategic checkpoint placements, and improved connectivity.
- Justify your choices and improvements in a comprehensive plan or design proposal.

****Guidelines:****

- Utilize Bloom's Taxonomy's "Creating" phase by actively constructing new route networks from scratch.
- Be thorough in graph representation to validate the accuracy of your "least dangerous" assertions.
- Present your proposed solutions in a creative format, such as a presentation or digital map, ensuring clarity and relevance to real-world application.

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

- How might adversaries exploit the original and proposed network? Propose measures to counter such scenarios.

- Consider both natural and human-induced factors that could alter the perceived safety of these routes. How does this affect your design choices?
- How does the geographical familiarity of El Paso enhance or complicate the process of creating a safer route network in comparison to unfamiliar areas?

By the end of this assignment, you should have designed an optimized path network that proposes effective solutions to enhance route safety using your understanding of graph theory and local geographical knowledge.