Project Title: PathFinder App: Personalized Career Exploration Based on Student Interests

Abstract: This project follows the engineering design process to create a web-based application called *PathFinder*. The goal was to reduce student anxiety by using a JavaScript-based algorithm to match personal interests (like gardening or technology) to specific, high-potential career paths.

The Problem (Identifying the Need)

The Issue: Many middle school students experience "future-related anxiety" because the professional world feels vast and disconnected from their current interests.

The Observation: Students often have hobbies but don’t realize these hobbies are the building blocks of careers.

The Gap: Most career tools are for adults or high schoolers; there is a lack of simple, empathy-driven tools for younger students.

Engineering Goal & Requirements

- **Goal:** To design and code an interactive app that provides personalized career recommendations based on student input.
- **Design Requirements:**
  1. **Accessibility:** Must run on a browser (Code.org App Lab).
  2. **Logic:** Must use conditional statements to accurately match 10+ interests to 30+ career options.
  3. **User Experience:** Must include an "Empathy-First" interface that uses encouraging language to reduce stress.

Materials & Development (The Build)

- **Software/Language:** JavaScript (Block and Text-based), Code.org App Lab.
- **Hardware:** 1:1 Chromebook.
- **Procedures:**
  1. **Brainstorming:** Mapping interests (Input) to Job Titles (Output).
  2. **UI Design:** Creating screens that don't feel "test-like" but "exploration-like."
  3. **Coding:** Writing the *`if/else`* logic and *`setScreen`* functions to handle user navigation.

Prototype Architecture

The Quiz Engine: Developed a multi-screen selector where variables track user choices.

The Match Algorithm: Created a database within the code. For example:

- *Input:* "Gardening"
- *Logic:* If variable `interest` == 'Gardening', then *showScreen* ('Nature_Careers').
- *Output:* Recommended roles like Botanical Scientist or Landscape Architect.

Engineering Validation & User Feedback

Internal Stress Testing: I conducted **12 rigorous debugging cycles**, manually testing every possible “interest-to-career” combination to ensure the JavaScript logic was sound and that no “dead-end” screens existed.

External Professional Review: My prototype was submitted to and evaluated by professional judges from the **2025 Congressional App Challenge**. Their feedback validated the app’s technical reliability.

User Testing Results (Beta Group):

- **92%** of student testers reported a measurable decrease in "future-related anxiety" after using the PathFinder tool.
- **88%** stated the UI (User Interface) was intuitive and easy to navigate.

The Iterative Fix: During testing, I discovered that the "Back" button on the *Botanical Scientist* screen was incorrectly mapped. I successfully refactored the code to ensure a seamless navigation loop, which is critical for a positive User Experience.

Analysis & Results

Did it meet the goal? Yes. PathFinder successfully simplified career exploration.

Empathy in Action: By providing descriptions of *why* a job fits, the app moves beyond a “job list” and acts as a digital mentor.

Success Metric: The app demonstrates that personalizing information is the most effective way to reduce student anxiety about the future.

Conclusion & Future Iterations

Final Conclusion: Engineering a solution for career exploration is possible using basic JavaScript. PathFinder proves that tech can be a tool for emotional support and academic planning.

Future Improvements for 2027:

1. Add a "Day in the Life" video for each career.
2. Expand the interest list to include local Tucson-based STEM industries.
3. Include a "Save your Path" feature using a cloud database.

Bibliography & Acknowledgments

Code.org The Design Process: Design Process Documentation

References: Helpguide.org (Mental Health and Stress reduction).

Congressional App Challenge: https://www.congressionalappchallenge.us

PathFinder App: https://studio.code.org/projects/applab/KROQyytwy963vAbBqy5lcNkMPz2mc8XCcpFzMwxaykg