Software Project WiSe 25/26

Milestone 2

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1 Project Diary - Milestone 2

1.1 Multiple Choice Questions

- Created and completed 4 Multiple Choice questions covering properties and conditions
  1. Necessary Conditions for Hamiltonian Cycle
  2. Graphs with Eulerian Circuits
  3. Properties of Eulerian Paths
  4. Hamiltonian Path Complexity
- Created and completed 3 Multiple Choice questions covering graph types
  1. Graph Types and Eulerian Circuits
  2. Graphs Without Hamiltonian Cycles
  3. Traveling Salesman Problem Properties
- Created and completed 2 Multiple Choice questions covering algorithm properties
  1. Fleury's Algorithm Properties
  2. Hierholzer's Algorithm Characteristics

1.2 Dynamic Exercises

- Created and completed fully dynamic exercise. Students analyze a randomly generated degree sequence of a connected graph with five vertices and determine whether it has an Eulerian circuit, Eulerian path, or neither. The exercise uses dynamic variables to generate different degree sequences on each attempt, with feedback adapting based on the count of odd-degree vertices to explain the correct classification.

1.3 Drag and Drop Questions

- Created and completed 3 Drag and Drop questions with dynamic feedback covering matching and ordering
  1. Graphs by Hamiltonian Cycle Count: Students order four graph types from fewest to most Hamiltonian cycles, with the drag-and-drop exercise accepting both valid orderings where graphs with zero cycles can be interchanged and providing feedback using the R evaluator to check multiple correct sequences.
  2. Hamiltonian Likelihood Ordering: Students arrange graphs by Hamiltonian cycle likelihood, receiving progressive positional feedback that identifies the first incorrect position and explains the relevant structural theorem (Dirac's condition, tree properties, or degree constraints).
  3. Hierholzer's Algorithm Steps: Students sequence algorithm steps with progressive positional feedback that pinpoints exactly where the error occurs and explains the logical dependency between the incorrect step and its prerequisite phases.

1.4 Summary

1.4.1 Questions Developed (Milestone 2)

- **Multiple Choice Questions**: 9 complete questions
  - Properties & Conditions: 4 questions
  - Graph Types: 3 questions
  - Algorithm Properties: 2 questions
- **Dynamic Exercises**: 1 complete exercise
  - Degree Sequence Analysis with dynamic generation
- **Drag & Drop Questions**: 3 complete questions
  - Ordering and matching exercises with dynamic feedback
- **Total Questions**: 13 questions/exercises
