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Unit 3 Assignment 2

CS352

* Describe the state of your project, what works and what doesn’t.

The `CaveExplorer` class successfully initializes the cave layout using both the default constructor and a file-based constructor. The `toString` method correctly returns the current state of the cave. The `solve` method uses a Breadth-First Search (BFS) algorithm to find a path to the mirror pool, and the `getPath` method returns the path taken to reach the mirror pool. However, the BFS implementation needs adjustments to properly track and return the path taken.

* Describe how you tested your program, including tests that made you rethink your code. Include the layout you used.

Initial testing involved checking the cave layout using the default constructor and verifying it with the `toString` method. I called the `solve` method and checked the output of `getPath`. For the file constructor, When using the test file `cave.txt”, I can initialized the `CaveExplorer` object and verify the cave layout from the file using the `toString` method. After calling the `solve` method, I can check the output of `getPath`.

During testing, I realized the path was not being correctly recorded, prompting a rethinking of how the path should be tracked during BFS traversal. Adjustments were made to ensure that the BFS correctly appends the direction taken for each move and returns the accurate path once the destination is reached. The layout used for testing was:

5 6

RRRRRR

R..SRR

R.RRRR

R..MRR

RRRRRR

* In a sentence or two, what did you learn?

I learned the importance of careful planning and testing, especially in tracking the state and path in an algorithm like BFS. Ensuring correctness in both the exploration and path-tracking logic was crucial.

* In a sentence or two, what did you like about this project?

I enjoyed the challenge of implementing the BFS algorithm in a constrained environment without using recursion or backtracking. It was satisfying to see the pathfinding work correctly.

* In a sentence or two, what did you find confusing or would like to see done differently regarding this project?

Initially, tracking the path within the BFS traversal was confusing. Clarification on different methods to track paths in non-recursive algorithms would be helpful.

* In a sentence or two, if you had another hour or two, what would you like to add to the project or how would you do things differently?

Given more time, I would refactor the BFS to ensure the path tracking is accurate and efficient, implement additional features such as multiple paths support and more complex cave layouts, and add more robust error handling and user input validation for the file constructor.