Frogs and water lilies

Members

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Game Description:

Objective:

The proposed game is a strategic challenge in which players must guide a frog through water lilies to reach a specific destination. The frog has energy bars and lives, and must avoid enemies that can be found in some water lilies. Movement is done by choosing connected water lilies, and distances are calculated by algorithms such as BFS and Dijkstra.

Game Elements:

1. Frog:
   - Each player controls a frog with 10 energy bars and 3 lives.
   - Initially located in a starting water lily.

2. Water lilies:
   - Represented as vertices in the first network using adjacency lists.
   - Some water lilies are connected by specific connections, defined by the BFS algorithm.
   - By choosing a water lily, the player can see the movement options based on the BFS network.

3. Enemies:
   - Some water lilies may contain enemies.
   - If the frog falls into a water lily with an enemy, it loses a life.
   - The frog has 3 lives in total.

4. Energy:
   - Each time the frog moves to a water lily, the distance is calculated using Dijkstra's algorithm.
   - If the distance chosen by the player is greater than the actual distance, the frog loses an energy bar.

Algorithms used:

1. BFS (Breadth-First Search):
   - Used to construct the first network, based on adjacency lists.
   - Helps to show the possible movement connections from the frog's current water lily.

2. Dijkstra:
Used in two situations:

- To calculate the distance between waterlilies when the frog moves.
- To evaluate whether the distance chosen by the player is greater than the actual distance, affecting the frog's energy.

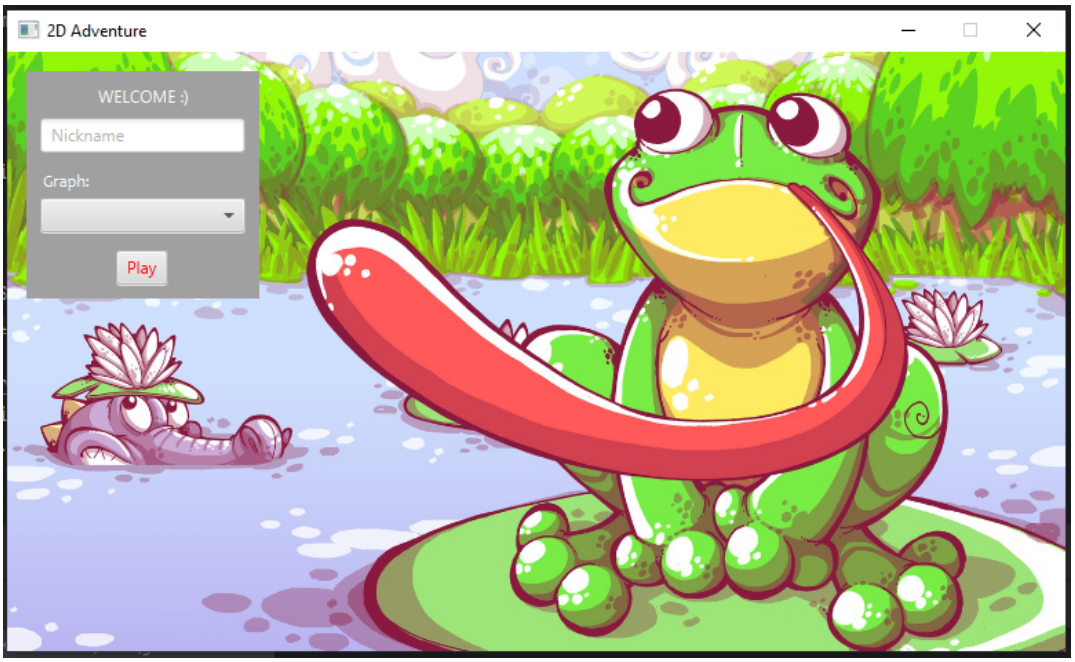
3. DFS (Depth-First Search):

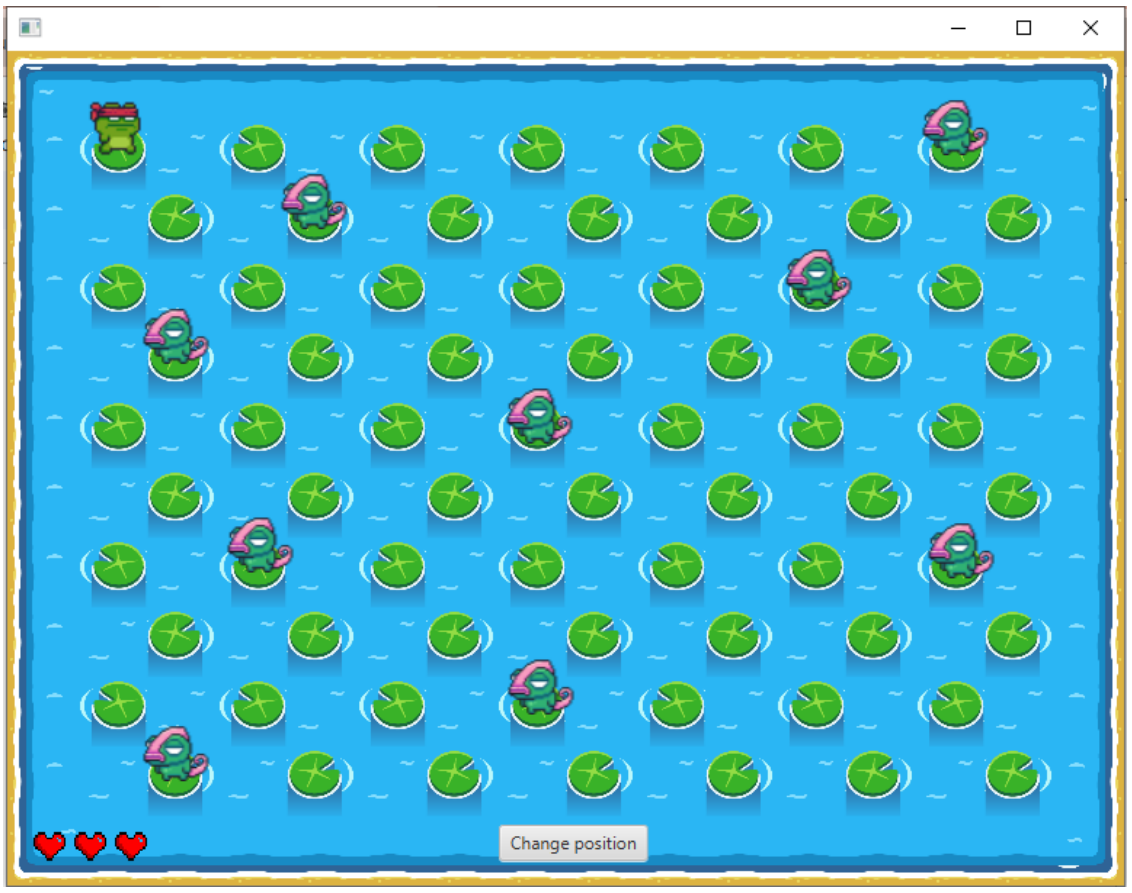
- Used in the second network with an adjacency matrix.
- It can have a specific purpose, such as generating enemies or creating more complex routes.

Game Dynamics:

1. The player chooses a destination water lily based on the information provided by the BFS network.
2. Dijkstra is used to calculate the actual distance from the frog's current position to the chosen destination.
3. If the distance chosen by the player is greater than the actual distance, the frog loses an energy bar.
4. If the frog falls into a water lily with enemies, it loses a life.
5. The game continues until the frog reaches the destination or loses all its lives.

Screenshots





Requirements

1. The user must enter his name
2. Allow the user to choose which type of network to use in the game.
3. The system must correctly display the connections a water lily has (vertex)
4. The system must correctly calculate the energy cost from a source water lily to a chosen water lily and to an unchosen water lily.
5. The system must correctly display the user's lives and energy and constantly update them in the game.
6. The system must display a GameOver or Win sale in case of losing or winning the game.