DS-PROJECT

CAR DASH

Dawood Hussain & Ibrahim Kayani

I22-2410 / I22-2686 -SEC E

**Introduction To Mechanics:**

The game "Car Dash" provides three modes: Easy, Nomad, and Hard.

**Modes:**

* **Easy Mode:**
* Player receives 5 Health Bars, a Shield, and a small racetrack of 26x26 size.
* **Nomad Mode:**
* Player receives 3 Health Bars, a Shield, and a small racetrack of 35x35 size.

**Hard Mode:**

* Player receives 1 Health Bars, a Shield, and a small racetrack of 40x40 size.
* Stepping on an obstacle causes instant death.

**Health:**

Player's health is based on difficulty, and there's no way to regain health. Avoiding obstacles is the only way to maintain health. Each obstacle hit decreases one health bar.

**Shield:**

Player starts with 0 shield bars.

Crossing a '+' symbol awards one shield bar.

Player can use 5 shield bars in combination to dodge one obstacle.

**Collectibles:**

Two ways to gain collectibles: collecting coins ('o') and collecting '?' symbols.

'?' symbols provide random collectibles out of 3 predefined options.

Collectibles contribute to scores and leaderboard ratings.

**CODE OVERVIEW:**

1. Libraries Used:

#include<iostream>

#include<fstream>: For File Handling

#include<string>: For getline function used for taking user names

#include<sstream>: For File handling (csv)

#include<conio.h>: For using getch() to boost game flows

#include<windows.h>: For using different color schemes and creating illusions.

2. **Global Functions:**

void ShiftRED(): Changes console color to RED.

void ShiftNORMAL(): Changes console color to Normal.

void ShiftORANGE(): Changes console color to ORANGE.

void ShiftYELLOW(): Changes console color for aesthetics.

void ShiftCYAN(): Changes console color for aesthetics.

string PrintBoard(): Prints the game logo using ASCII art.

3. **Classes Overview:**

**3.1 Axis Class:**

Represents a node in the maze.

Contains directional pointers (North, South, East, West) to adjacent nodes.

Has an index, weight, and symbol.

Index is used to access individual Node By using GetAxis(int a) func;

3.2 **LinkedList Class:**

Represents a linked list of nodes for use in the graph.

Supports insertion, deletion, and retrieval of nodes.

**3.3 CoinNode and CoinList Classes:**

CoinNode: Represents a node for coins and collectibles.

CoinList: Represents a linked list for collecting coins and collectibles.

At the end of the game, the size of the linked list is used to determine the collectable count, and the score is updated.

3.**4 QueueNode and Queue Classes:**

QueueNode: Represents a node for the obstacle queue.

Queue: Represents a queue for generating random obstacles.

Obstacles are placed in the queue at the beginning of size n/2, where n is the number of vertices selected by the difficulty level. One obstacle will appear on the map randomly after every move of the player.

**3.5 Maze Class:**

Represents the core of the game and the visual representation of the map.

Initializes the maze, walls, collectibles, and obstacles.

Provides functions for generating obstacles, initializing walls, collectibles, and printing the maze.

4**. ScoreTree Class:**

A BST TREE to store data for scores, used for writing to and retrieving from a CSV file.

Reverse inorder traversal is used to display rankings.

**4.1 Node Struct:**

Represents a node for storing results in a BST tree for file handling purposes.

**5. Graph Class:**

**5.1 Graph Class:**

Represents a graph using an adjacency list.

Utilizes the maze structure to generate graph edges.

Provides functions for adding edges, printing the graph, and moving the player along the shortest path.

**5.2 GetShortestPathAlgo:**

An alternative to Dijkstra's algorithm.

The program moves in the east direction if there is an edge, and if there isn't, it checks for the closest east node that is an edge.

This algorithm works efficiently in automated mode and chooses the shortest path.

**6. File Handling:**

The code includes file handling features for storing and retrieving player scores.

BST TREE for SCORES (CSV FILE HANDLING)

MAZE STORING AND RETRIEVAL (NORMAL FILE HANDLING)