Snake Game Documentation

Project Overview

This documentation explains the Snake Game implementation in Python using the curses library. The Snake Game is a classic arcade game where the player controls a snake that grows in length as it consumes food while avoiding collisions with walls and itself.

Game Mechanics

The game operates on the following principles:

- The snake moves continuously in the current direction
- Player controls the snake using arrow keys (UP, DOWN, LEFT, RIGHT)
- Food appears randomly on the screen
- When the snake eats food, it grows longer and the score increases
- The game ends if the snake hits a wall or itself
- The goal is to achieve the highest possible score

Code Structure

The snake game is implemented with the following key components:

```
# Key game initialization
stdscr = curses.initscr()
curses.start_color()
curses.init_pair(1, curses.COLOR_GREEN, curses.COLOR_BLACK)  # Snake color
curses.init_pair(2, curses.COLOR_RED, curses.COLOR_BLACK)    # Food color
```

The main game loop handles movement, collision detection, and rendering:

```
while True:
    # Get user input (non-blocking)
    key = stdscr.getch()

    # Update snake direction based on key press
    if key in [curses.KEY_UP, curses.KEY_DOWN, curses.KEY_LEFT, curses.KEY_RIGHT]:
        direction = key
```

```
        # Move snake in current direction
        head_y, head_x = snake[0]
        if direction == curses.KEY_UP: head_y -= 1
        elif direction == curses.KEY_DOWN: head_y += 1
        elif direction == curses.KEY_LEFT: head_x -= 1
        elif direction == curses.KEY_RIGHT: head_x += 1

        # Check for collisions
        if head_y in [0, height-1] or head_x in [0, width-1] or [head_y, head_x] in snake:
            game_over = True
            break
```

Running the Game

To run the Snake Game, follow these steps:

- Ensure you have Python installed on your system
- Set up a virtual environment: python -m venv venv
- Activate the virtual environment:
- - Windows: .\venv\Scripts\activate
- - macOS/Linux: source venv/bin/activate
- Install required packages: pip install windows-curses (Windows only)
- Run the game: python snake_game.py

Controls

- UP ARROW: Move snake upward
- DOWN ARROW: Move snake downward
- LEFT ARROW: Move snake left
- RIGHT ARROW: Move snake right
- Q: Quit the game

Technical Implementation

The game is implemented using the curses library, which provides terminal control for character-based applications. The snake is represented as a list of coordinates, with the head at index 0. Food is placed at random coordinates on the screen.

Collision detection checks if the snake's head coordinates match any wall or body coordinates. When the snake eats food, a new segment is added to the snake

and new food is generated at a random position.

Conclusion

This Snake Game implementation demonstrates key programming concepts including:

- Game loops and timing
- User input handling
- Collision detection
- Dynamic data structures (the growing snake)
- Terminal UI using curses
- Random element generation