Programing assignment - Final Project Group 9

Names

- **Student 1**: Luís De Albuquerque Hollanda
- **Student 2**: TzuLing Lin
- **Group**: 9

Synopsis

Our animation is inspired by traditional Christmas shop window displays, such as those found in major department stores during the holiday season. Our animation recreates a festive scene featuring a snow-covered landscape, a decorated Christmas tree, a cozy house, and interactive elements like blinking lights and music. Elements from the original design that appear in our animation include fallen snow, the decorated tree with blinking lights, and the cheerful atmosphere conveyed through music and visuals.
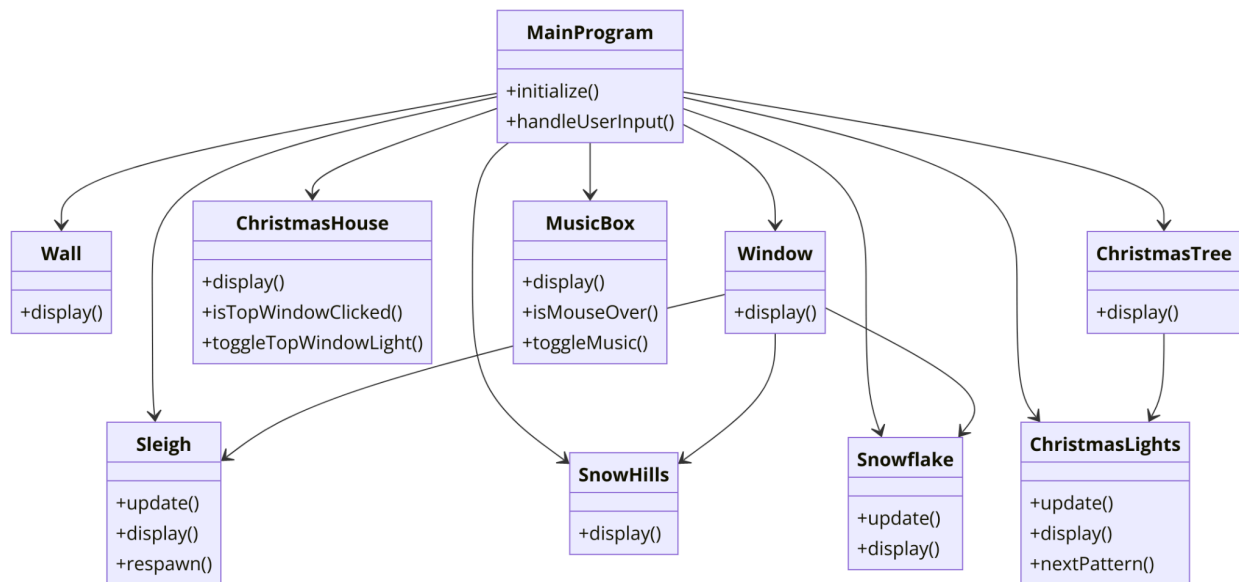
Usage and Interactions

- **House window light**: Click on the top window of the house to turn its light on or off.
- **Music box playback**: Click on the music box to play or stop the Christmas music.
- **Change Light Patterns**: Click on the Christmas tree to cycle through different blinking patterns of the tree lights.
- **Automatic Sleigh Animation**: Watch as the sleigh moves across the sky periodically.
- **Snowflake Animation**: Snowflakes fall continuously within the window.

Architecture

- **Main Program** (Main): Main page that calls all classes and includes interactive actions
- **Wall** (Wall class)
    - display(): Displays the outer wall background.
- **Window** (Window class)
    - display(): Renders the shop window frame and a frosted glass effect.
- **SnowHills** (SnowHills class)
    - display(): Draws the snowy hills at the bottom of the window.
- **ChristmasHouse** (ChristmasHouse class)
    - display(): Draws the house.
    - isTopWindowClicked(): Check if the window is clicked within its size.
    - toggleTopWindowLight(): Toggles the light of the top window.
- **ChristmasTree** (ChristmasTree class)
    - display(): Renders the tree.
- **ChristmasLights** (ChristmasLights class)
    - update(): Updates the lights based on the current pattern.
    - display(): Draws the lights.
    - nextPattern(): Cycles to the next blinking pattern.
- **MusicBox** (MusicBox class)
    - display(): Draws the music box.
    - isMouseOver(): Checks if the music box is clicked.
    - toggleMusic(): Plays or stops the music.
- **Snowflake** (Snowflake class)
    - update(): Updates the position of the snowflake.
    - display(): Draws the snowflakes.
- **Sleigh** (Sleigh class)
    - update(): Moves the sleigh and handles respawning.
    - display(): Draws the sleigh.
    - respawn(): Resets the sleigh's position and movement.

Program Structure Diagram

MainProgram
+initialize()
+handleUserInput()

Wall
+display()

ChristmasHouse
+display()
+isTopWindowClicked()
+toggleTopWindowLight()

MusicBox
+display()
+isMouseOver()
+toggleMusic()

Window
+display()

ChristmasTree
+display()

Sleigh
+update()
+display()
+respawn()

SnowHills
+display()

Snowflake
+update()
+display()

ChristmasLights
+update()
+display()
+nextPattern()

The diagram above illustrates the relationships between the classes in the program:

- The **Main Program** initializes instances of each class and handles user input.
- **Wall** class sets up the background of the scene.
- **Window** class sets up the frame for the scene and delimitates boundaries for **Sleigh, SnowHills** and **Snowflake**.
- **ChristmasHouse**, **ChristmasTree**, **MusicBox**, **Sleigh**, and **Snowflake** classes are responsible for drawing their respective elements and managing their behaviors.
- **ChristmasLights** manages the blinking patterns of the tree lights and interacts with **ChristmasTree**.
- **MusicBox** uses the Processing Sound library to play music when interacted with.
- **SnowHills** adds depth to the scene by displaying snowy hills at the bottom of the window.