Documentation PS05-vasvia

Drop ‘n’ Stack Game!!

This C++ code “Drop ‘n’ Stack Game” is an interactive game where a structure is built by stacking floors on top of the base i.e., the 0th floor. The floors keep moving from left to right in different colors and the player has to press Spacebar to drop the block at the correct time to align it with the base or previously stacked floors. The game terminates either if the floor is not placed correctly on the top of the base or other floors or you press **Esc** Key to exit the game once the game is over you can see the final score on the terminal. The goal of the game is to stack as many blocks as possible without making the tower fall.

Below are the steps on **how to use the program**:

- Once the code is compiled, run the **ps5.exe** code.
- The game will start as soon as the window opens up.
- You will see the floor moving around, and you press the **spacebar** key to drop the moving floor on the base
- You keep repeating it to stack more and more floor
- Once the floor is not correctly placed, the game will terminate and you will see the final score in the console.
- Additionally, you can press the **ESC** key to terminate the game and you will see the final score till where you played in the console.

Below shows **how each condition was satisfied**:

- **uses OpenGL animation using double-buffering**

The whole program has been written using OpenGL and additionally double buffering was used by calling **FsSwapBuffers()** to ensure smooth transitions during the block movement and falling animations.

- **runs the animation in a for or while loop until the user wants to terminate (for example, pressing ESC key. Or if you write a game program, it is also ok to run the program until the game is over.)**

The program keeps running the animation and uses **While** loop for the program. To terminate the program **ESC** key needs to be pressed or you fail the game to terminate the program.

- **must be an interactive program**

The game is interactive as you play it by pressing **Spacebar** key to drop the block on the tower and stack the floors together.

- **must be an interactive program uses at least one of the three features of OpenGL explained in class, color gradation, line stipple, or alpha blending**

I have used **color gradation** in the **DrawBackground** Function for the **sky** which does the transition from Dark blue to sky blue giving a beautiful gradient.

- **uses at least two types of OpenGL primitives from GL POINTS, GL LINES, GL LINE STRIP, GL LINE LOOP, GL TRIANGLES, GL TRIANGLE STRIP, GL TRIANGLE FAN, GL QUADS, GL QUAD STRIP, and GL POLYGON**

The features that were used were **GL_QUADS** to create the ground and sky**. GL_Triangle** was used to create the spikes of the grass. To define the blocks more, I made a border around them which I made using **GL_Line_Loop**.

- **uses at least one of the following**
    - **math library function,**
    - **shuffling,**
    - **sorting,**
    - **state transition,**
    - **numerical integration using Euler's method**

The code uses Math library i.e., **cmath**. The functions in this used are **cosf**(), **sinf**() and **DrawCircle**(). These functions were used to calculate x and y coordinates of the circle for drawing clouds.

The code also uses **state transitions** i.e., **isFalling**. The **isFalling** Boolean indicates whether the moving block is currently falling or not. When the spacebar key is pressed the block transitions to the falling state by calling **DropBlock**() which sets **isFalling** to True.