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CS-330 Comp Graphic and Visualization

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7-1 Final Project Reflection

1. **Justify development choices for your 3D scene**. Think about why you chose your
   selected objects. Also consider how you were able to program for the required
   functionality.

   The choice of objects in the 3D scene aligns with the themes seen in the original image of
   Bluey's backyard. Using objects like cylinders, rectangles, spheres, prisms, pyramids, and
   the torus made it possible to replicate the scene. Some of the shapes can be observed
   easily in the reference image like the spheres and tapered cylinder to form the tree. The
   branches on the tree were replicated using a combination of tori and cylinders to give
   dimension to the tree. Three tori are joined together on the right-hand side to replicate the
   wavy branch of the reference image.

   Based on the reference image, the bench around the tree could be replicated by a torus,
   but it could also be made using prisms to accurately depict the boxy nature of the planks
   used to make the bench. The legs of the bench are made of rectangles. The flower base
   and bushes in the background are replicated using spheres of different widths and heights.
   The flowers are made using a pyramid shape with a transparent background. The flowers
   go around the pyramid giving the illusion of many flower buds.

3D Scene

Original Image:

Bluey Official Website. (2024b, May 8). *Bluey bonus bits: Old MacDonald*.

2. **Explain how a user can navigate your 3D scene**. Explain how you set up to control the

virtual camera for your 3D scene using different input devices.

Users can easily navigate through the 3D scene using the A, S, D, W, O, and P keys and the mouse. The keys are controlled by the ProcessKeyboardEvents in the ViewManager.cpp and allow the user to move forward, backward, left, and right and to enter and exit the orthographic view. The mouse allows users to move around the space and the Mouse_Wheel_Callback allows for zooming when using the scroll wheel. Users are met with the scene facing the tree and a circular bench around the tree and can go around the tree to get a better view of the bushes and flowers in the back of the scene. The camera is set in the PrepareSceneView where the perspective opens slightly to the left viewing the tree and bench, and seeing some of the bushes and flowers in the back.

3. **Explain the custom functions in your program that you are using to make your code more modular and organized**. Ask yourself, what does the function you developed do and how is it reusable?

Modular programming is present in custom texture-loading functions that can be reused in different parts of the code. This is done by using CreateGLTexture in the SceneManager.cpp. This function maintains clean and organized code that can be easily reued by loading textures and associating them with unique tags to different scene components can reuse the same texture without having to reload it. The code is also split up to render individual parts, like the branches and bench, etc., of the 3D scene to enhance readability, organization, and reusability. These sections can be edited without affecting other parts of the code. Shaders are also used to support modular updates to lighting and material properties without altering the rendering logic. These along with texture provide dynamic effects like lighting and realistic texture.

References

Bluey Official Website. (2024b, May 8). *Bluey bonus bits,: Old Macdonald*. Bluey Official

Website. https://www.bluey.tv/watch/bonus-bits/old-macdonald/