**3D Modeling: Choosing 3D Shapes to Accurately Replicate 2D Images**

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CS330: Computer Graphics and Visualization

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January 19, 2025

**3D Modeling: Using Basic Shapes to Replicate 2D Images**

For this milestone, the objective was to choose a 2D image that will later be transformed into a 3D model as part of the final course project. The chosen image features a vibrant collection of children’s toys, including a wooden train, a ring stacker, a bead maze roller coaster, and wooden alphabet blocks. These objects are composed of simple, recognizable geometric shapes, making them both visually engaging and achievable to recreate. By breaking down these toys into their basic components, I can focus on mastering fundamental 3D modeling techniques while ensuring the scene meets all project requirements. The playful and colorful nature of the toys provides a creative yet manageable challenge, building the foundation for the final project. The selected image is shown below, offering a clear reference for the objects I will replicate.

***A group of toys on a white background

Description automatically generatedSelected Image***

***Selected Major Objects From the Scene***

1. Wooden Train
2. Ring Stacker
3. Bead Maze Roller Coaster
4. Alphabet Blocks

**Detailed Replication Using Simplified 3D Shapes**

**Wooden Train:**

The wooden train is composed of multiple geometric shapes, making it the most detailed object in the scene:

* **Cab:** The cab is represented by a rectangular box, while the roof is modeled using a vertically halved cylinder.
* **Base:** A flattened rectangular box forms the base of the train.
* **Steam Engine:** A cylinder serves as the main body of the steam engine, with an optional cone at the front for added detail. To simplify, the cone can be omitted.
* **Wheels:** Although the wheels appear to have an outer torus for detailing, they will be simplified to plain cylinders for ease of modeling.

**Ring Stacker:**

This toy offers opportunities for both simplification and refinement:

* **Post:** The central post will be modeled as a single cylinder.
* **Rings:** Each ring can be modeled as a torus for accuracy or simplified into a single tapered cylinder to represent the entire stack.
* Base: A flattened cylinder or rectangular box will serve as the base.

Bead Maze Roller Coaster (Children’s Bead Maze):

The bead maze introduces curved and repetitive elements:

* **Base:** The base will be modeled as a long, flattened rectangular box.
* **Rods:** The rods will be modeled as curved toruses, as this provides a simplified yet accurate representation of their shape.
* **Beads:** Each bead sliding along the rods will be modeled as a sphere.

**Alphabet Blocks:**

The alphabet blocks are the simplest objects in the scene:

* **Blocks:** Each block will be modeled as a cube.
* **Details:** Textures for the letters and numbers can be added later, focusing initially on clean, uniform cube shapes.

***Simplifications***

To ensure the project remains achievable, the objects below will be simplified where possible:

* The train wheels will be modeled as plain cylinders, omitting the torus-like ridges.
* The rings of the stacker can initially be modeled as a single tapered cylinder instead of individual toruses.
* The bead maze rods, while curved, are already simplified by using toruses rather than multiple skinny cylinders.

A flat plane will serve as the base of the scene, grounding all the objects and replicating the surface shown in the image. These simplifications maintain the scene’s accuracy while ensuring the modeling process is manageable.

**Why This Image Is a Good Choice**

When selecting an image, I wanted something relatable and achievable. As a mother of three, including a seven-month-old, I was inspired by the toys I see every day, which are designed to teach colors, shapes, and patterns. This image aligns perfectly with the project requirements, as it includes at least four objects, and a minimum of one object (the train and others) that incorporates multiple shapes. While I considered more complex images, I chose this one to focus on learning the tools and techniques of 3D modeling rather than getting overwhelmed by unnecessary complexity. By working with familiar and straightforward objects, I can balance creativity with practicality, ensuring a successful and engaging final project. This scene offers a perfect combination of simplicity and detail, providing a strong foundation for applying fundamental 3D modeling techniques in OpenGL.

**References**

Koya. (2017, October 30). Wooden toys on white background 3d rendering. iStock. https://www.istockphoto.com/photo/wooden-toys-on-white-background-3d-rendering-gm867830532-144514195