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Class: CE2B

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End of Semester Practical – A-Frame VR Apartment Design

DESIGN CHOICES

For this project, I created a fully furnished virtual apartment using A-Frame, a powerful WebVR framework. The apartment design included:

- **Four separate rooms: two bedrooms, a hall, and a kitchen.**

- **Realistic interior elements: walls, floors, ceilings, and roofs constructed using <a-box> elements with textures mapped from image assets.**

- **Furniture and decor: Included GLB 3D models such as a modern sofa, dining table set, chandelier, ceiling fan, and others.**

- **Lighting: Directional, ambient, and point lights were added to create a realistic indoor environment.**

- **Animated features: Ceiling fan rotation and moving water for the swimming pool.**

- **Navigation-friendly layout: Open doorways, walkable spaces, and clear visibility across the apartment.**

Textures were carefully chosen to represent realistic materials like tiles, painted walls, ceilings, and outdoor pavement.

TECHNICAL CHALLENGES AND SOLUTIONS

1. **Texture Not Rendering**

   o **Issue: Some <a-box> elements with image textures did not appear in real-time.**

   o **Cause: Incorrect image file paths, spaces in asset IDs, or missing texture images.**

   o **Solution:**

     ▪ **Renamed assets to remove spaces (e.g., "hall tiles" to "hall-tiles").**

- Verified that all image paths were correct and the files existed in the images/ directory.

- Ensured that assets were fully loaded using <a-assets>.

2. **Overlapping Objects**

   o **Issue: 3D models or entities overlapped with each other, causing visual clutter or hidden models.**

   o **Solution: Adjusted the position, scale, and rotation of each model after careful spatial planning.**

3. **Lighting Glitches**

   o **Issue: Some rooms were too dark or unrealistically bright.**

   o **Solution: Tuned the intensity, type, and color of lights and placed them logically inside each room.**

4. **Model Loading Delays**

   o **Issue: Some GLB models loaded slowly or not at all.**

   o **Solution: Ensured all models were preloaded in the <a-assets> section and reduced model complexity when possible.**

FUTURE IMPROVEMENTS

If I had more time or resources, here are enhancements I would consider:

- **Interactive Elements: Add clickable objects using A-Frame's cursor and event-set components.**

- **Day/Night Cycle: Use sky elements and lighting changes to simulate time of day.**

- **Sound Effects: Include ambient sounds or click-triggered audio for realism.**

- **Improved UI: Add teleportation or menu-based navigation to move between rooms.**

- **Optimized Performance: Compress textures and models for faster loading on mobile devices.**

- **Additional Rooms: Include a bathroom, garage, or balcony area for a more complete home layout.**