**Project Title: KUET Cafeteria with OpenGL**

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**Description:**

Our project is to create a 3D model of a modern cafeteria using OpenGL. Users can interact with the scene by opening doors, turning lights on and off, and using coffee machines. The cafeteria will feature modern furniture with curved designs, like round tables and artistic lamps. We'll use realistic materials such as marble, wood, and glass for walls, floors, and furniture. Advanced lighting will create a cozy atmosphere. Moving objects like ceiling fans, sliding doors, and digital menu boards will make the scene lively. Additional features include an aquarium with animated fish and interactive trash bins, enhancing the overall experience.

**Features:**

**Dynamic Scenes:**

* **Interactive Elements:** Allow users to open and close doors, toggle lights, and operate coffee machines.
* **Weather Effects:** Simulate sunlight streaming through windows or rain visible outside to create a dynamic atmosphere.

**Curvy Objects:**

* **Modern Furniture Design:** Incorporate curvy chairs, round tables, and artistic lamps to reflect contemporary aesthetics.
* **Architectural Features:** Add elements like spiral staircases or arched counters to enhance visual appeal.
* **Decorative Items:** Include hanging plants or chandeliers with curved designs to add character to the space.

**Aesthetic and Realistic Design:**

* **Realistic Textures:** Apply materials such as marble, wood, or glass for walls, floors, and furniture to enhance realism.
* **Advanced Lighting:** Utilize soft ambient lights, spotlights, and shadows to create a modern ambiance.
* **Detailed Decorations:** Incorporate elements like menu boards, coffee cups, and digital displays to add depth to the scene.

**Realistic Objects with Motion:**

* **Ceiling Fan:** Rotates at adjustable speeds based on user input and reacts to environmental changes.
* **Swinging Door:** Doors that open and close automatically when customers or staff pass through, with accompanying sound effects.
* **Conveyor Belt:** Moves trays or food items toward serving counters, with user-controlled start/stop functions.
* **Digital Menu Board:** Displays menu options or promotions with dynamic animations.
* **Aquarium:** Features animated fish and bubbles, with user-adjustable lighting.
* **Interactive Trash Bin:** Lid opens and closes when users "throw" trash, with sound effects.
* **Pendulum Clock:** A decorative clock with a moving pendulum that ticks in real time, adjustable by users.
* **Sliding Door:** Glass doors that slide open or close as customers approach or exit, with subtle animations.
* **Roasting Oven or Grill:** Features opening lids with visible smoke or steam effects and rotating food items.
* **Rotating Advertisement Board:** Displays rotating ads, with adjustable speed or pause functions.
* **Vending Machine:** Dispenses selected items with falling animations and illuminated buttons.
* **Table Lamps:** Emit adjustable warm light, creating a cozy ambiance for different seating areas.

Incorporating these features will create a lively and immersive cafeteria environment, enhancing user engagement and realism.

Table 1: Key bindings

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| --- | --- |
| **Keys** | **Action** |
| X | Zoom out |
| Z | Zoom in |
| R | Reset camera position |
| T | Transition time of day (gradual change) |
| 2 | Toggle night mode |
| F | Toggle daylight mode |
| E | Move camera down |
| Q | Move camera up |
| D | Move camera right |
| S | Move camera backward |
| A | Move camera left |
| W | Move camera forward |
| ; | Turn table lamps on/off |
| Y | Use vending machine |
| I | Rotate advertisement board |
| U | Operate roasting oven/grill |
| J | Open/close sliding doors |
| K | Adjust pendulum clock time |
| G | Start/stop conveyor belt |
| H | Open/close doors |
| M | Turn lights on/off |
| V | Toggle ceiling fan rotation |
| C | Operate coffee machine |