Project B: The Ender Dragon flying around the Clover in 3D world

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User Guide

Goal

The goal of this Project B is to build a 3D world with Ender Dragon , Clover (Both from my Project A), Torus (From 7.14jt.BasicShapesCam), Icosahedron and interact with it. The user can see through two different cameras: Perspective Camera and Orthographic Camera. The camera can be moved in three modes: ↑↓←→ (Aim camera in any direction without changing its position), WSAD (Move forward/backward in the gaze direction and strafe sideways left/right) and IKJL (Move along X/Z axis). The Icosahedron can be rotated by mouse dragging.

Introduction

After completely loaded, the user will see randomly flying Ender Dragon, continuously swing Clover, continuously rotating Torus and stationary Iconsahedron.

Help

- Instructions are presented under canvas
- Click `Open Control` on the upper right of the web page or press `/` to open the Control Menu.
- Some functions are shown in `Control Menu` - `Camera` and will be illustrated later

Control Menu

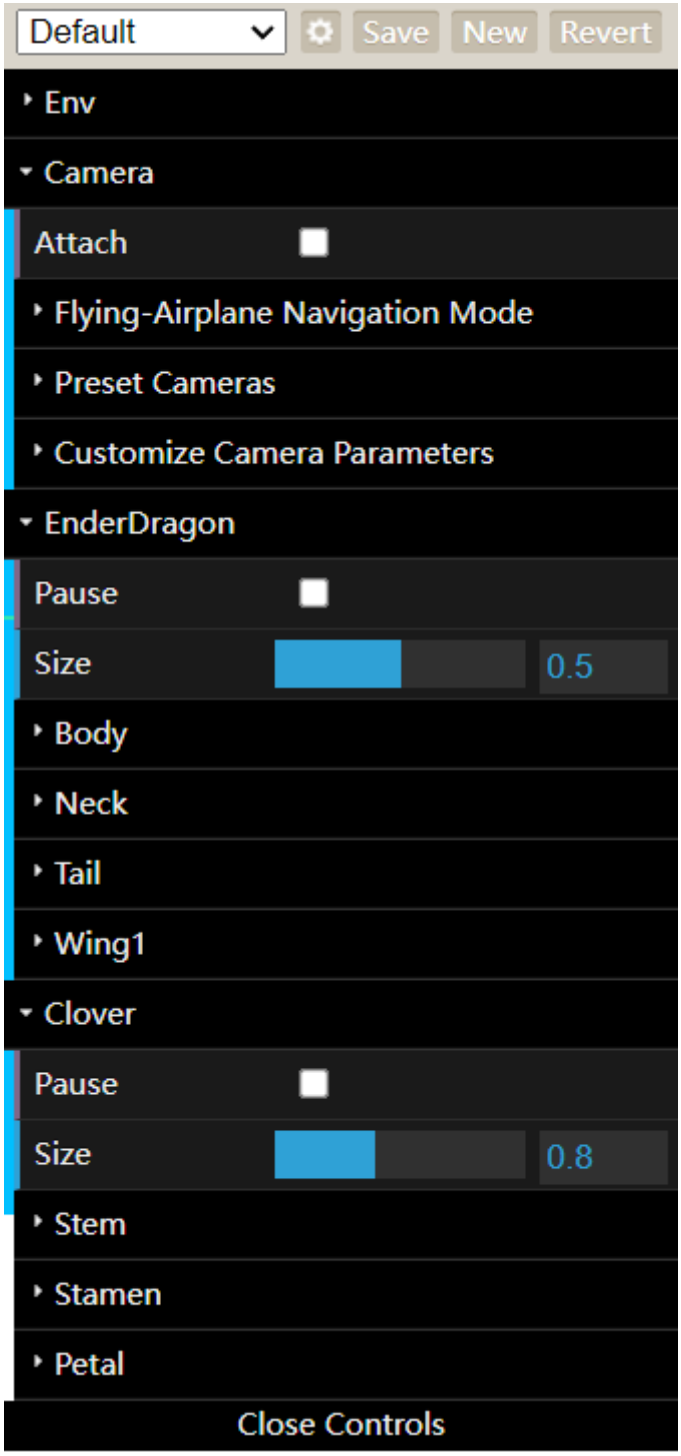


Figure 1: Overall Config

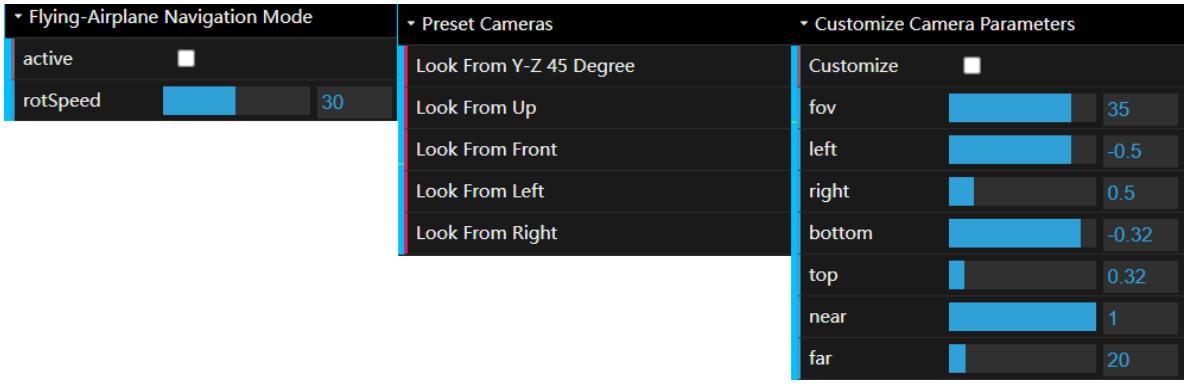


Figure 2: Camera Config

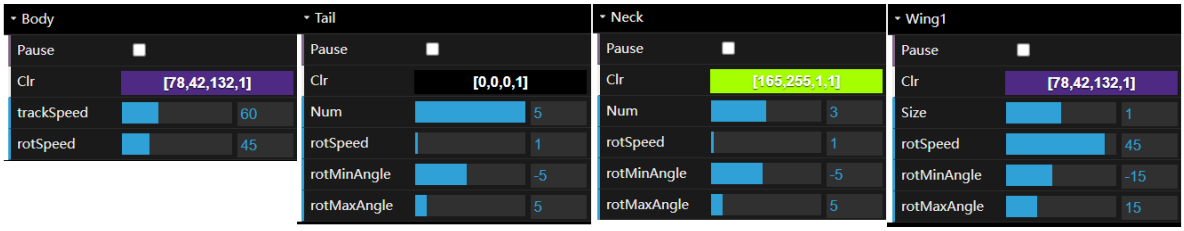


Figure 3: Ender Dragon Config

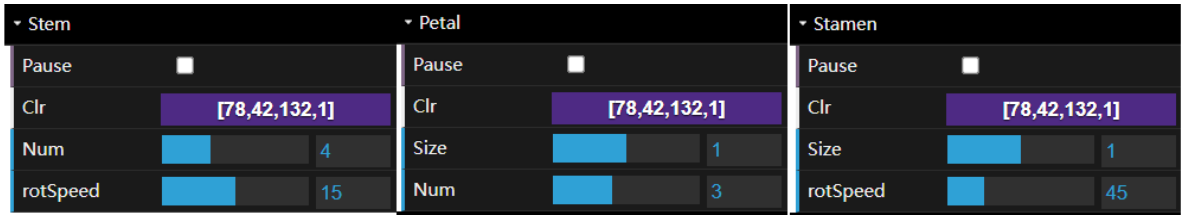


Figure 4: Clover Config

Camera Config: The user can activate Flying-Airplane Navigation Mode, use Preset Cameras to verify certain functions and customize Camera Parameters.

Ender Dragon/Clover Config: Each part can be configured independently. `Pause` is to pause and resume. `Clr` is to change its color. `Num` is to change the segments number of Tail/Stem/Petal. `Size` is to zoom in and out. `rotSpeed` is the rotation speed. `rotMinAngle` and `rotMaxAngle` is to define the range of rotation of Tail/Neck/Wing.

Instruction

Keyboard Control

- /: Toggle Control Menu
- R: Revert configuration in Control Menu
- Space: Pause/Resume globally

Camera Control

1. ↑, ↓, ←, →: Aim camera in any direction without changing its position
2. W, S, A, D: Move forward/backward in the gaze direction and strafe sideways left/right
3. I, K, J, L: Move along X/Z axis

Mouse Control

Drag & Move: Rotate the Icosahedron (Please choose different `Preset Cameras` like `Up`, `Front`, `Left`, `Right` in `Control Menu`-`Camera` to verify whether the rotation is correct).

Results

Screen Shots

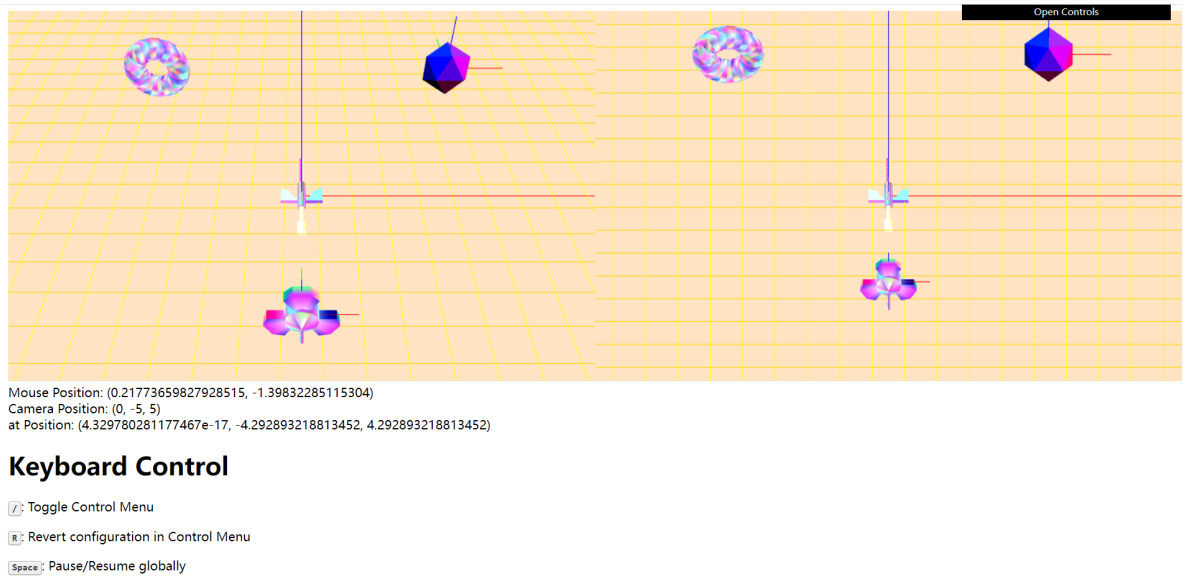


Figure 5: Initial State

In the initial state, Torus, Ender Dragon and Clover are paused (`config.Env.Pause = true`)

Figure 6: Attach Camera to Clover Stamen

Enable `Control Menu` - `Camera` - `Attach` to attach the camera to the Clover Stamen. Choose `Look From Front` in `Control Menu` - `Camera` - `Preset Cameras` to get a better view. The camera will rotate as the Clover rotate.

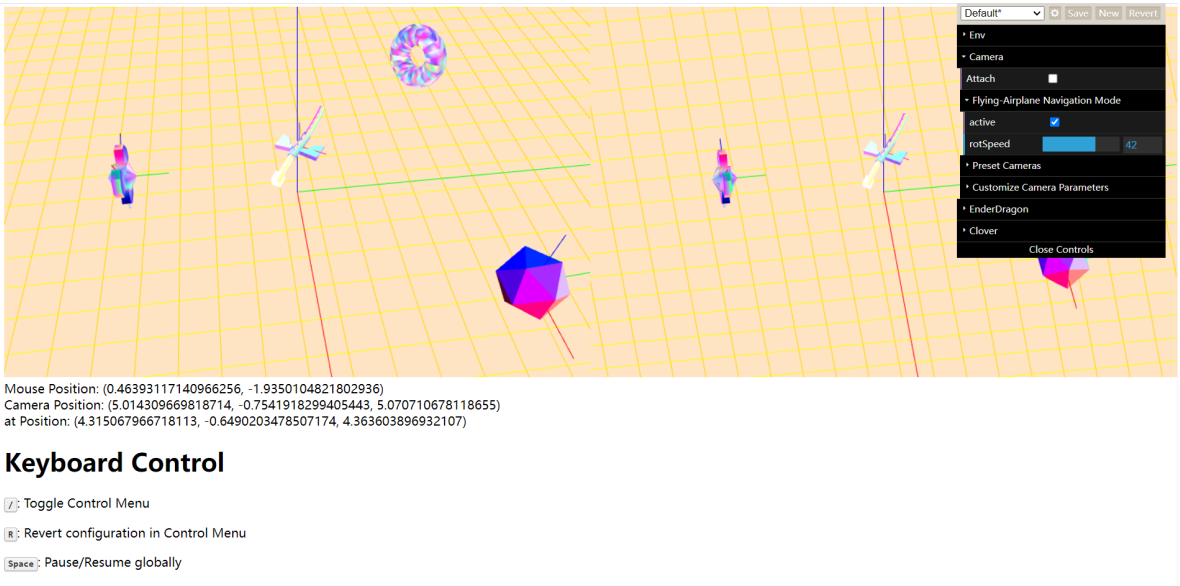
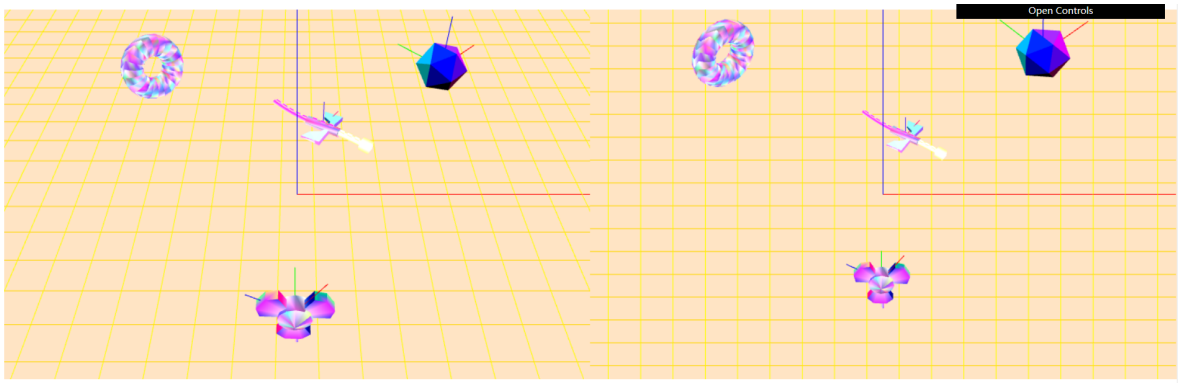


Figure 7: Flying-Airplane Navigation Mode

Enable Flying-Airplane Navigation Mode by enabling `Control Menu` - `Camera` - `Flying-Airplane Navigation Mode` - `active`. The camera will rotate around Z-axis automatically and continuously. The user can change `rotSpeed` to accelerate/decelerate the rotation.



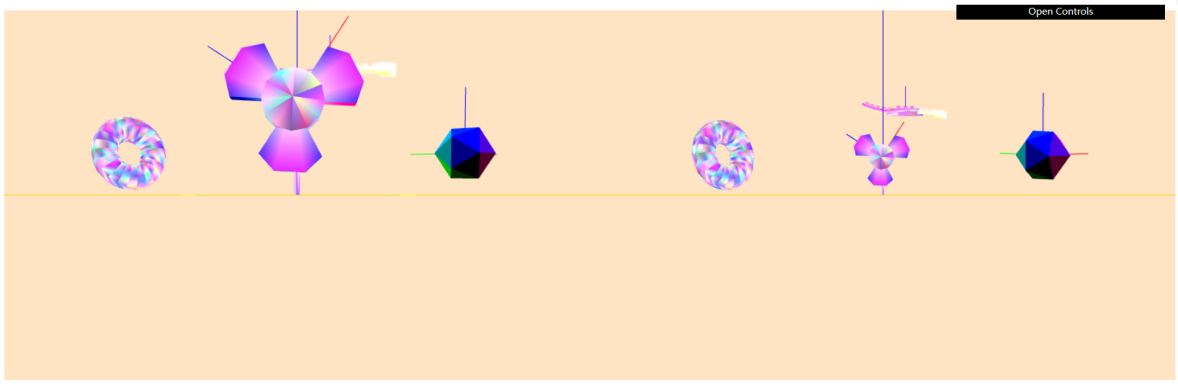
Mouse Position: (0.17538054268696235, -1.5618448637316562)
Camera Position: (0, -5, 5)
at Position: (4.329780281177467e-17, -4.292893218813452, 4.292893218813452)

Keyboard Control

/: Toggle Control Menu

R: Revert configuration in Control Menu

Space: Pause/Resume globally



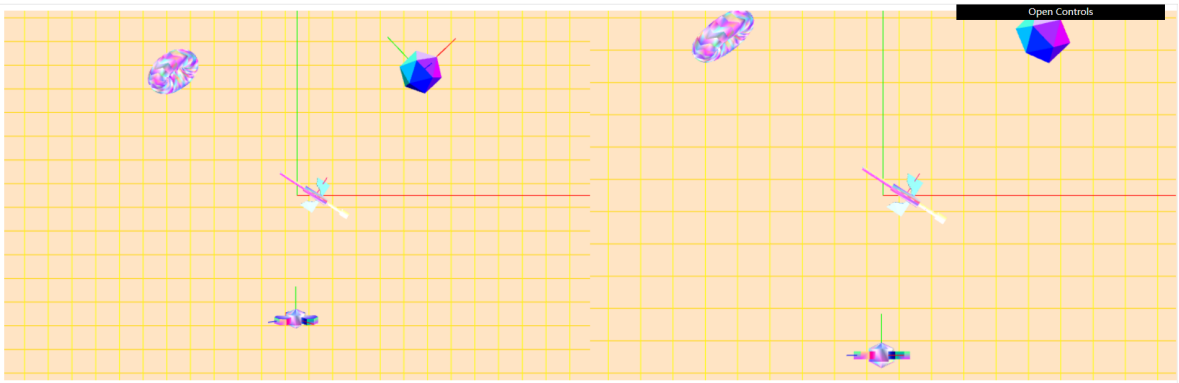
Mouse Position: (0.26406353408338856, -1.6373165618448637)
Camera Position: (0, -5, 0)
at Position: (6.123233995736766e-17, -4, 6.123233995736766e-17)

Keyboard Control

/: Toggle Control Menu

R: Revert configuration in Control Menu

Space: Pause/Resume globally



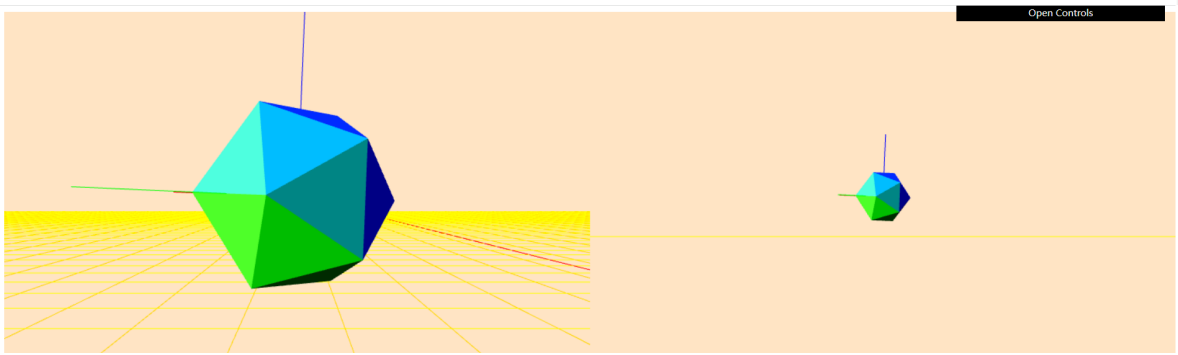
Mouse Position: (-0.613500992720053, -0.4129979035639413)
Camera Position: (0, 0, 10)
at Position: (7.498798913309288e-33, 1.2246467991473532e-16, 9)

Keyboard Control

/: Toggle Control Menu

R: Revert configuration in Control Menu

Space: Pause/Resume globally



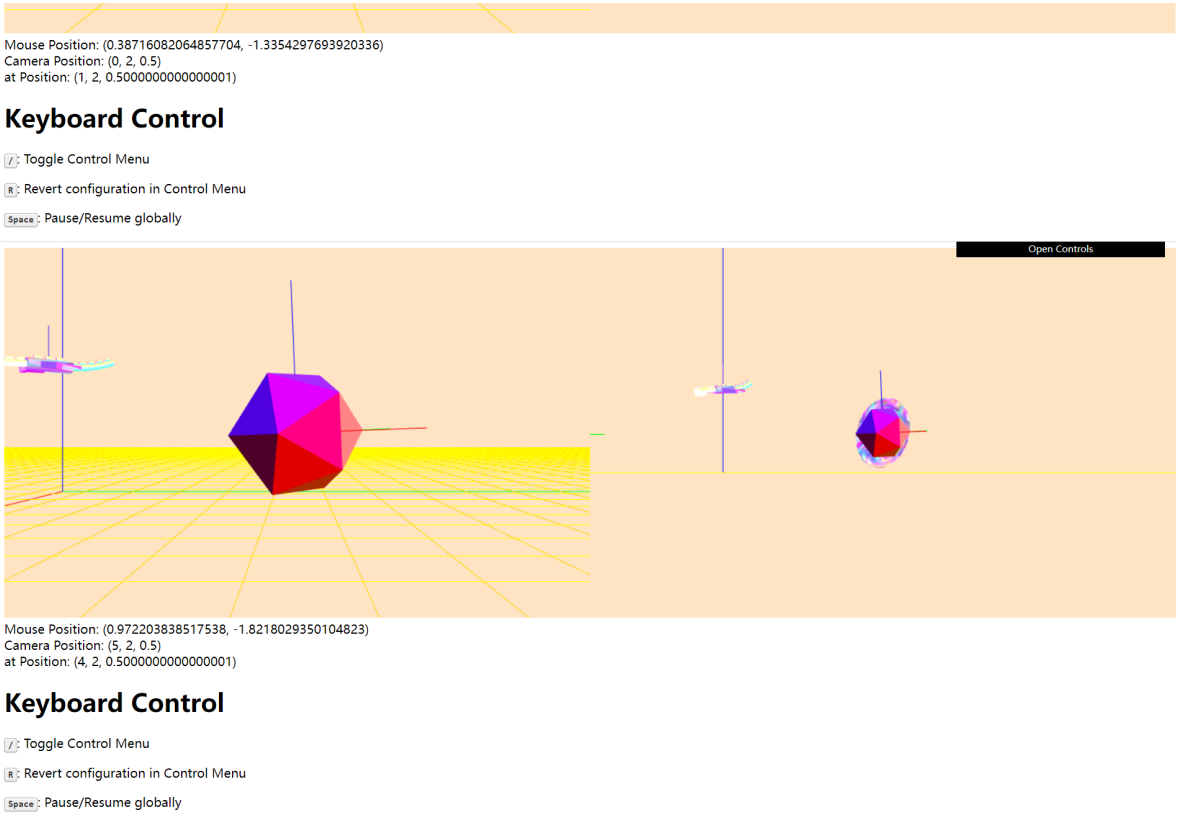


Figure 8: Preset Cameras (Can be used to verify rotation)

The user can choose several Preset Cameras in `Control Menu` - `Camera` - `Preset Cameras`. These cameras can be used to verify whether mouse drag & move to rotate Icosahedron (Mouse Control) is correct.

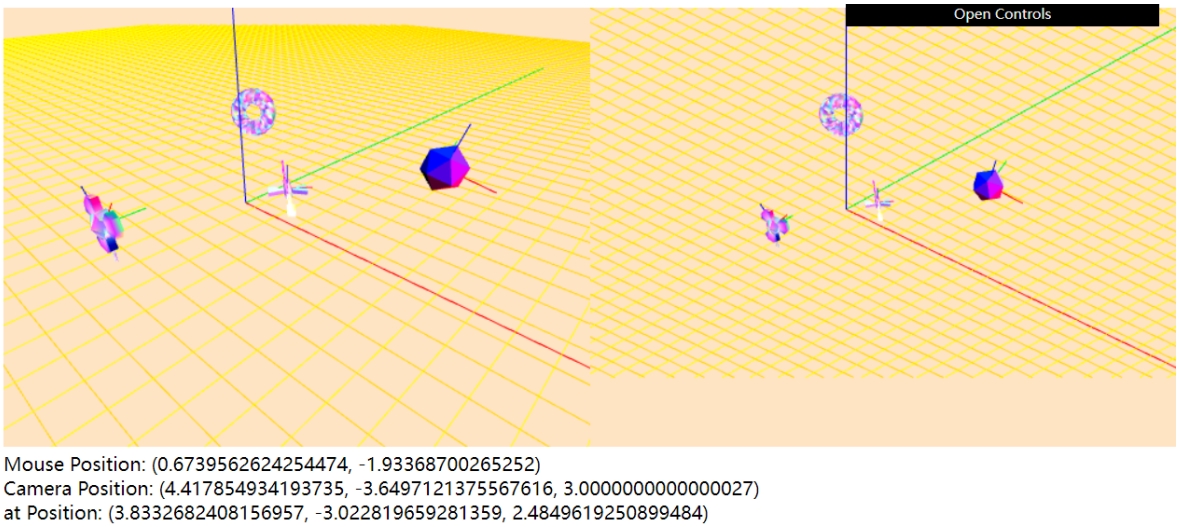


Figure 9: User Adjustable Camera Parameters & Keyboard Control & No distortion when resizing the window

User Adjustable Camera Parameters: The user can customize camera parameters when enabling `Control Menu` - `Camera` - `Customize Camara Parameters` - `Customize`. `fov` will be ignored in this function because the user will adjust `left`, `right`, `bottom`, `top`, `near`, `far`. Other parameters except `near` and `far` will be modified automatically when customizing one

parameter to prevent distortion.

Keyboard Control: Please see Instruction Section

No distortion when resizing the window: The content will never squash/stretch as the user re-size window for taller or wider images of any size. And will never invoke browser horizontal slider-bar (vertical slider-bar will appear because user instruction in web page is a bit long).

Scene Graph

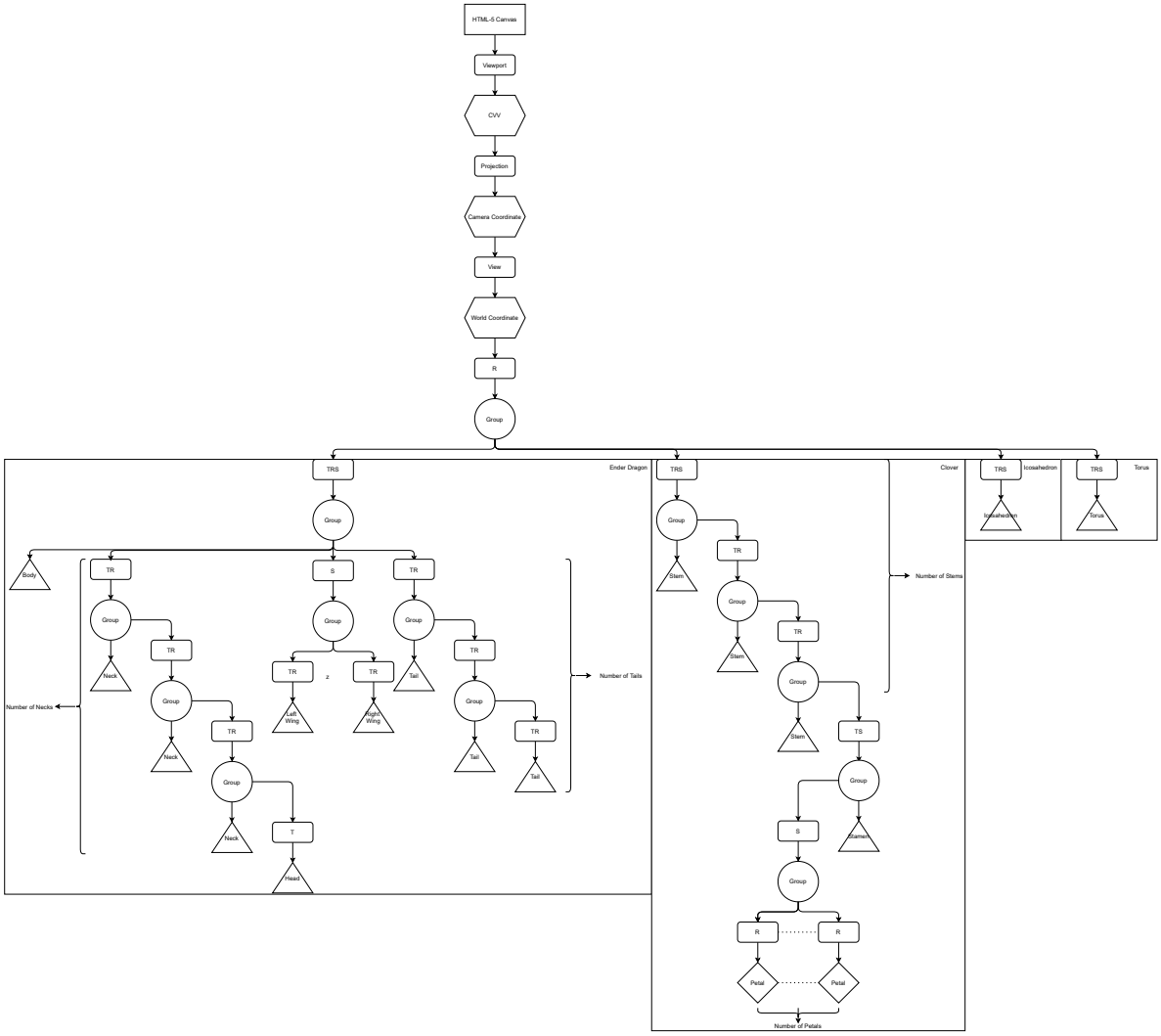


Figure 10: Scene Graph