CS3028 Group Project

Datasets for Objects and Manipulation (D.O.M)

Welcome to your new program! Here's a quick guide to get started along with some tips and tricks to help you make the most of it.

Introduction

Generating images of 3D objects can be tedious when working with large datasets. D.O.M. is here to simplify the process. This program is designed to help you efficiently generate datasets for your 3D objects. It aims to make dataset generation easier, while offering a dedicated tool for your needs.

Installation Prerequisites

General Prerequisites

- Ensure you have python installed - https://www.python.org/downloads/
- Set up your workspace and navigate to it in VSCode or your chosen code editor of choice.
- In terminal *run pip install -r requirements.txt*
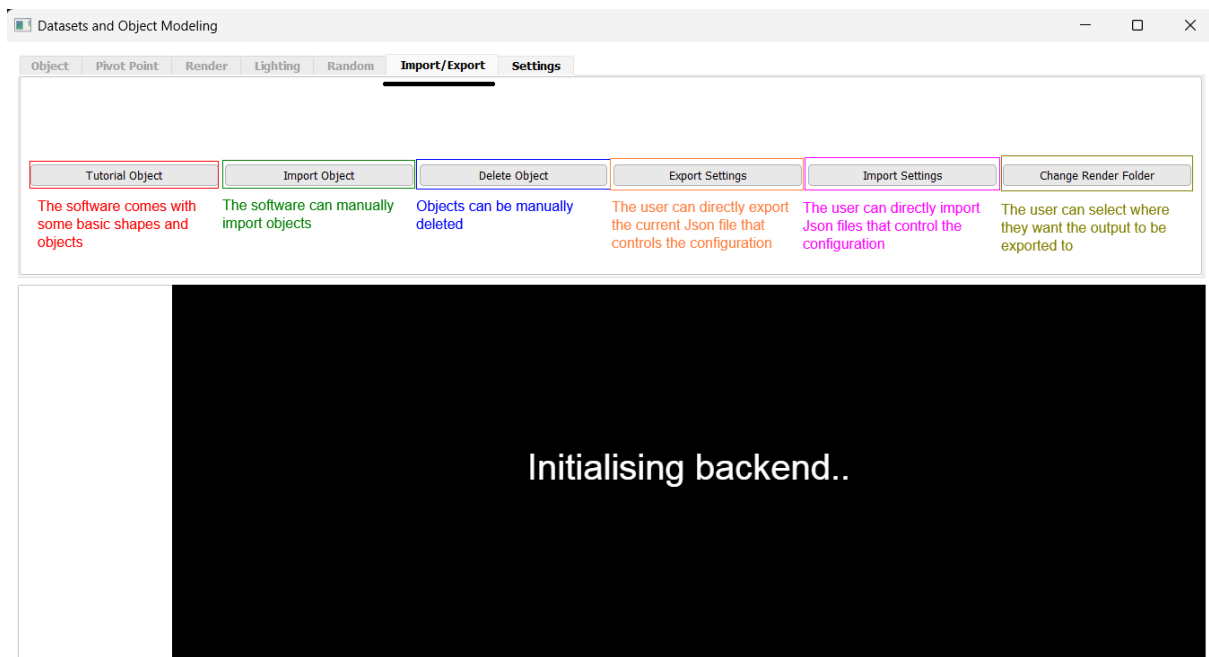
MacOS Prerequisites

Error Message - (Permission Error: Operation not permitted)

- Open system settings and navigate to privacy & security
- Navigate to full disk access and add new applications.
    - Give terminal full disk access: Applications/Utilities/terminal
    - Give vs-code full disk access: Applications/VSCode
- Ensure that both of these applications are selected for this to avoid the permission error.
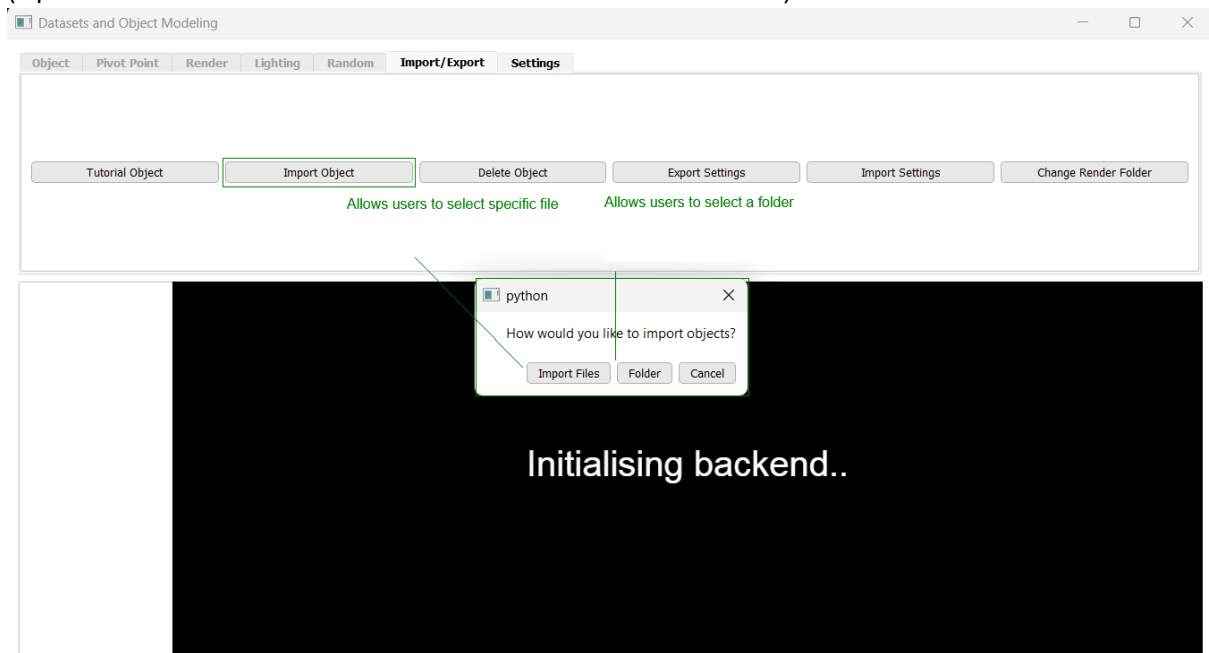
Getting Started

To run D.O.M., simply execute the UI.py file located in the frontend folder.

1. Begin by loading a tutorial object or uploading an object.

Datasets and Object Modeling

| Object | Pivot Point | Render | Lighting | Random | **Import/Export** | Settings |

Tutorial Object	Import Object	Delete Object	Export Settings	Import Settings	Change Render Folder
The software comes with some basic shapes and objects	The software can manually import objects	Objects can be manually deleted	The user can directly export the current Json file that controls the configuration	The user can directly import Json files that control the configuration	The user can select where they want the output to be exported to

Initialising backend..

2. When uploading a custom object, you can choose to upload an individual file or a folder. (Uploaded items will share their file name within the software.)

Datasets and Object Modeling

| Object | Pivot Point | Render | Lighting | Random | **Import/Export** | Settings |

Tutorial Object	Import Object	Delete Object	Export Settings	Import Settings	Change Render Folder

Allows users to select specific file   Allows users to select a folder

python   ×

How would you like to import objects?

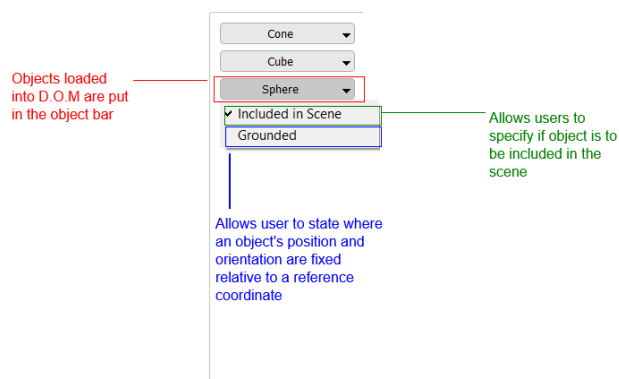[Import Files] [Folder] [Cancel]

Initialising backend..

3. Once an object is uploaded, the viewport will automatically update. Any changes you make to elements in the scene will trigger automatic updates in the viewport.
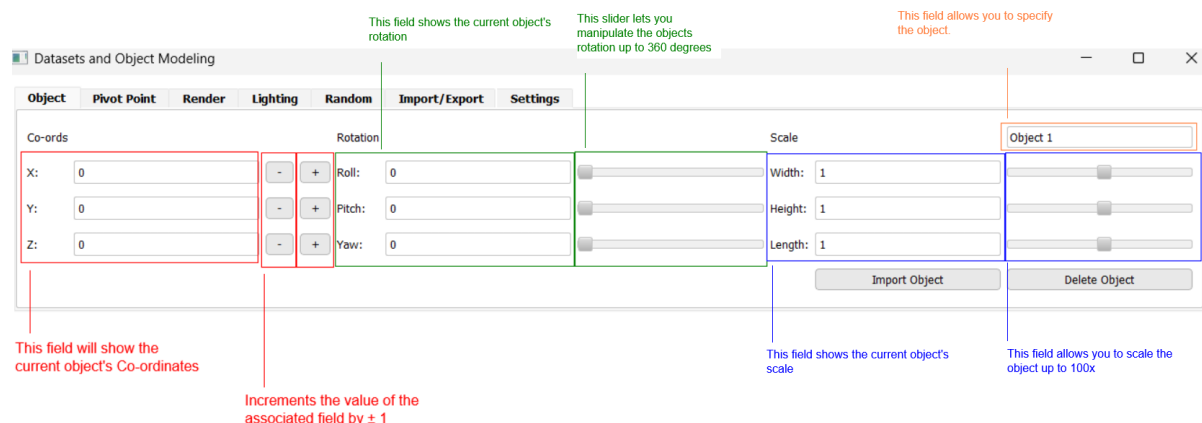
Object Bar

When an object is uploaded, the **ObjectBar** will append an element. This allows you to specify whether particular objects in the scene should be grounded or not.


Objects loaded into D.O.M are put in the object bar

Allows users to specify if object is to be included in the scene

Allows user to state where an object's position and orientation are fixed relative to a reference coordinate

Object Tab

The **ObjectTab** enables users to change the starting elements for each object. Users can select the object via the combobox (highlighted in orange below).

This field shows the current object's rotation

This slider lets you manipulate the objects rotation up to 360 degrees

This field allows you to specify the object.

This field will show the current object's Co-ordinates

Increments the value of the associated field by ± 1

This field shows the current object's scale

This field allows you to scale the object up to 100x

Pivot Tab

The **PivotTab** allows users to:

- Specify a custom pivot point (red).
- Assign an object as the pivot point (blue).
- Set the distance between the camera and the pivot point in meters (green).
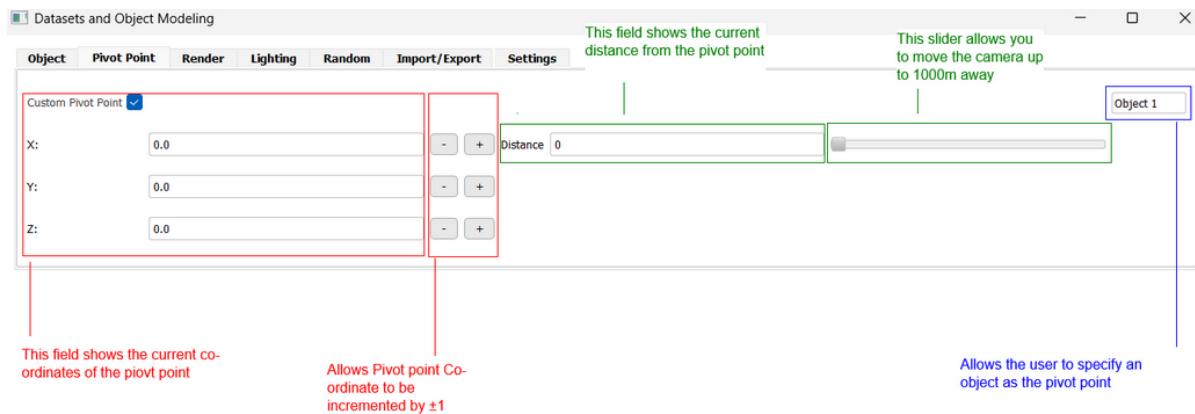
Render Tab

The **RenderTab** provides options to configure rendering settings:

- Specify the number of renders to generate (red).
- Define the change in degrees per axis of freedom (green).
- Begin rendering by pressing **Generate Renders** (blue).
- Use the unlimited render feature to generate renders continuously until manually stopped (orange).
- Preview the current render configuration before generating final outputs (pink).
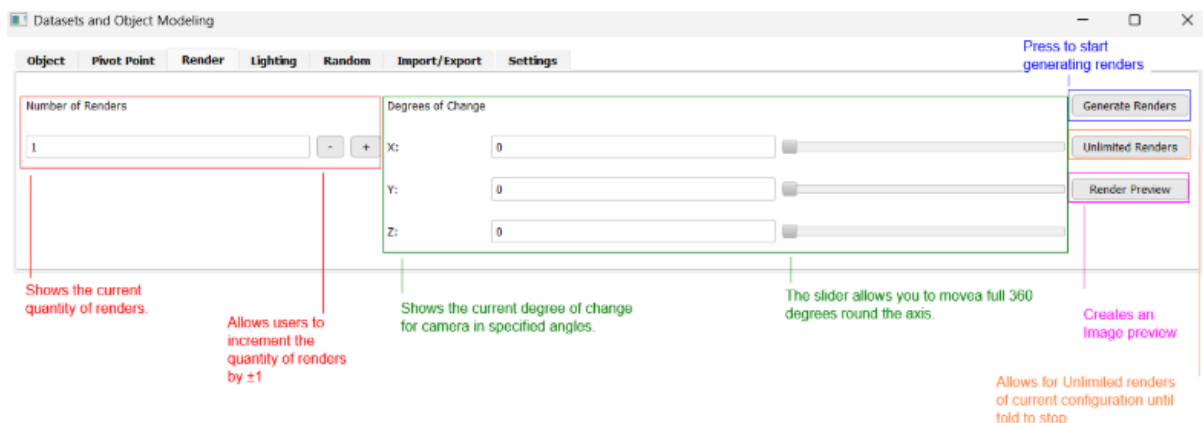
Lighting Tab

The **LightingTab** lets users fine-tune lighting options:

- Adjust light strength (red).
- Change light color (green).
- Modify light radius (blue).
- Select the type of light (pink).
- Specify light position (orange).
- Set light angle (neon).
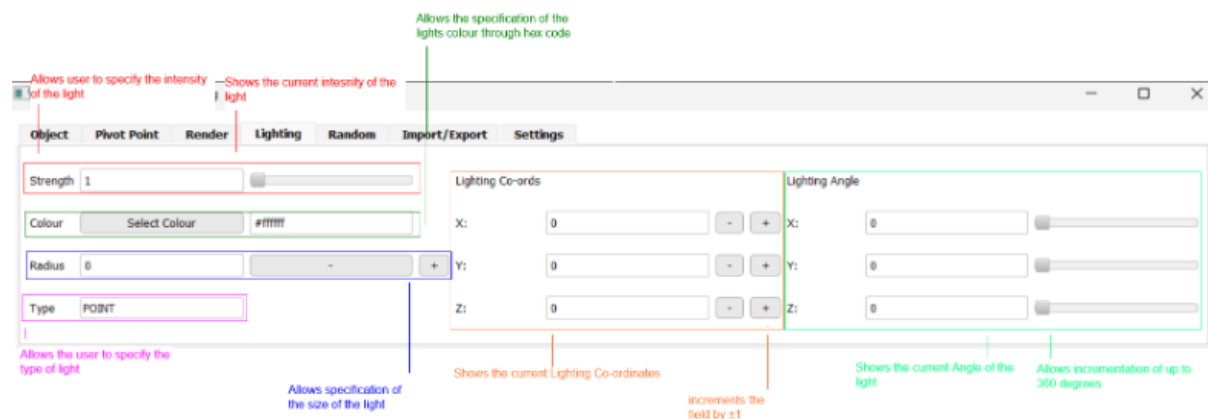
Random Tab

The **RandomTab** allows fields across all pages to be set to random:

- Activate randomness globally (red).
- Set randomness per set (green) or per frame (blue).
- Adjust the random seed value (orange).
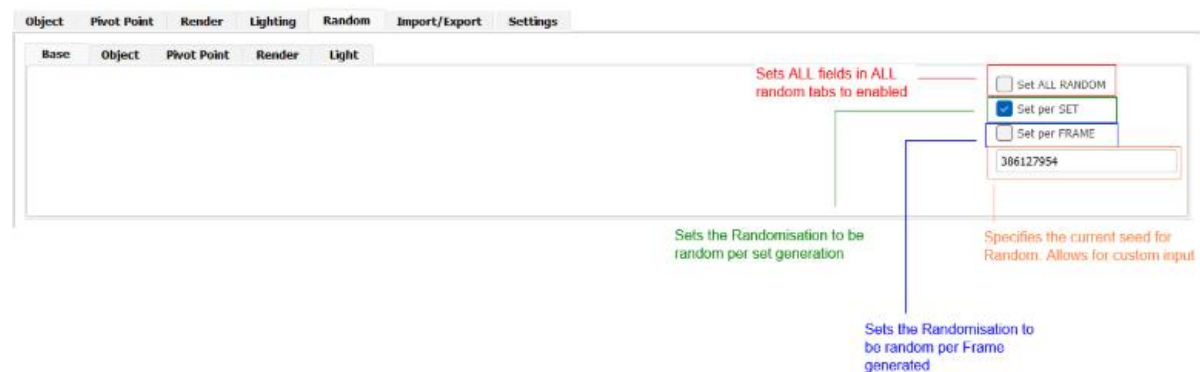
Random Selection:

- Activate specific fields using the checkbox (red).
- Define lower and upper bounds for random elements (green and blue).
- Change the target object (orange).
- Set all elements on the current page to active (pink).

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- Oliver Japp, Ilya Waywell, Dominic Brown, Ben Brown, Ethan Burke, Miller Dawson, and Sophie Bowie. Datasets and Object Manipulation (D.O.M). Version 1.0, April 15, 2025. https://github.com/b3nb07/CS3028_Group_Project.

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