University of Ottawa
Faculty of Engineering

# ENGINEERING DESIGN
# GNG 1103

## DELIVERABLE K: USER GUIDE

Team Members:

Reggie Amarasingam
Asiya Farah
Emily, Rudderham
Hasbiya, Yusuf

Group B01-1
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## Need Identification and Product Specification Process

The problem is that EllisDon needs to provide its employees with 3D models of the design plan. If a 3D model could be provided to the workers, they can visualize the final product, which will allow them to be more accurate and efficient when working on the construction site.

The product allows a worker to upload the plans to their phone and view the plans room by room. This will give workers a good visualization of the final product. In addition, the plans are accessible offline as well, so an internet connection is not required.

## Features

### Game Controls

The game controller provides a rotating key by tapping the screen on a singular axis that allows the user to move around his subject with ease. The swift motions can place an overview of the figure, permitting the individual to move forward, backward, and side to side by using a virtual joystick. Afterward, a rotational joystick was made to access the camera position, allowing the user to rotate around the models freely and manipulate the viewing angle using two different rotational axes. This feature is great for detail-oriented users who need a closer look at their 3D model.

### QuickView

Allows users to quickly jump to a location proximal to where they want to be rather than having to navigate through the entire building to get to their desired room. This feature was constructed using the height and length of the building, which were then divided by the number of floors of the building to obtain location markers on each floor.

### Main Menu

For a more fluid experience for the user, the main menu was created. With the main menu, additional options such as a quit button and an options menu were added.

### Tutorial

The tutorial offers an explanation for how to integrate your building model into the app through Unity, as well as a walkthrough of all the buttons and features of the app.

### Hide Icons

As the screen real estate on mobile phones is limited, we decided to integrate a feature that would allow you to hide all non-essential icons on the screen to ensure that you can see as much of the model as possible. The joystick is kept so that the user can rotate from a stationary position for 360˚ viewing.

**Discipline switch**
Buttons were added and assigned for each discipline. Once a button is pressed, the application closes the active model and opens the model associated with the chosen discipline. As a result, the user can switch between mechanical and electrical, structural, and architectural views.

## Screenshots

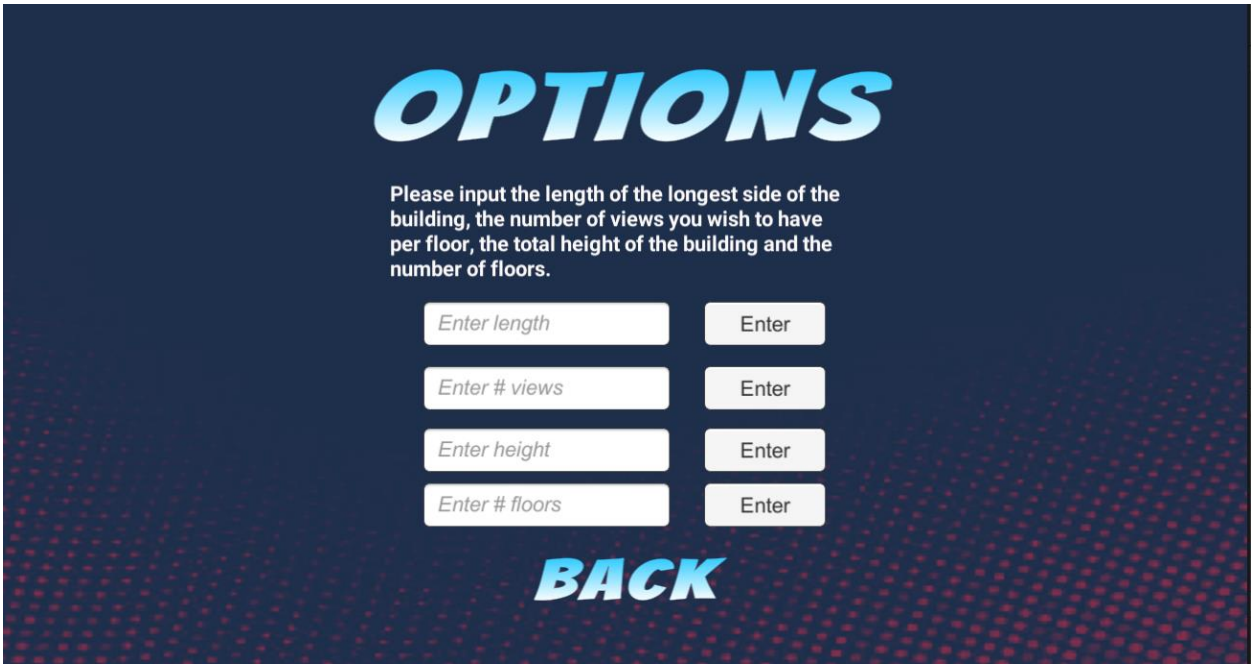

Figure 1: Options Menu layout

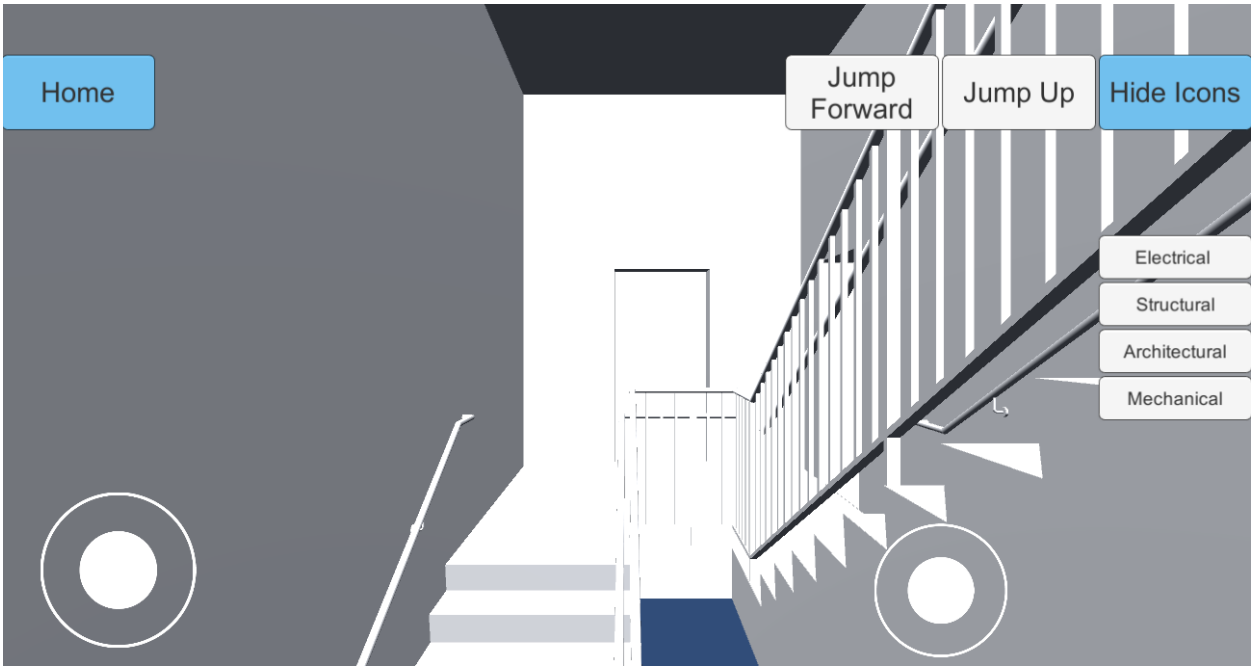

Figure 2: Standard Game View Layout

Figure 3: Hide Icons View Layout

## Setup

**Uploading BIM file**

To upload your BIM file, first, open the Unity file from the Unity Hub. Next Assets -> Import New Asset and select the file you wish to import. Alternatively, open your file explorer and drag the desired file into the Assets bar at the bottom of the Unity Editor. Next, drag the file from the Assets bar to the Hierarchy Window. The file is now included in the game view.

It is important to properly size and position the 3D model properly. To do this, click on the model and use the corresponding arrows to slide the model in the x,y, and z directions. In the inspector window, change the size of the model. Click on the MainCamera asset in the Hierarchy window for a preview of how the model will be seen in the app.

Once the model is properly placed in the scene, drag the script CameraRotate from the Asset Window and place it on the model. Next, drag Rotate Joystick from the Hierarchy Window into the Joystick Field of the model.

**Building the app**

After setting up your BIM file, the application is now ready to be built and installed on a mobile device. To do select file -> Build Settings. Next, select which file type you wish to build and press build. This creates a file that can then be shared with other devices to download and use.

**Navigating the app**

To make use of the QuickView feature, select the options menu, and fill in all the required values. Use the left joystick for translating and the right joystick for rotating.

## Scripts

**TextInput**
Gathers the text inputted by the user in the options menu and assigns it to the corresponding variable (i.e., height, length, views floors)

**ScrollView**
Finds variables created in *TextInput* and converts them from string to int or float. Creates an increment for the main camera by dividing the length of the building by the number of views and the height of the building by the number of floors. Linked to the *JumpUp* and *JumpForward* button to move the camera by the specified increment once pressed and to reset the camera position once the desired amount of views has been reached.

**CameraMove**
Registers the displacement of the joystick from its center and multiplies this value by the predetermined moveSpeed to dictate the translation of the camera in the x and z direction.

**CameraRotate**
Registers the displacement of the joystick from its center and multiplies this value by the predetermined moveSpeed to dictate the rotation of the camera around the horizontal and vertical axes.