1 Installing Unity

To run or build the provided source code two things need to be installed on the system:

1. Unity - the editor in which the provided code can be opened. To install follow the instructions at `https://docs.unity3d.com/Manual/InstallingUnity.html`
2. Steam VR - a library that provides VR support for the project. To install it, Steam must be installed first before Steam VR can be installed: `http://store.steampowered.com/steamvr`

After the above components are installed on the system, the provided source code can be opened in the Unity editor. After opening it in the Unity editor, the furniture assets need to be prepared in order for the Object Tool to work as intended. To do this click Assets → Build AssetBundles from the menu bar. Only then the project can be run on the local computer.

2 Building the project

To build the project with Unity select File → Build Settings... This will open a new window in which you can specify some build details. Click Build to build the project as a standalone piece of software in the specified location. To supply the build project with default furniture assets, copy `AssetBundles\sample` file from the source code and copy it into `main_Data\AssetBundles` directory in the build location. The program can then be executed by running the newly created executable main file.

3 Using the program

3.1 Controllers

The interaction with the application is done with the use of Vive controllers. Figure 1 contains the image that will be used as a reference to explain what button to press when using the program. The buttons labeled in said figure will be referred to as the Menu Button (1), Trackpad (2), Trigger (7) and Grip Button (8), and are the same for both controllers. The controllers will be referred to as right and left, but they are not required to be held in that hand and the user can hold them in a way that fits them best.

3.2 Changing tools

To change the currently used tool, a tool menu has to be opened first. This can be done by pressing the menu button (1) on the right controller, which will toggle the menu between the open and closed state. Closing and opening the menu again will always reopen it directly in front of the user. The tools can then be selected by pointing at the icon representing the desired tool and pressing the trigger (7) with the controller that should become that tool.

3.3 Saving and loading previous projects

Saving and loading previous projects can be done via an additional menu which can be opened and closed by pressing the menu button (1) on the left controller. Similarly to the tool menu, it will always be opened directly in front of the user.

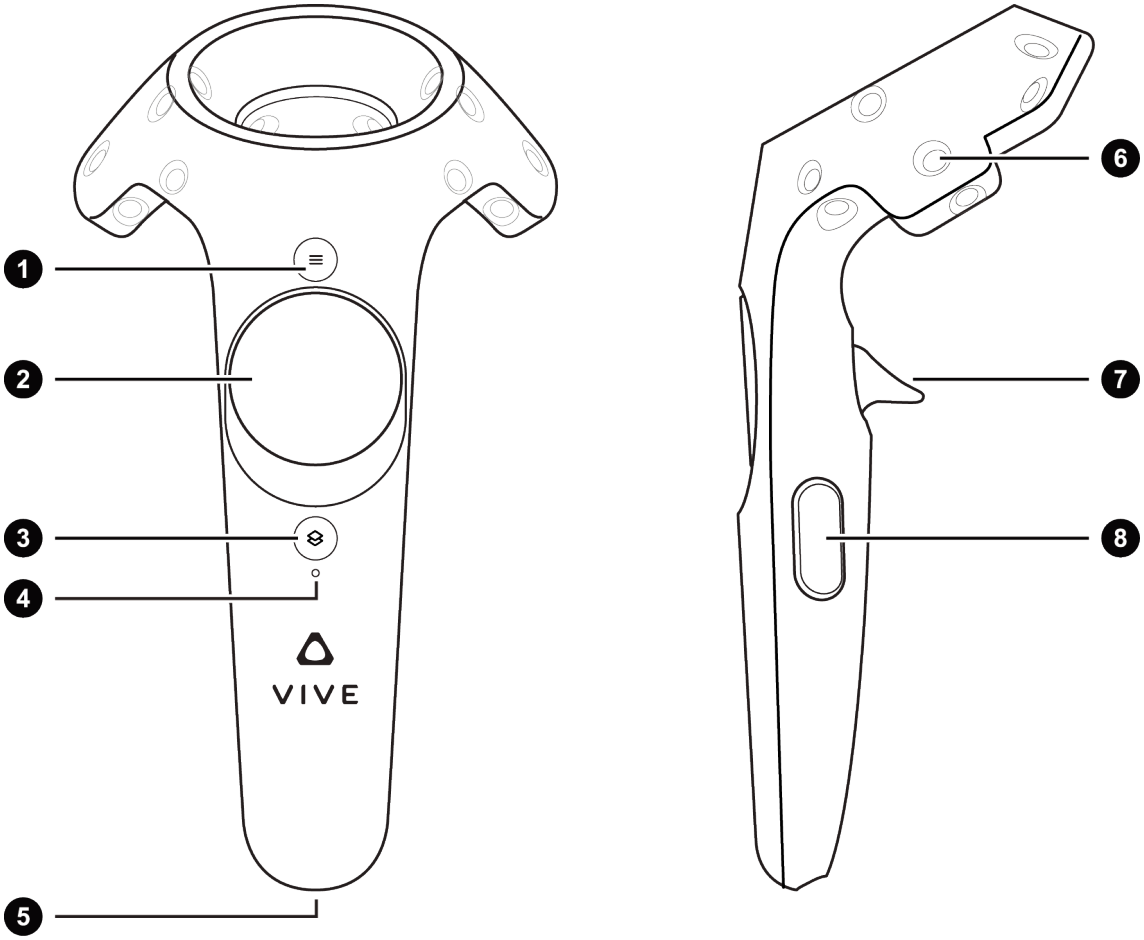

Figure 1: HTC Vive controllers

3.4 Example

The example below will lead you through the process of creating a simple building and saving your progress:

1. **Move to the place where you want to start building your room by either physically walking over to that location or using the teleport tool.** To use the teleport open the tool menu by pressing the menu button (1) on the right controller and select a teleport tool by pointing at it with the laser and pressing the trigger (7) on the controller you're pointing with. The controller on which the trigger (7) was pressed will be the controller that the teleport tool is assigned to and it'll be the controller that will be used to teleport. Point at the ground and press the trigger (7) on that controller to move to the pointed location.
2. **Change the tool to wall tool and use it to build 4 walls of your room forming a rectangle.** If you closed the menu, or walked far away from it you can close it and reopen it by pressing the menu button (1) on the right controller. To build a wall, point at the place you want it to start from and press and hold the trigger (7). Then point to the location where you want the wall to end and release the presses button. If you started the wall in the wrong place point at the sky to cancel that wall segment. The line drawn on the ground shows where the wall is going to be places, so you can see if it starts and ends in the desired location.
3. **Select the floor build tool from the tool menu and create a floor segment.** Press the trigger (7) to select 4 points on the ground that match up with the corners of your room.

If you misplaced one of the points you can press the trackpad (2) on the left controller to cancel the last point. When the 4 points are places touch the trackpad (2) on the controller that acts as the floor build tool to confirm and create a new floor segment. The lines drawn show you where the floor you are creating now is going to be placed.

4. **Paint the floor segment you created.** To do this, change to tool to the paint floor tool and point at the floor you want to paint. Press the trackpad (2) to toggle between the textures and the trigger (7) to apply the texture to the floor that is being pointed at. The same tool can be used to apply different textures to objects as well.

5. **Add roof to the room to give it a building appearance.** Use the roof tool for that purpose. Go to the above floor by pressing the grip button (8) on the right controller and create a roof over the created room in the same way as you created a floor segment. When finished press the grip button (8) on the left controller to return to the group floor.

6. **Add objects to the scene using the add object tool.** The green ghost object will show you where the object is going to be places. The objects will take on the same rotation as the controller, and you can hold pad and raise/lower the controller to increase/decrease scale. You can change the object by pressing the trackpad (2) and confirm the placement with the trigger (7).

7. **Move the objects around after they have been places.** To change the location of an object after it placement use the select object tool. After pointing at an object and pressing the trigger (7) you will be able to move, scale and rotate the object in the same way as you can do in the object tool.

8. **Remove objects that were placed accidentally.** To remove objects, walls or roofs use the Delete tool. To use it simply point at the object you want removed and press the trigger (7) on the corresponding controller.

9. **Add doors and windows to the newly created room.** To add a doorway select the add doorway tool. To place a doorway point at the place in the wall where you want the doorway to be places and press the trigger (7). Once placed doorway cannot be removed and multiple doorways can't be joined together to create a wider passage.

10. **Save your current work, so it can be opened later or transferred to another machine.** To save the current project bring up the save/load menu by pressing the menu button (1) on the left controller and select the save option from it with either controller by pointing at it and pressing the trigger (7).

11. **Open your project after restarting the program, or transfer it to another machine.** To transfer the saved project between two machines, copy the .sav file corresponding to your project from the projects folder in your installation location and paste it to the same folder on the machine you want to open your project on. To load the project on the next occasion, bring up the save/load menu. Press the load icon corresponding to your project by pointing at it with a controller and pressing the trigger (7).