

# Producing a Level Editor For 3D Environments

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### Introduction

Level creation in video games is a large aspect of the overall production and creating easy to use tools allows developers to include more high quality content in a fast and convenient way. This project details the production of a tool to ease the development of 3D levels for games.

### Tools Used

The project was created using Unity Game Engine for its wide variety of libraries and features enabling a smooth production for the tool. The access to the libraries saved a lot of time during development that could instead be spent on improving the tools features.

### References

Unity, 2020. *Unity Documentation*. <https://docs.unity3d.com/Manual/>

### Results

The tool developed during this project can be used to create 3D levels easily using rudimentary shapes and textures, provided by the user. These files can be exported to a simple text file that is readable by the user, with the benefit of allowing for manual edits.

All of the files are localised to the tools, meaning as long as the tools file structure is unaltered, the project has no dependencies. Files, such as the textures, don't need to be kept after being imported as the tool stores them locally.

The user controls for the tool are easy to use and follow a standard design adopted by the industry including WASD for movement, moving the mouse for looking around and the mouse buttons for interaction.

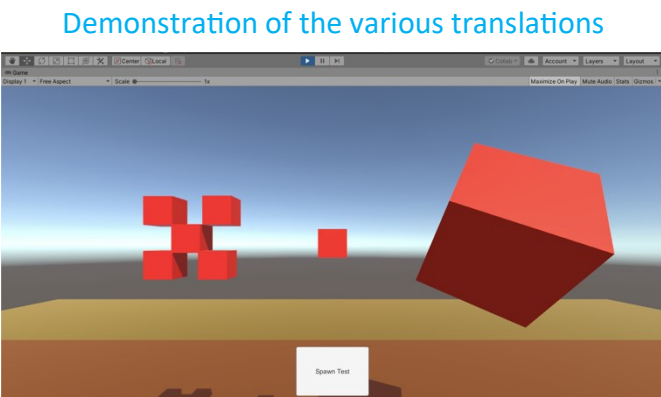


Figure 1.  
Simple shapes translated into various positions, sizes and rotations.

Example Map File

```
Cube[(-5.0, 6.0, 8.0)|(0.0, 0.0, 0.0)|(1.0, 1.0, 1.0)|156784967  
Cube[(-4.0, 8.0, 8.0)|(0.0, 0.0, 0.0)|(1.0, 3.0, 8.0)|990467333  
Cube[(-3.0, 7.0, 8.0)|(0.0, 0.0, 0.0)|(1.0, 1.0, 1.0)|683498758  
Triangle[(-4.0, 11.0, 8.0)|(0.0, 0.0, 0.0)|(2.0, 3.0, 8.0)|296712186  
Cube[0.0, 6.0, 8.0)|(0.0, 0.0, 0.0)|(9.0, 1.0, 9.0)|952917263  
Cube[0.0, 6.0, 3.0)|(0.0, 0.0, 0.0)|(9.0, 1.0, 1.0)|158863276  
Cube[5.0, 6.0, 8.0)|(0.0, 0.0, 0.0)|(1.0, 1.0, 1.0)|729890582  
Cube[0.0, 6.0, 13.0)|(0.0, 0.0, 0.0)|(9.0, 1.0, 1.0)|868250157
```

Figure 2.  
An example map that has been exported to a text file

Example Map File Imported

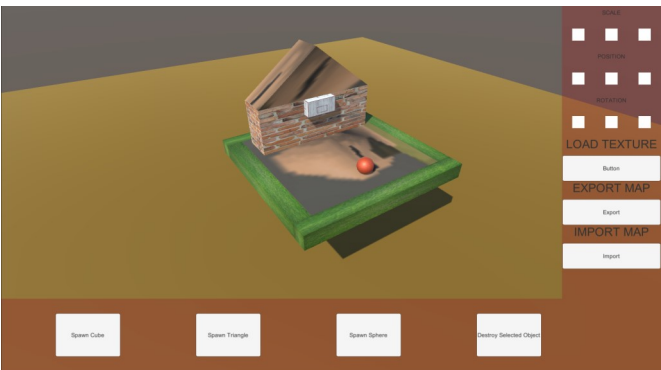


Figure 3.  
The map file from figure 2 imported into the tool.

### Conclusions

The project, and the tool developed during the project, fits into the targeted space between professional and end-user in-engine tools, leaning more towards the desired in-engine feature set.

As the project was developed using Unity and uses standard Unity libraries, the map files, alongside the importer, can be used to import into any Unity project.

To improve on the toolset in the future, the included feature set could be improved on, such as by ensuring the text input is easier to use, or and individual axis could be locked when manipulating with the mouse.

One feature that was removed due to time and development constraints was the modifier system for interactive objects, such as moving objects between waypoints.

### Usability

The toolset developed will currently work on Windows platforms, with the possibility to be supported across a wide variety of platforms with future development, such as Xbox and Playstation.

### Project Files

The project can be accessed at:  
<https://github.com/AlexSDevDump/3D-Level-Editor>