

# Introduction to Blender

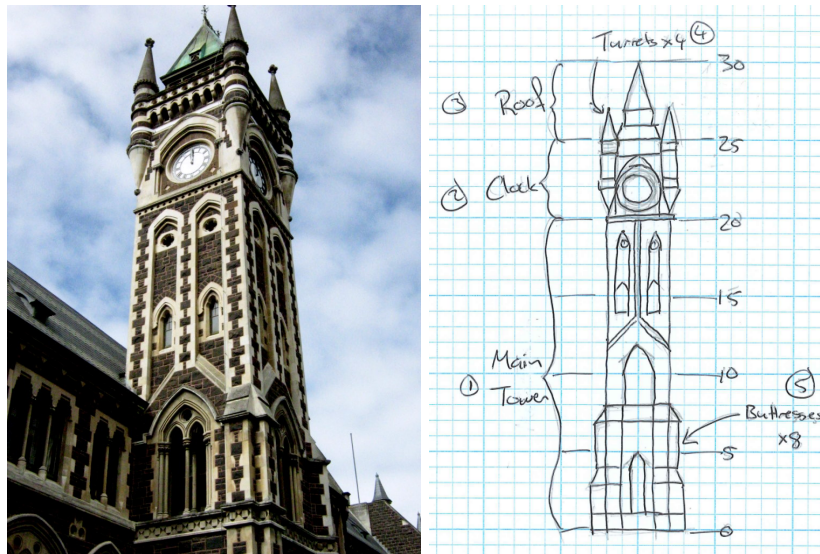
COSC342 Lab 1

2017

## 1 Introduction

In this lab we'll work through making a model of an object, or at least get started on it. The object we'll be working with is the University clocktower. This is a fairly complex building, so we'll simplify things a bit. Firstly, we'll just do the clocktower itself, not the whole building, and secondly we'll ignore a lot of the fine detail. This lab is a walkthrough of one way to do this, but should hopefully give you some experience with Blender and an idea of how things work. Also, feel free to mix things up a bit as you go – add a bit of detail here, or adjust some dimensions there.

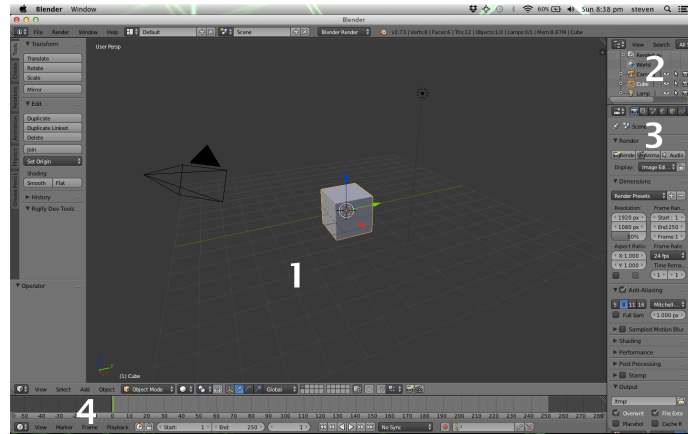
To get started it is often useful to get some reference images and make a sketch of the object. In many cases it is a good to do this sketch on graph paper, so that you can judge how big things need to be. Here's what I did to get started:



Note that the sketch doesn't have all the details in it, but it has more than enough for our purposes. I've also identified five main components, which will help us to structure the model a bit.

## 2 Getting Started with Blender

When you open up Blender it should look something like this:



There are several main parts to the screen:

1. The main 3D View, where you will be doing most of the designing.
2. The Outline View which shows the structure of the scene.
3. The Properties panels which contain a lot of detailed settings.
4. An Animation View, which won't be used in this tutorial.

The default scene has three objects in it – a cube, a camera, and a lamp. To start with we can render the default scene – just choose *Render Image* from the *Render* menu. The image is drawn, but is not saved – if you want to do that you can choose *Save Image* from the *Image* menu at the bottom of the 3D view. Press **esc** to get rid of the rendered image.

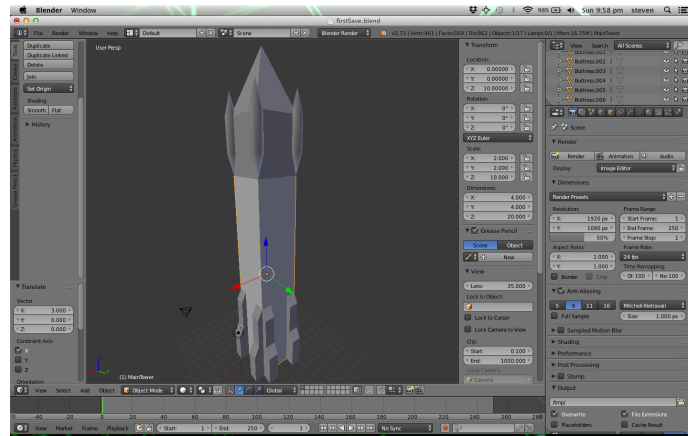
There are a few things to keep in mind when using Blender:

- If you are part way through an operation and want to cancel it, pressing **esc** usually often it.
- Blender uses its own key bindings, rather than operating system-specific ones. In particular, **control-z** is undo even on OS X where it would normally be **command-z**.
- Blender key commands are case sensitive, so **a** selects all, while **A** adds a new object. Modifier keys like **shift** or **alt** will be written in lower case to match the keyboards in the lab.
- You can rotate the view by holding down the middle mouse button (or wheel).

- To slide the view around, hold down **shift** while dragging with the middle mouse button.
- The middle mouse button zooms the view in and out.
- To delete an object, select it and press **x**.

## 3 Some Basic Shapes

We'll start by using some basic shapes (or *primitive objects*) to make the general shape of the tower. By the time you've finished this section your model should look something like this:



### 3.1 The Main Tower

That starting cube looks like a good place to get started with our model – it could do quite well for the main tower component. Select just the cube, by right-clicking on it – the cube should be highlighted in orange, while the camera and lamp are dark. You can deselect things by holding down **shift** while right-clicking, and (de)select everything by pressing **a**. However, we want to make it taller. To do this we need to stretch it a bit, and there's a lot of ways to do that – we'll look at 3.

#### 3.1.1 Mouse-based Manipulation

The first approach is to use the mouse and the co-ordinate axes attached to the cube. There are three axes – the X-axis is red, the Y-axis green, and Z is blue. If you click on one of those arrows and drag it the cube will move along that axis. You can change this behaviour in a panel at the bottom of the screen that looks like this:



There are three options here:

- The arrow is translation – moving the object around.
- The curve is rotation – spinning the cube in place.
- The line with a box at the end is scaling – the one we want.

Switch to scaling and stretch the cube vertically a bit. If you get in a bad place, then **control-z** will undo your changes.

### 3.1.2 Keyboard Manipulation

An alternative is to use shortcut keys. Just about every key in Blender is a shortcut, so be prepared for unexpected weirdness if you are mashing the keyboard while using it!

The shortcut for scaling is **s** – press it while the cube is selected then you can make the whole block bigger or smaller by moving the mouse. Click the left button to fix the scale where you’ve put it (or press **return** or **enter**). Press **esc** to cancel the operation if it’s going a bit wrong.

Often we want to scale just in one direction, like we could with the mouse-based approach. To do that press **s** then the axis you want to scale along (**x**, **y**, or **z**). Then move the mouse as before.

Finally we can scale by precise quantities by pressing **s**, then (optionally) an axis, then a number. So to scale by a factor of 2 along the Z axis you’d type **s z 2 enter**.

You can do the same with translation and rotation. The keyboard shortcut for translation is **g** (for ‘go to’), while rotation is **r**.

### 3.1.3 Entering Values Directly

Looking at our plan, we want the main tower to be 4 units wide, and 20 units tall. Getting this precisely with the mouse is very difficult, and deciding on the chain of things to do with the keyboard is not always easy. An alternative is just to say how big we want the object to be.

To do this we first need a new bit of the Blender interface – by pressing **n** you can bring up a pane with lots of numbers describing the currently selected object. At the top we have Location, Rotation, Scale, and Dimensions. Since we want the main tower to be  $4 \times 4 \times 20$ , we can just enter 4, 4, and 20 in the X, Y, and Z Dimensions.

We can also think about where we want the tower to be. There’s a grid displayed through the X-Y plane, and it is convenient to think about that as the ground, so we want the tower to sit on that plane. Since the tower is 20

units tall, this means it should be centred 10 units above the ground. Set the cube's location to be 0, 0, 10.

**Save your work now.** Press **control-s**, or select *Save* from the *File* menu. This is always important, and newer version of Blender are pretty stable, but do it now. Do it often. Save partial models with different names as backups. If you're wondering what to do next, press **control-s**.

## 3.2 The Clock

The second part of the tower includes the clock, but the basic shape is still roughly a cube. We could extend the main tower further up, but things will be easier to organise if we keep it separate. To do this we need to add a new cube – in the 3D View press **A** to bring up the *Add* menu, then select *Mesh* then *Cube*. Adjust the new cube so that it is  $4 \times 4 \times 5$  units in size and centered 22.5 units above the ground plane.

### 3.2.1 Naming Things

If you look in the Outline View in the top right, you'll see that the objects we've got now are *Cube* and *Cube.001*. This is not very helpful, especially when you end up with *Cube.623* etc. To help manage things it is a good idea to name your objects sensibly. You can change the name of an object by double-clicking on it in the Outline View (note that a single left-click will select the object). Rename the two cubes to *MainTower* and *ClockTower*, or something similarly descriptive.

## 3.3 The Roof

The roof is roughly a pyramid, but we can get there from a cube. Basically the idea is that we start with a cube, put in a few divisions for the middle tier of the roof, and then collapse the top corners together to make a point. We want to start with another cube the same size as the *ClockTower*. We could add a new cube, as before, but it is easier just to make a copy. Select the *ClockTower* cube and press **D**. Rename the new cube to *Roof* and position it above the *ClockTower*.

### 3.3.1 Edit Mode

Next, let's get this cube looking less square at the top. To do this we need to switch mode in Blender – so far we have been in *Object Mode*, since we've been dealing with whole objects, but we need to change to *Edit Mode*. First select the *Roof*, then either choose 'Edit Mode' from the menu at the bottom of the 3D View, or press **tab**. We now have a view of the object which shows the edges and corners (vertices) and can select or deselect individual vertices.

Right-click on one of the top vertices then hold down **shift** and right-click on the other 3. In the *Tools* tab on the left open the *Merge* drop-down and choose *At Center*. You can also open this menu in the editor by pressing **alt-m**.

Go back to *Object Mode* by choosing it from the menu or pressing *tab*  
**Save your work now.**

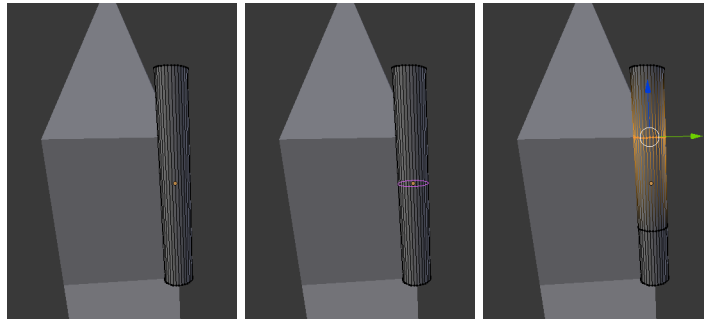
### 3.4 The Turrets

Next we have the four small turrets. We'll start with making one, then copy it to make four identical ones. The nearest primitive object to the turrets is a cylinder, which you can add in the same way as a cube. Make a cylinder called *Turret* that is 7 units high, and 1 unit wide and deep. Place it so that it is centred at 2, 2, 23.5.

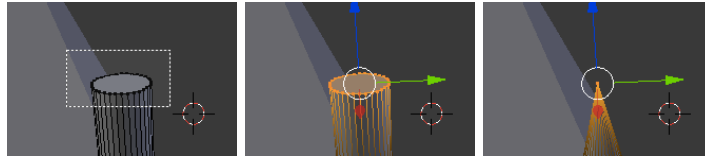
Now we need to make it pointed at the top and bottom, so go into edit mode. Notice that the cylinder only has vertices around the top and bottom faces, so if we merge those at the centre we'll end up with the cylinder vanishing to a line. First we have to add some more vertices to divide the cylinder up. There's a useful tool for this in the panel on the left, called *Loop Cut and Slide*. Select that then move the mouse over the *Turret*. You should see a magenta circle around the middle of the turret. Left click and you can start to slide that circle up and down the cylinder.

Watch the numbers in the top of the numeric panel to the left as you move up and down – the Z value should change from  $-1$  at the bottom of the cylinder to  $+1$  at the top. These are *local* co-ordinates, which are measured relative to the cylinder. You can switch these to *global* co-ordinates, which are measured relative to the world. When you've got the new points where you want them you can lock them down by left-clicking. You can then update their positions using the global or local co-ordinates.

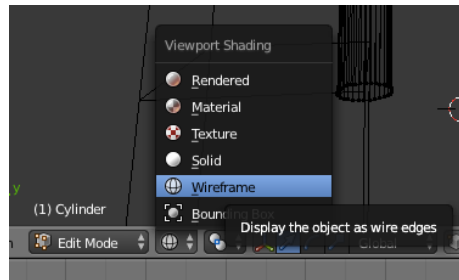
Put two new rings of points around the cylinder, one two units up from the base ( $Z = 22$  in global co-ordinates, or about  $-0.43$  local), and one two units down from the top ( $Z = 25$  global or  $+0.43$  local).



Now that we have a bit more structure, we can merge the top and bottom rings of vertices together. Instead of selecting each one individually, you can select by drawing a box on the screen. Get into a view where you can see the top or bottom of the cylinder clearly, press *b*, then left-click and drag to draw a box around the points with the mouse. Go ahead and merge the top and bottom vertices together to create a spindle shape with points at each end. Then go back to object mode.



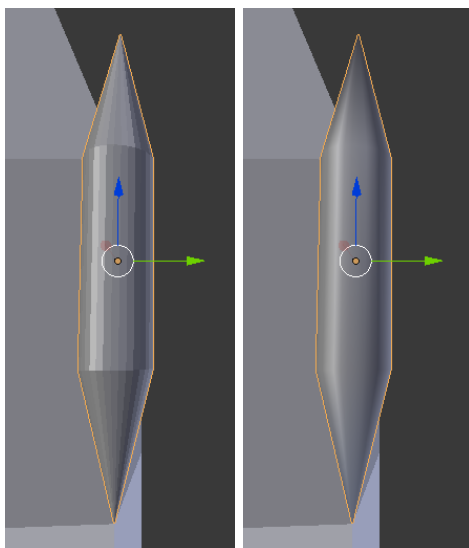
Note that some of the vertices at the bottom of the turret are inside the main tower, which can make them hard to select. There are a few ways to get around this. One is to move the turret aside while we work on it, another is to use layers, which we'll get to later. For now we can see all the vertices by changing from the solid view we have now to a wireframe view. To do this, open the menu just to the right of the Edit/Object mode menu at the bottom of the 3D view. There are a lot of different view types here, but just select *Wireframe* for now.



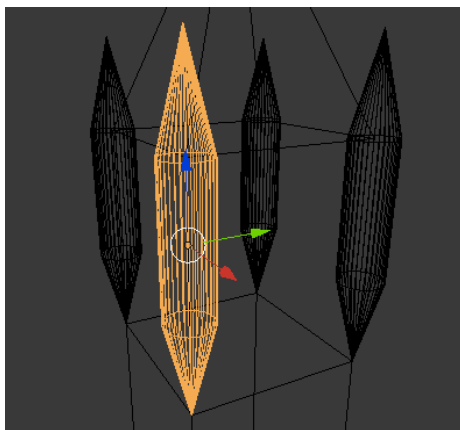
**Save your work now.** I'm not going to keep adding this, but hopefully you've got the message...

### 3.4.1 Smooth Shading

The turret's shape should look OK, but if you go back to the *Solid* view and look closely you'll notice that you can see that the cylinder is made up of narrow strips. You can reduce this problem by having Blender smooth out the shading across the faces. Simply select the object then choose *Smooth* under *Shading* in the panel on the left.



Now that we have one good-looking turret, we can duplicate it with D, and make four copies, placing them around the top of the tower.



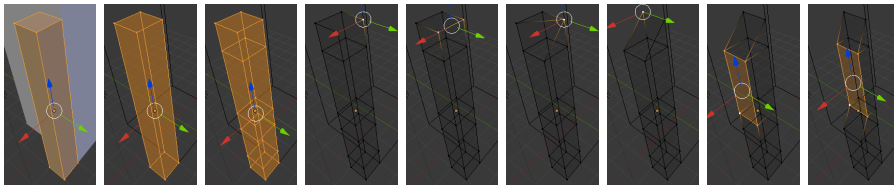
### 3.5 The Buttresses

The tower's base is supported by 8 buttresses. As with the turrets we'll make one then duplicate it. Follow these steps to make a buttress:

1. Add a new cube and call it *Buttress*.
2. Make it 8 units high and 1 unit wide and deep.
3. Place it at 2.5, 1.5, 4.
4. Go into edit mode.



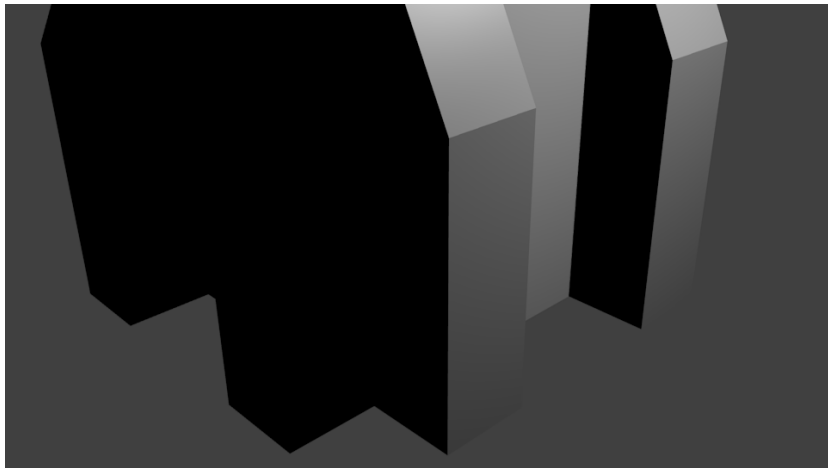
5. Add loop cuts at heights of 1, 3, 4, and 7 units in global co-ordinates (-0.75, -0.25, 0, and 0.75 local).
6. Select the vertex at the top of the buttress that is against the edge of the tower.
7. Hold down **shift** and select the vertex that is connected to the first, but not against the tower.
8. Merge these vertices, but choose *At First* rather than *At Center*.
9. Repeat this for the other pair of vertices on the top of the buttress.
10. Select the next four vertices down the face at the front of the buttress.
11. Change their X value from 3.0 to 2.5 (global) or 1.0 to 0.0 (local).



Leave edit mode and make 7 additional copies of this buttress around the building. You will need to rotate them around the Z-axis to get them to line up. You can do this numerically, with the mouse, or with keys as described for scaling at the start of this tutorial.

## 4 Setting the Scene

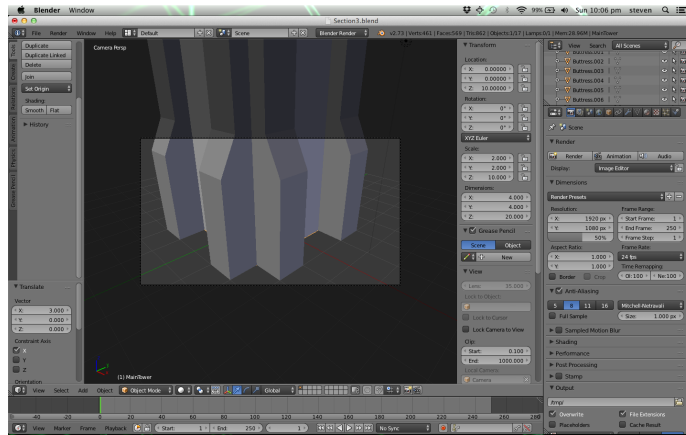
Now that we've made a good start on the tower, we can render a scene. Select *Render Image* from the *Render* menu, or press **F12**. The image you see should look something like this:



## 4.1 Placing the Camera

This is a picture of the tower, but there are a few problems. The big one is that we're looking at it from the wrong place and wrong angle. Press `esc` and make sure you are in object mode. Select the camera, either by clicking on its wire-frame in the 3D view, or choosing it from the outline view. If you can't find the camera, select on *Camera* in the outline view then press `.` on the number pad. This will centre your view on the selected object.

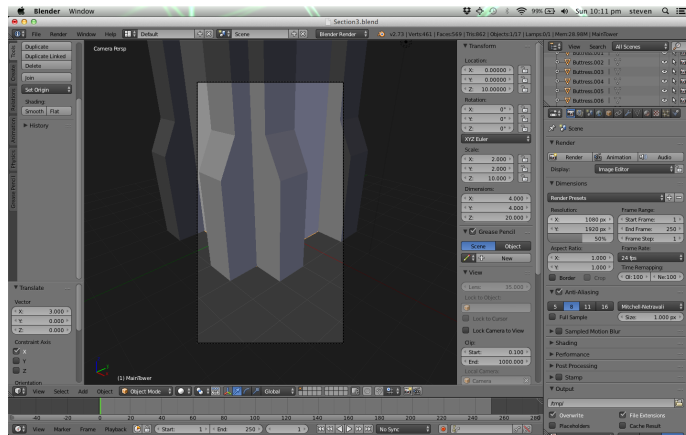
For now we want to see what the camera sees. We can do this by pressing `0` on the numeric key pad, or selecting *Camera* from the *View* menu at the bottom of the screen. Your 3D view should show a box which is the camera's view, and everything outside the box is darker.



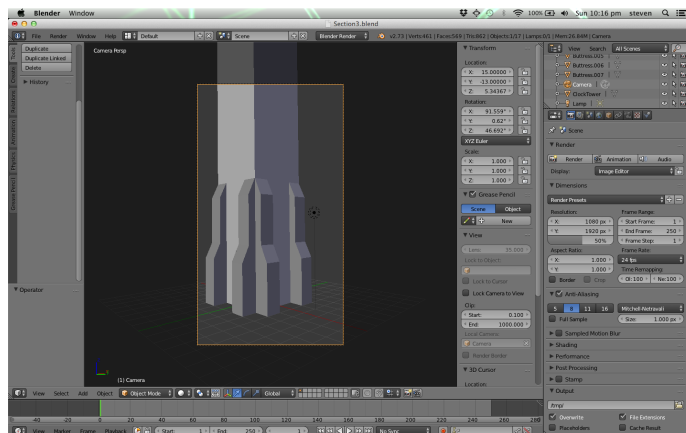
Now we can change the camera position and properties, and see what effect this has on the view of the camera. Firstly, we want to make a picture of a tall building, so a wide landscape view is not the best. We can either rotate the camera around, or just change the shape of the picture. The second option is easier since it makes the 3D rotations a bit simpler to manage later on. In the *Properties Panel* on the right there are a lot of different panels that can be brought up by clicking on these icons:



By default the *Scene Properties* (the camera icon) are selected, but if not, click on the camera icon. In the *Dimensions* property group there is a *Resolution* which by default is  $1080 \times 1920$ . Edit these numbers so that they are  $1920 \times 1080$ . The camera's view should now be taller than it is wide.

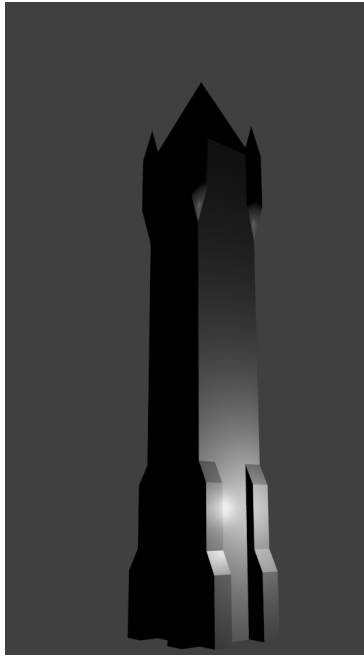


We are too close to the tower to see it all, so we need to move the camera back. The *Location* of the camera in the numeric properties is roughly 7.48, -6.51, 5.34. Let's step back twice as far in *X* and *Y*, changing the *X* location to 15 and the *Y* location to -13.



This looks more promising, but we need to rotate the camera so that it looks up. 3D rotations are tricky – we'll talk about them in lectures fairly soon – but for now we can do a bit of trial and error. Try changing the *X*, *Y*, and *Z* angles a little bit and see how the camera view changes. Increasing *X* seems to help, so do that until the base of the tower is near the bottom of the camera's view.

We still can't see the whole tower, so move back further and experiment with the camera's position and orientation until you're happy with the view. If you get stuck, then putting the camera at 27.5, -24, 5 with rotation angles of 105, 0, and 50 is not terrible. Rendering an image will now produce something like this:



Have you saved your work recently?

## 4.2 Lighting

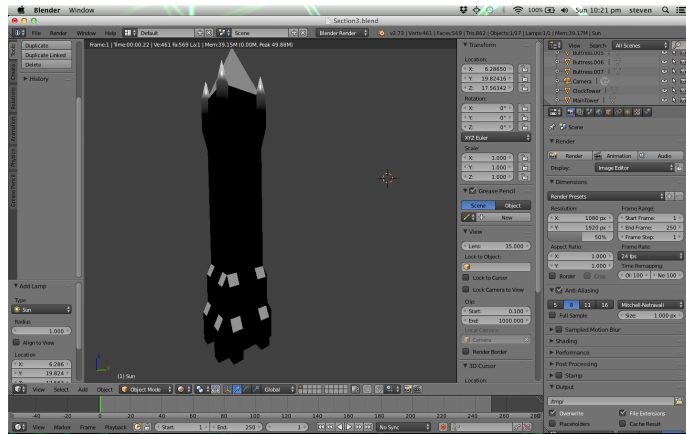
We've now got a good view of the tower, but the lighting isn't really showing it off. Lighting is a big topic from both a technical and artistic perspective, and we'll discuss it more later in the course. For now we'll start by removing the existing light – select it in either the outline or 3D view, and press **x** in the 3D view to delete it.

### 4.2.1 Turn on the Sun

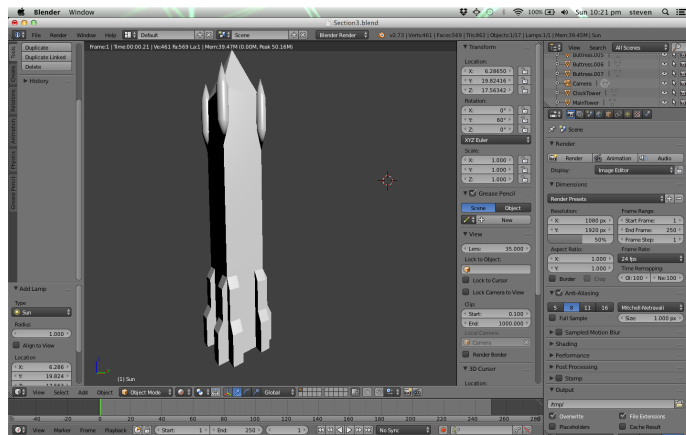
We'll now add a new light. Press **A** and open the *Lamp* sub-menu. There are five options here – Point, Spot, Sun, Hemi, and Area. The light we just deleted was a Point light source, these are like a bare light bulb in a room and cast light in all directions that dies off with distance. A Spot light source is like a point light source, but it casts light in only some directions. A Sun provides constant light from one direction, which is a good approximation to a very distant, very bright light source (like the Sun). A Hemi is like a Sun, but only illuminates in front of the light's position, and an Area light source simulates a glowing surface.

Add a Sun to the scene – since it is a directional light source, it doesn't really matter where you put it. What matters is what direction it is facing, which is indicated by the dashed line extending from the light source. You can see the effects of this direction by having Blender render the scene as you change it.

We've already seen *Solid* and *Wireframe* views, but now we want to change to *Rendered*. This doesn't display the light or camera, but does show the objects more-or-less as they'll be drawn (it's a quick preview, so not always accurate). If the new Sun is not selected, switch back to *Solid* view to select it before changing to *Rendered*. The rendered view can be slow, but is useful for checking lighting and textures. With the default light angle being straight down the model looks something like this:



If we rotate the light by 60 degrees in Y we get a better effect:

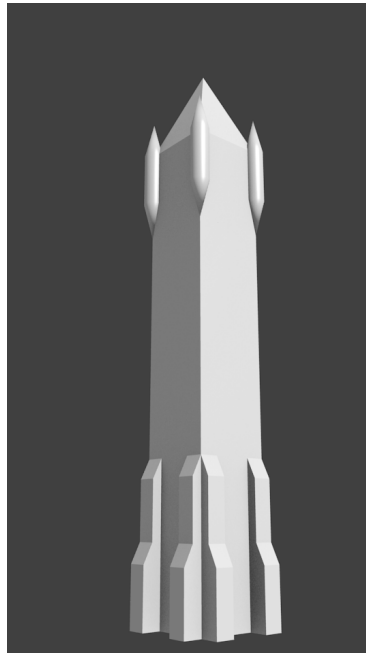


## 4.2.2 Ambient Light

With just a single Sun light source, the shadowed side of the tower is completely black. For an object floating in space this is fairly accurate, but the scattering of light off other objects and through the atmosphere means that this is not what usually happens on Earth. We could add more light sources, or some other objects and do complex computations, but an easier way is to approximate this

by some sort of overall base lighting, which is commonly called *ambient* light or, in Blender, *environment lighting*.

In the Properties panel select the fourth icon across, which looks like a little globe. This brings up the *World* properties. Turn on *Environment Lighting*, and set its Energy to about 0.3. If you render the image now it should look like this:

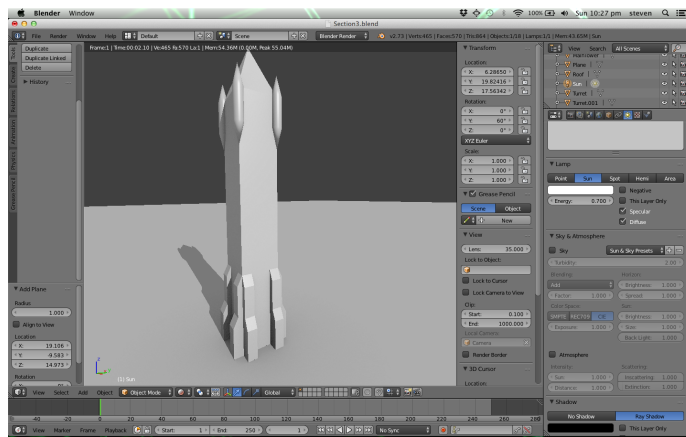


### 4.3 Background

The tower is looking OK now, but it is floating in space, which is a bit weird. A simple background would just be some flat ground for the tower to sit on. Add a new *Plane*, call it *Ground*, place it at 0,0,0, and resize it so that it is very big (say 1000 units on a side).



This looks better, but shouldn't the tower be casting a shadow? Select the *Sun* light source, and go into the *Data* properties panel, which for this object has a little sun-shaped icon. Down the bottom there is a panel called *Shadow* which is currently set to *No Shadow*. Changing this to *Ray Shadow* will give us the shadows you'd expect. While we're here, change the sun's Energy to 0.7 so that the sum of the sunlight (0.7) and ambient light (0.3) is 1.

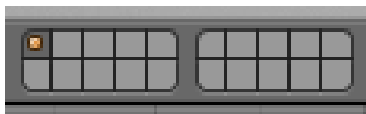


## 5 Managing the Scene

We are going to start adding some more detail to the model, but first it's worth thinking about how we can organise things. Even with this simple model we have 17 objects, a light, and a camera. These start to get in the way of each other – working on the main tower might be easier if the buttresses weren't there for example.

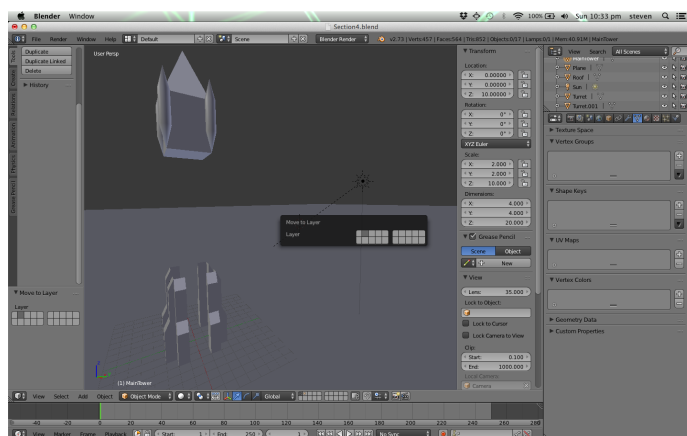
## 5.1 Working with Layers

Part of Blender's solution to this is to use *layers* which can be displayed or hidden as needed. These are shown at the bottom of the 3D View with the layers with objects in them having a little orange dot, and active layers shaded a bit darker.



What constitutes a layer depends a lot on the scene. In a model of a city, the clock tower might be a layer, or all of the buildings perhaps. Since we're just modelling a single building, however, we can afford to use a finer division. The original plan for the clock tower identified 5 main components – the main tower, the clock, the roof, the turrets, and the buttresses. Lets make each of those a layer, and keep an extra one for general scene stuff like the camera, lights, etc.

We'll start with the main tower. Select the MainTower object in the 3D view, press **m**, and then select the layer you want to move it to. Move it to the second layer, and it vanishes. You should now be able to switch between the layers, or to turn multiple layers on or off by holding down **shift** while clicking on them.



Move the other main components to their own layers. As a shortcut you can press a number after **m**, with 1 being the first layer, 2 the second, and so forth.

## 5.2 Parents and Children

The other sort of organisation that would be useful is treating objects as a group. For example, suppose we wanted to make the buttresses a bit taller. We'd have to edit 8 individual objects to do so.

We can start by linking the objects together in the tree provided by the Outliner. This is a form of a *scene graph*, which we'll come back to later in the



course. Grab the mesh icon (the orange triangle) beside *Turret.001*, and drag it over *Turret*. A message saying ‘Drop to set parent’ should show up, so let it go. If you open up the *Turret* object by clicking on the small + to its right you can see that *Turret.001* is now a child of it in the tree. Repeat this for the other two turrets.



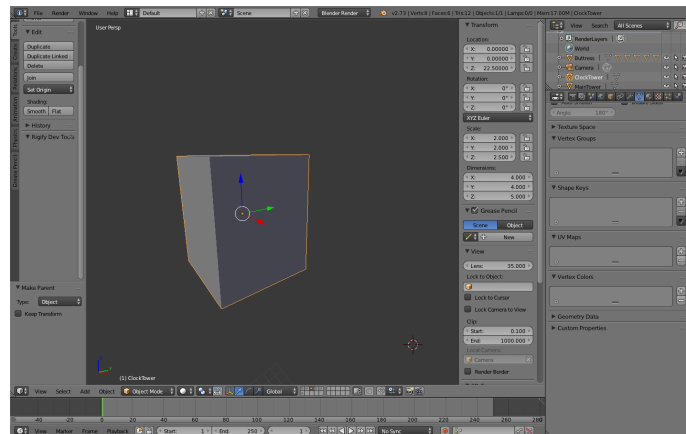
Another way to make these parent relations is with the keyboard. In the 3D view select the object you want to be the child and then the parent (order is important here). Press **control-p** and select *Object* from the pop-up menu.

Now try moving *Turret* – all the others should move with it (be sure to put it back by pressing **esc** before you finish the move or **control-z** afterwards). Note that you can still move the other turrets independently, if you want to change their location relative to the base object.

Make all the other buttresses children of *Buttress*. Your scene should now have a small number of top-level objects, most of which correspond to layers.

### 5.3 A Little More Detail

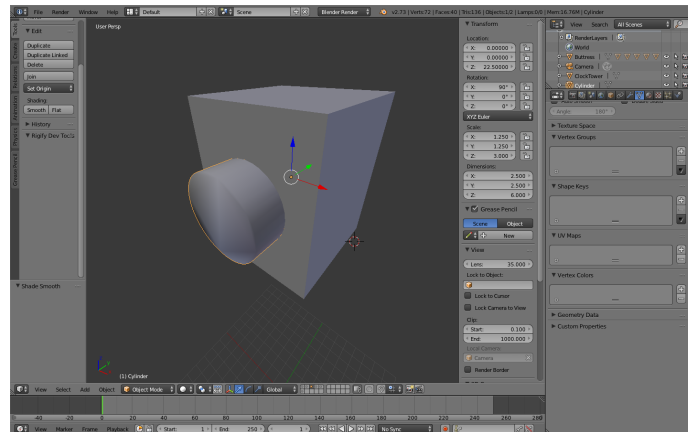
Now that we have some more structure, lets add just a bit more detail to the scene. Select just the layer with the *ClockTower* object in it.



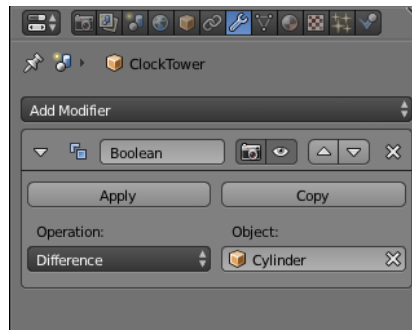
This doesn't look much like a clock – there's no clock face to start with. A clock face is a circle, but we want the face to be set in to the tower a little. We'll start by removing some cylindrical holes through the cube that's already there, then add the clock faces.

We want to cut a cylinder out from the cube, so first make a cylinder. You want this to be 2.5 units wide and deep, and more than 4 units tall so that it

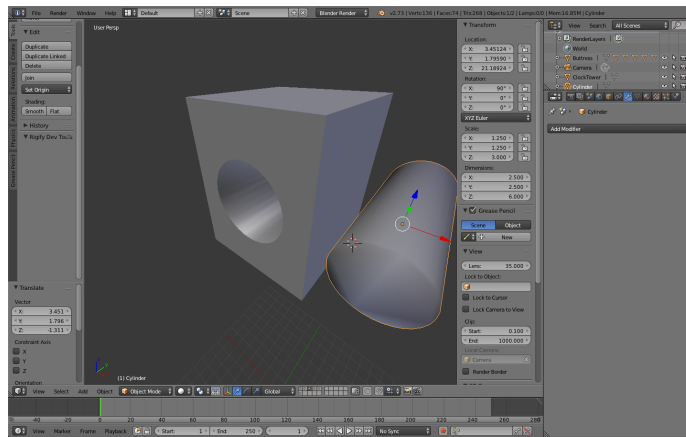
is longer than the cube is thick. Rotate the cylinder by 90 degrees about the X axis, give it smooth shading, and place it so that it is centred in the same location as the *ClockTower* object. This object will get a generic name like *Cylinder* – we’re not going to keep it around for long so this is OK, but you might want to call it something more meaningful to get into the habit.



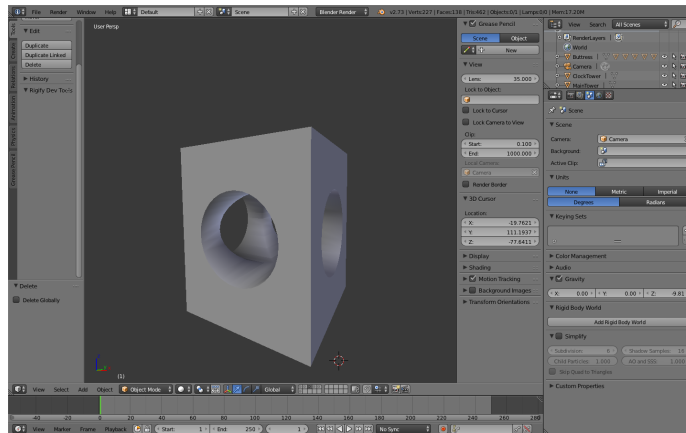
Now we want to do something new – subtract the cylinder from the cube. Select the *ClockTower* cube and open the Modifiers Properties panel, which is the one with the spanner option. Choose *Add Modifier* and select *Boolean*, which is near the top of the *Generate* column. Select *Difference* from the *Operation* drop-down, and in *Object* select the cylinder you just made. Click on *Apply*.



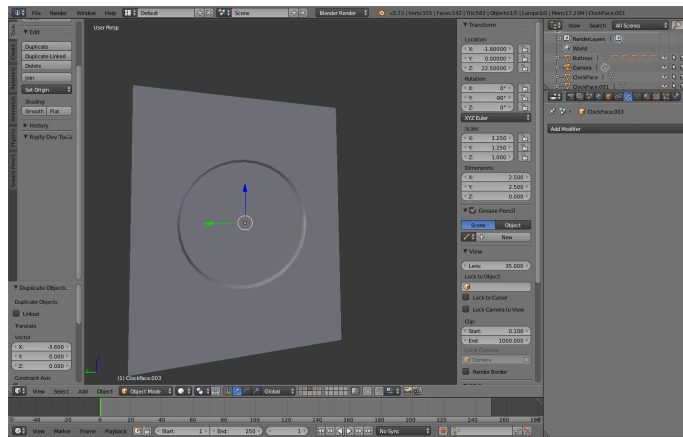
Nothing seems to have happened? Try moving the cylinder away from the *ClockTower* – there’s a hole through the middle of it now.



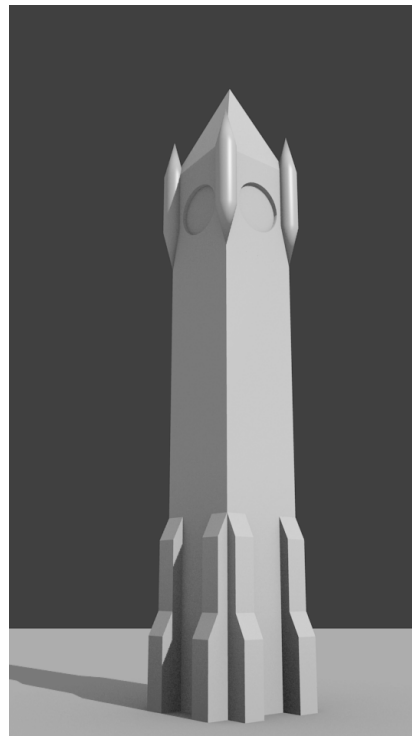
Change the rotation of the cylinder to be 90 degrees around the Y axis (rather than X), and cut another hole through the *ClockTower* at right angles to the first. You can now delete the cylinder, since we're done with it.



Now we can add clock faces to the model. You could do this with cylinders, but since the clock faces won't have any depth we'll use a flat circle. Press **A** and add a *Circle* from the *Mesh* menu, resize it to have a diameter of 2.5, then call it *ClockFace*. The circle is just an outline, and we need to fill it with a solid face. Select the circle, go into edit mode, make sure all the vertices are selected, and press **f**. Go back to object mode, and position the circle inside one of the holes you've made, set back a little from the front.



Make three additional copies of the *ClockFace*, put them in the other holes, and then make all four *ClockFaces* children of the *ClockTower*. A rendered image should now look something like this:



## 6 Materials and Textures

Things are starting to look like a clock tower, but it's all shades of pale grey, which is not ideal. To fix this we need to add some more detail.

### 6.1 The Sky

Lets start with something that is simple to do. Go into the World properties (the globe icon in the Properties panel) and check the box beside *Blend Sky* in the *World* panel. Click on the rectangle under *Horizon Color* to bring up a colour picker and choose a fairly pale blue (not too pale though). Do the same for *Zenith Color* and set it to a lighter shade of the same blue. Note that when choosing colours, a lot of people go for very strong colours. Often more muted shades are easier on the eye. To see the effects of this you can either render an image, or change the view from *Solid* to *Rendered*.

### 6.2 Materials

To add colours to the objects in a scene we need to define some *materials*. The real clocktower is made of bluestone (the dark grey basalt) with Oamaru Stone (the white limestone decoration), its roof is copper which has formed a green patina, and we'll make the ground a nice grassy green.

Select the *MainTower* and go into the *Materials* property pane (the circle divided into quadrants). All the objects currently have a default material, which is a fairly shiny light grey. At the top of the *Materials* pane is a list of materials currently applied to the object – it is possible to have more than one, as they they interact in different ways. Currently there is just the default material, called *Material*

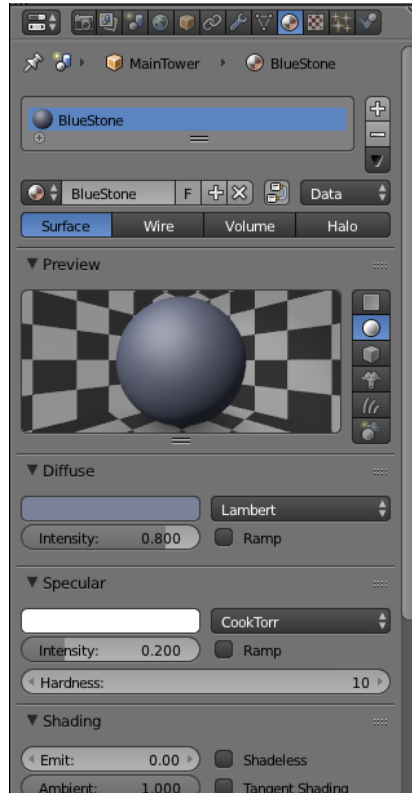
First, select the default material in the list and press the - button to the right of it. This will remove the default material. Now click on *New* to add a new material and call it *Bluestone*. Below the material list is a preview of the material so you can see what it might look like. If you change the 3D view shading model (to the right of the object/edit mode menu) to *Material* or *Rendered* you can see the effects in the scene as well.

#### 6.2.1 Your First Material

First we'll change the material's basic colour, which is the *Diffuse* panel. Click on the coloured rectangle to bring up a colour picker, and make it dark grey. Don't got too dark – it is easy to take colours to the extremes – and you may want to add just a faint tinge of blue.

The sphere preview shows quite a strong highlight, which makes the material seem like plastic rather than stone. This is known as a specular reflection, and you can see that in the *Specular* there are settings for *Intensity* (default of 0.5) and *Hardness* (default of 50). The intensity is how bright the reflection is, and the hardness is how sharp or blurry it is. For a stone surface we want to

reduce them both, probably not to zero but maybe 0.2 for Intensity and 10 for Hardness.



Now we have a Bluestone material we can re-use it for other elements. Select the *ClockTower*, and you will be able to add the Bluestone material to that element as well. Just select it from the drop-down below the materials list for that object.

Next we might want to apply this material to the turrets. If you select the *Turret* object, and change the material. Recall that we made the other turrets children of this one – but they have independent materials at the moment.

Select the four turrets, making sure to select the primary *Turret* last – this might be easier if you only show the turrets' layer, or use a wireframe view. Press **control-1** to link properties, and choose *Materials*

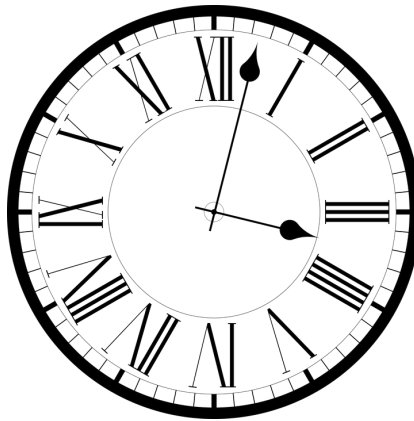
### 6.2.2 More Materials

The light coloured stone used for the trim is a type of sandstone from near Oamaru. Make a new material for this type of stone. It should have similar properties to Bluestone, but be a light cream colour. Apply this material to the buttresses.

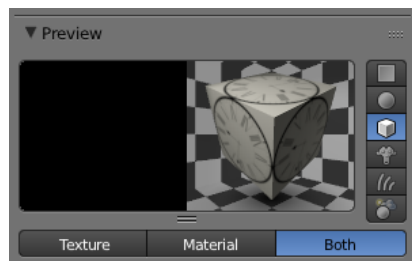
Make separate materials for the clock faces, ground plane and the roof of the tower. The clock face can look the same as, or similar to, the buttresses, but we'll be adding a texture to it soon, so it needs to be different. The roof should be a pale green, and the ground could be a grassy green or an earthy brown as you like.

### 6.3 Adding Texture

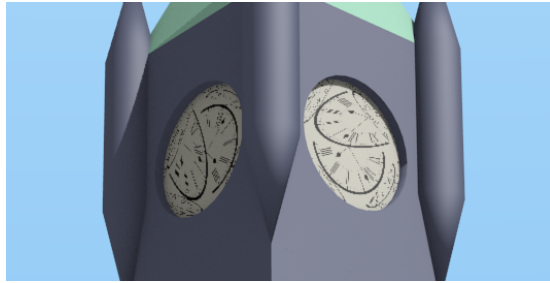
Materials provide a basic colour for an object, but often we want more detail. The clock face, for example, could do with some numbers and hands. We could model this with geometric objects, but unless we're going to get up very close then that's probably too much work. Another approach is to use an image to provide this detail. The following image can be found from <https://pixabay.com/en/clock-old-clock-antique-clock-face-1605224/>



Save this image with your `.blend` file, then select the *ClockFace* object. Go into the *Texture* properties pane, which is the checkerboard beside the material property pane. Add a new texture called *ClockFace*, change its preview to *Both*, then in the *Image* panel choose *Open* and browse to find the clock face image. If you change the preview to a cube, it should look something like this:



That looks pretty good, so let's see how it renders...



That's not great, and the problem is how the texture is wrapped around the object. There are quite a lot of options for this, but the one we need to change is to switch the *Coordinates* in the *Mapping* panel from *UV* to *Generated*. A rendered image should now look like this:

