**Objectives:**

* Reduce the number of triangles in a model
* Create a texture stamp

**Starter files:**

This lab has 3 different starter files that will provides different levels of challenge. You can start at any level you wish. However, it is a good idea to do at least a little at each level to better understand the process:

* Hardest [lab2.max](https://seneca-gam536-dps936-s20.github.io/content-s20/lab2a.max) - modelled with shape, must start by reducing triangle count without major alterations of shape
* Medium [lab2b.max](https://seneca-gam536-dps936-s20.github.io/content-s20/lab2b.max) - triangles reduced, unwrap has not yet begun. Even if you do not finish doing this part yourself, you should at least do a few pieces to familiarize yourself with the process of unwrapping
* Easiest: [lab2c.max](https://seneca-gam536-dps936-s20.github.io/content-s20/lab2c.max)- All polygons are properly stretched to avoid distortion, only need to pack the stamp
* Unwrap helper [unwraphelper.jpg](https://seneca-gam536-dps936-w20.github.io/content-w20/unwraphelper.jpg)

**Triangle reduction**

If you wish to try this, you need to start with the hardest version lab2.max - modelled with shape, must start by reducing triangle count without major alterations of shape of the model.

The amount of resources necessary to render a scene depends on how complex the scene is. One measurement of this complexity is the number of triangles used to create the objects within a scene. In this lab you are given a model of a train station. Your job is to reduce the number of triangles in that scene. This can be done by a variety of methods:

* removing hidden faces
* making objects less round (it is important that something that is round is still roundish... it shouldn't become a square or triangular prism
* remove unneeded vertices and re-create edges

During the triangle reduction process it is very important to keep the following in mind: you cannot fundmentally change the shape entirely.. for example, the lamp is tapered. You can't just make it a cylinder the taper must still exist... but it can be less round.

Reduce to the number of triangles to no more than 1000 triangles.

**Unwrapping Setup:**

You should at least learn how to do a basic unwrap setup even if you don't complete your lab starting from the medium difficulty file.

* Create One Object (do this if you are using your own model and not the starter file) If you are starting with your own model, you will need to attach the pieces of the model together. Pick a piece of the model (something that is big and centred), right click context menu and choose attach, then click on the other pieces. You can then click to attach all the other pieces.
* Convert the mesh to an editable mesh (in right click context menu).
* drag the unwraphelper.jpg file onto the model
* Apply the UVW Unwrap Modifier to your object
* Open the UV editor
* In the UV Editor, use marquee select technique to move all the pieces to left of stamp area
* change the background image (using drop down to top right) to the unwrap helper file

The UVW Unwrap modifier is a very complicated modifier. It has its own selection roll out and its own separate editor. You can open the UV editor by hitting the "Open UV Editor" button in the rollout Within the UV editor, some of the common shortcut keys like ctrl-c, ctrl-v do NOT work as you expect. You will need to pay attention to learn the details of how to use this modifier.

[video of above steps](https://youtu.be/mZnx0BqlYaw)

**Unwrap each surface**

* select by poly all the faces you wish to unwrap... to start try the top surface of the platform.
* This piece is flat so probably easiest to apply flat projection
* use the vertical scale in the uv editor to fix the stretching (every number should be in a square, not a rectangle). View in orthographic mode to be sure your camera is looking at surface at 90 degrees without depth. Look for the surface to look like a bunch of numbered squares. Check to make sure the numbers are not written backwards, if they are, flip the shape.
* once you are happy move the piece to the right of the stamp

[video of above steps](https://youtu.be/SHlb3I6yFkg)

When there is nothing remaining to left of stamp, you are done this part of the lab

In class there will be demonstrations on how to do this more easily, some tips and tricks, as well as things to watch out for.

**Pack the stamp**

You must either start with the easiest starter file or get to the same point by yourself (triangles reduced, texture properly stretched on every surface.) When you are building a model for game, you have 1 texture. That texture is just an image. In order to create this image though, you must start by creating a stamp that you can then use to create the texture. in the UV editor, pack the stamp. This is done using the following process:

* place all the pieces back inside the square area.
* objects that are the same can occupy the same space
* objects that are different must not be on top of each other.
* faces with details like writing need a lot more space than faces without even if they are smaller. For example the train platform is huge compared to a sign... but the sign will have more details and so it will need more space. However, to avoid bad pixellation, if a surface is large, you shouldn't make it too small in the stamp.