

Character assignment 5 - costume model

UW CSE490 summer 2023

Instructor: Dave Hunt

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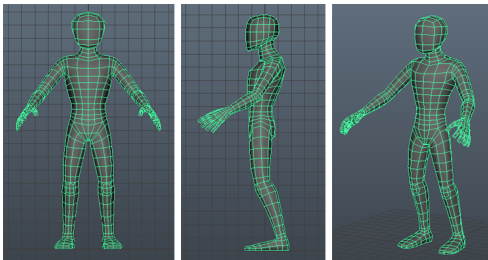
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Introduction

In this assignment we will start from the gray model we built in the previous assignment. We will continue learning more polygon modeling techniques to use for adding more detail to elaborate our character's costume. Next, we will do UV mapping for one part of the character. We will then copy skin weights from the previous gray model assignment.



Start from the skinned gray model scene from the previous assignment

Save it as a new file named
assignment_5_costume_model.ma

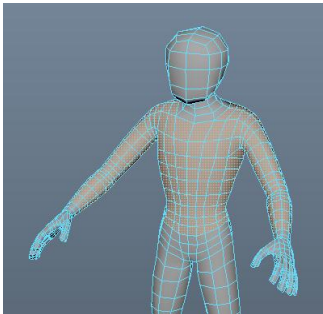
Part 1, Modeling the costume

The next steps describe general suggestions for how to model parts of a character's costume. Since every character will be slightly different you can choose to use the techniques that make the most sense for your character. Try to keep the topology clean using evenly spaced quads as much as possible.

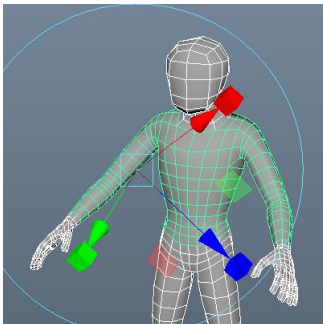
Here are concept art drawings for the example character, Sly.



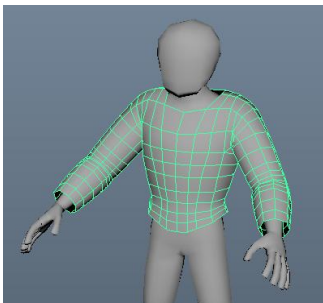
1.1 Modeling the jacket



1. Select the faces of the gray model in the jacket area



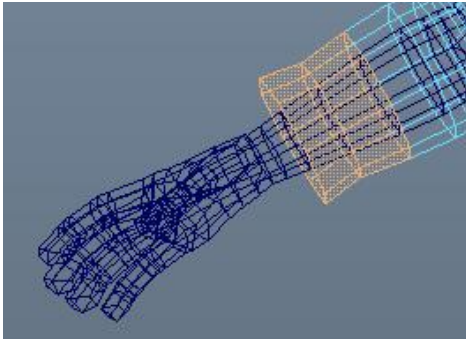
2. Duplicate faces
 - a. Access the polygon modeling menu by holding down shift and right-clicking the model
 - b. Press **Duplicate Faces**



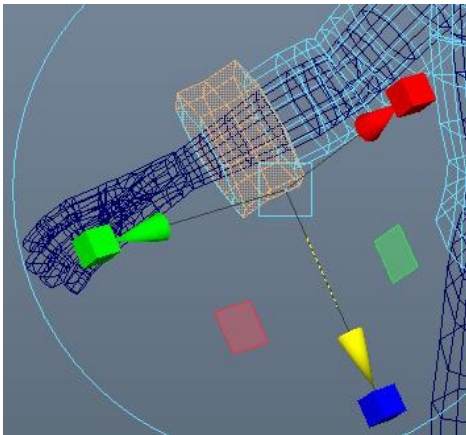
3. Extrude the faces outward on the Z axis using the blue arrow of the extrude manipulator. This will move the faces out along the direction of their normals.
4. Watch out for places where the model interpenetrates itself like the armpits. Model the vertices so they don't overlap.

(Tip: it can save time to work on only one side of the model and then mirror it to the other side when finished.)

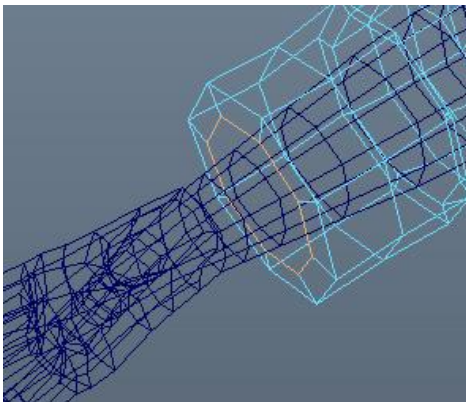
1.2 Modeling the sleeve cuffs



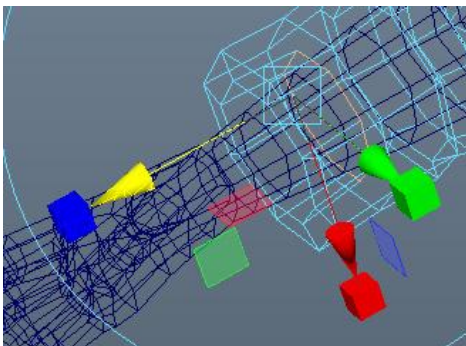
1. Select the last two rows of faces on the sleeve



2. Extrude the faces
 - a. Shift-right-click on the model, [Extrude Faces](#)
 - b. Move the faces outward on the Z axis (blue arrow)

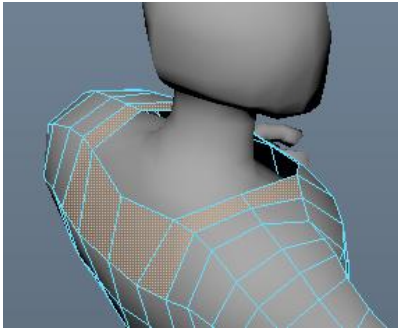


3. Model the interior of the sleeve by extruding edges
 - a. Select the edge loop at the end of the sleeve
 - b. Shift-right-click the model, [Extrude Edges](#)

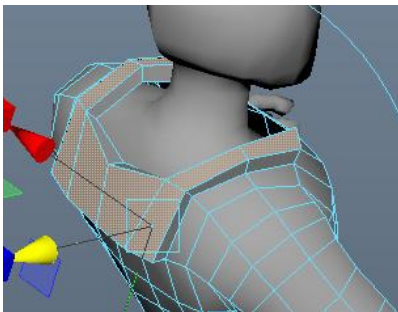


4. Move the extruded edge back along the Z axis

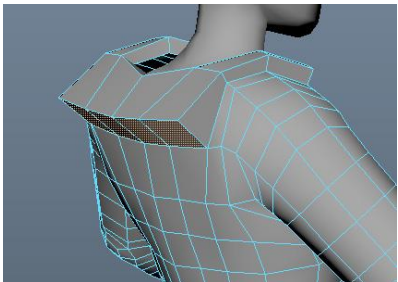
1.3 Modeling the hood



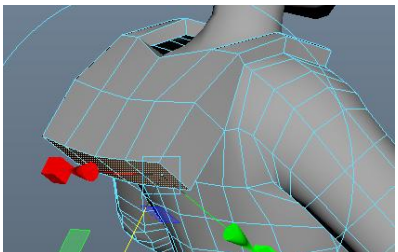
1. Select the faces around the base of the collar where the hood will be modeled



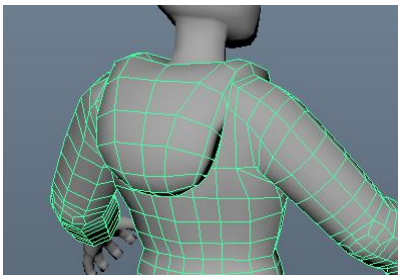
2. Extrude faces
 - a. Shift-right-click the model and [Extrude Faces](#)
 - b. Move the faces out along the Z axis



3. Model the back of the hood by extruding more faces

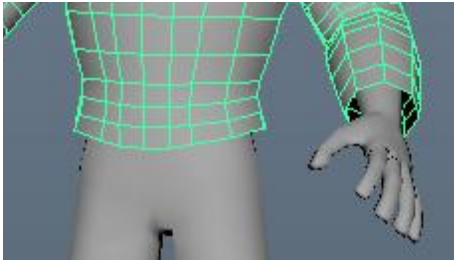


4. Move the new faces out and extrude them again

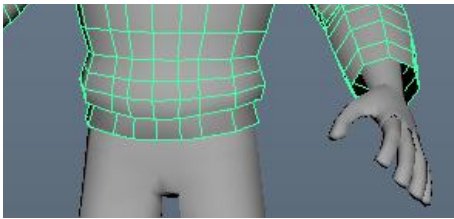


5. Model the new vertices around until the shape looks like the concept art.

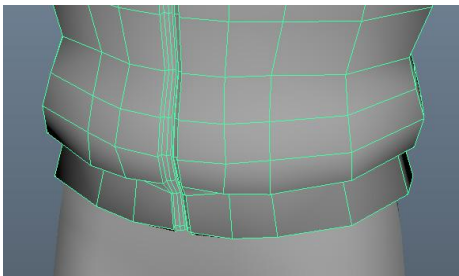
1.4 Modeling the jacket details



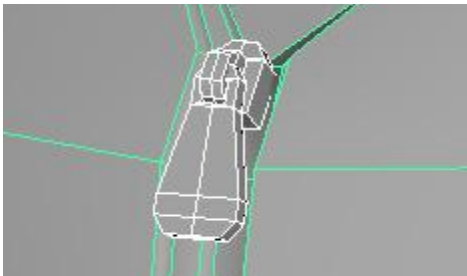
1. Model the jacket bottom by extruding edges



2. (jacket bottom finished)

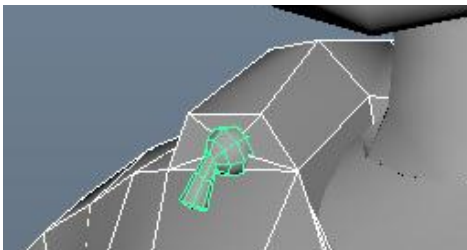


3. Model the zipper by extruding edges
 - a. You might choose to keep some of the edges hard for sharp creases.
 - b. Otherwise it is good to soften the edges with shift-right-click [Soften/Harden Edges](#) → [Soften Edge](#)



4. This zipper was modeled starting with a new polygon primitive cube
 - a. Adding edge loops
 - b. Extruding faces and edges
 - c. Moving the vertices

Separate elements like this can be combined with the jacket model



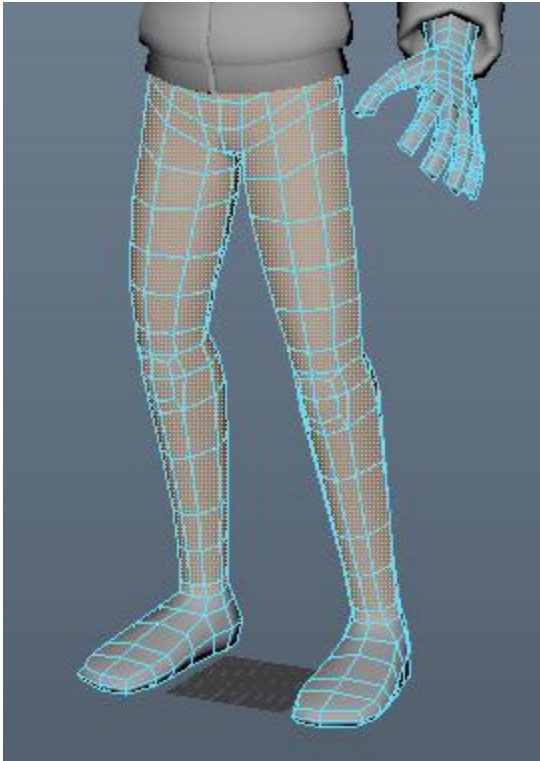
5. This hood drawstring was modeled starting with a new polygon primitive sphere
 - a. Extruding faces

When finished with symmetrical details be sure to mirror the polygon model. Delete one half, align vertices to center and shift-right-click [Mirror](#)

1.5 Modeling the pants

The pants can be modeled using similar techniques as were used to model the jacket.

1. Select faces

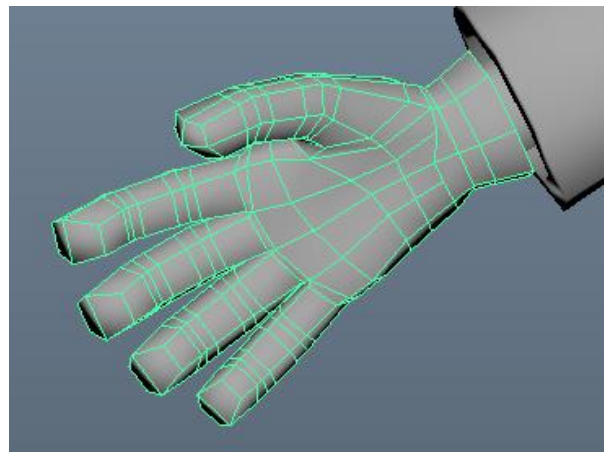
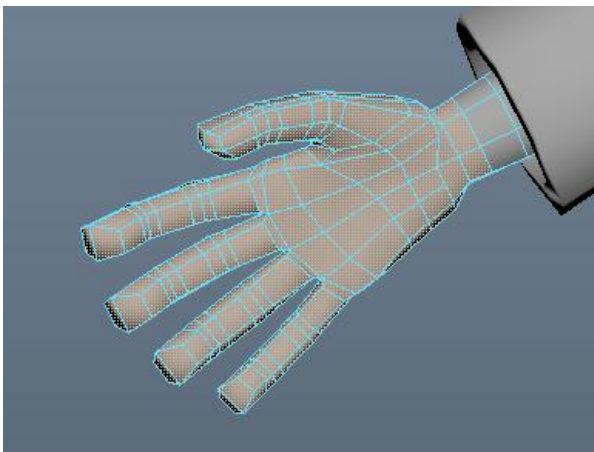


2. Duplicate faces and model vertices

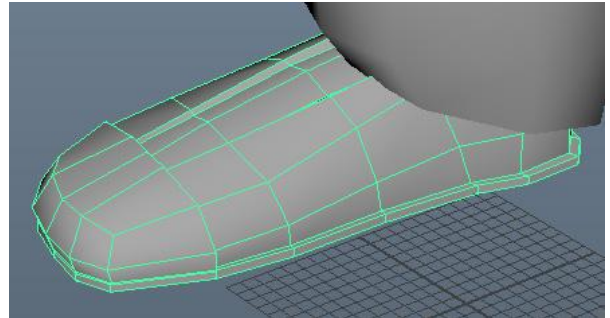
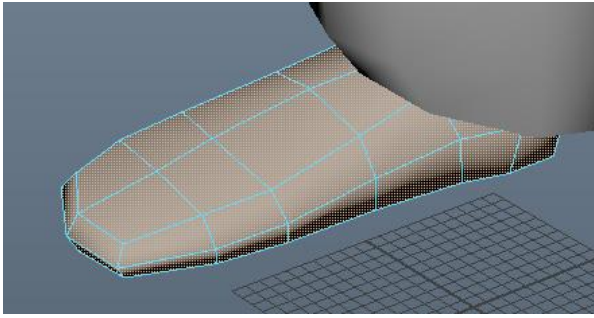


1.6 More costume examples using similar polygon modeling techniques

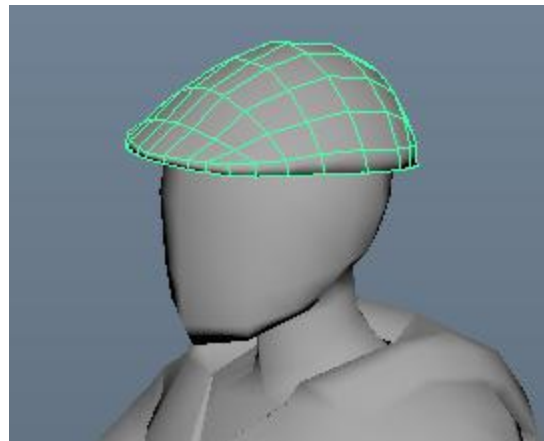
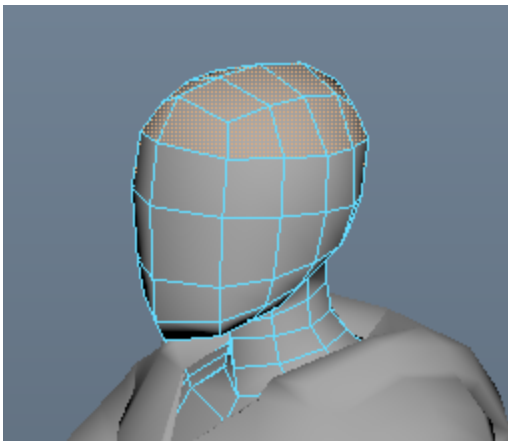
Modeling the gloves



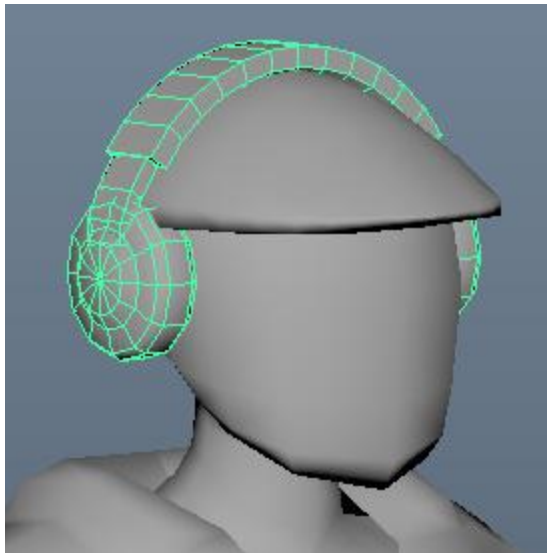
Modeling the shoes



Modeling the hat



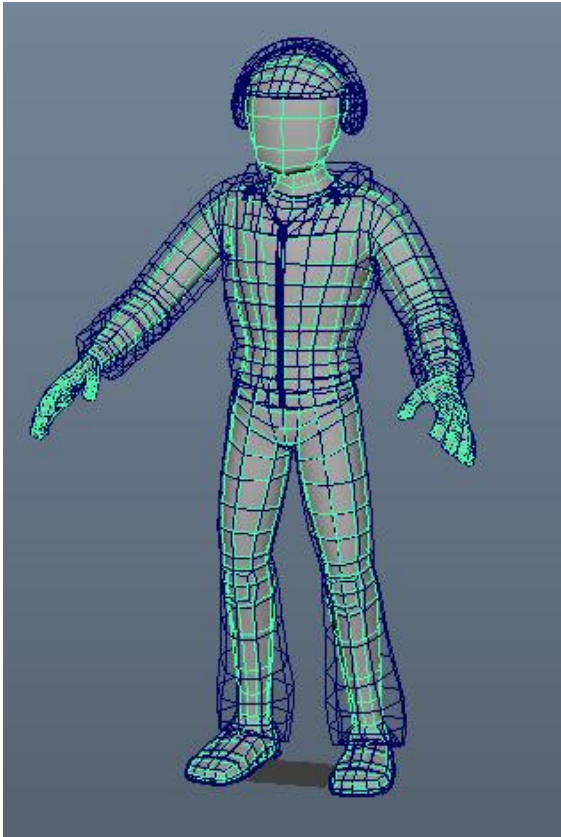
Modeling the headphones



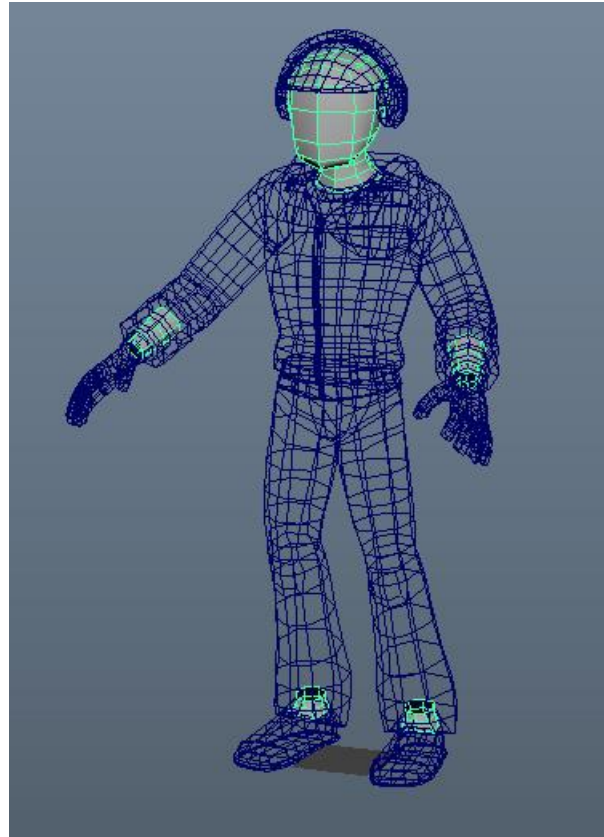
1.7 Delete interior faces

After the costume modeling is complete we need to delete any parts of the model that will not be seen. This will optimize the character model so that it will have better performance at runtime. It will also make it easier to do skin weighting if we don't have overlapping parts of the model.

Select and delete all of the faces that are covered by the costume models



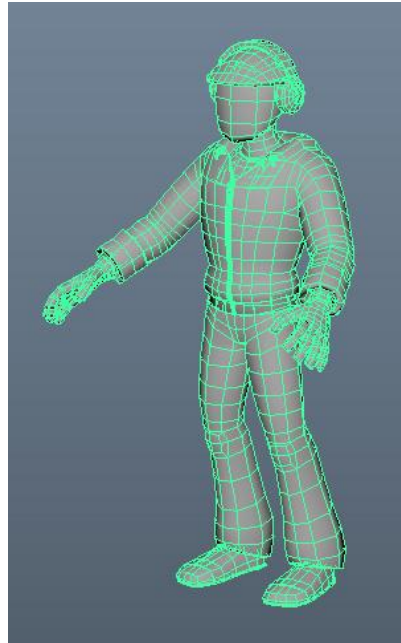
Here are the only faces of the original gray model that are not covered by the costume



End of part 1.

Remember to save your scene!

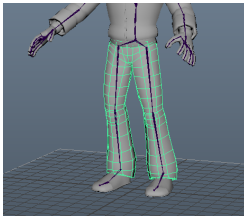
Add screenshots of your costume model to Miro to turn in with your assignment



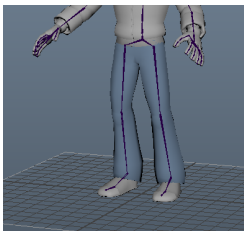
Part 2, Applying solid color materials

In the next steps we will add materials with solid colors to our costume model in order to get a basic representation of how the colors should look.

2.1 Add a new material to a mesh



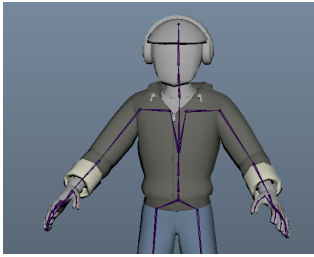
1. Select one of the meshes of your costume model. For example, the pants
2. Create a new material
 - a. Right-click the mesh and [Assign New Material...](#)
 - b. Choose [Lambert](#) in the pop-up window
 - c. Give the material a useful name like *pants_material*



3. Open the material attributes
 - a. Right-click the mesh and [Material Attributes...](#)
 - b. (sometimes you need to do this twice for it to work!)
4. Choose a color
 - a. Click the Color attribute field and select the color you want from the color picker

2.2 Add multiple materials to the same mesh (if necessary)

Sometimes it is necessary to add multiple materials to the same mesh. This can be done by applying the material to a selection of faces. This example shows the jacket and sleeve cuffs.



1. Repeat the steps above to add a new material to a mesh
2. Select faces where a new material will go (example: cuffs)
3. Right-click the selected faces and [Assign New Material...](#)
 - a. Choose [Lambert](#) in the pop-up window
 - b. Name the material
 - c. Choose a color
4. You can also assign materials from the Hypershade
 - a. [Windows](#) → [Rendering Editors](#) → [Hypershade](#)

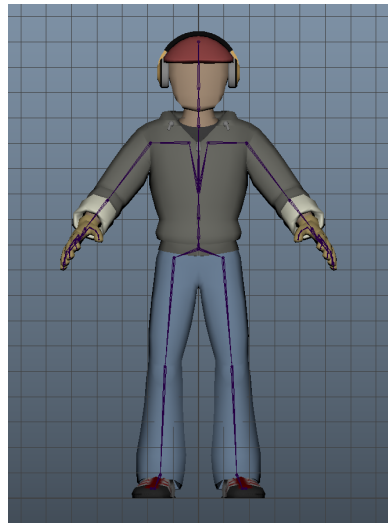
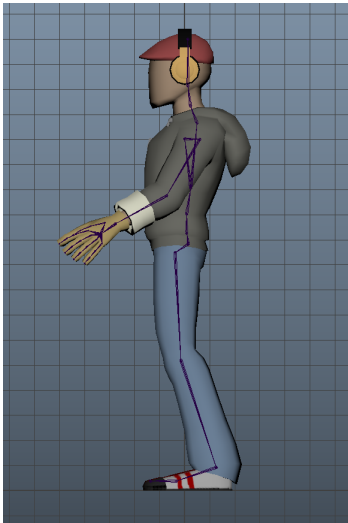
2.3 Finish adding solid color materials to the rest of your costume model

Repeat the steps above until all of the meshes on your costume model are colored.

End of part 2.

Remember to save your scene!

Add screenshots of your finished costume model to Miro to turn in with your assignment.



Part 3, UV mapping (optional)

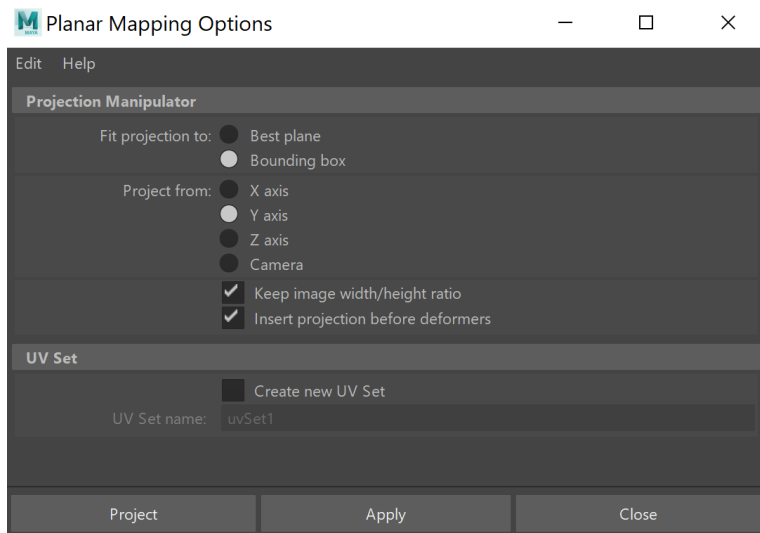
If you are feeling ambitious you are welcome to do UV mapping for one or more of the meshes in your costume model. This will enable you to apply painted texture maps following the lessons that will be taught in the world classes. This section of the assignment is not required if you would prefer to spend time on the world building assignments instead.

3.1 Assign a new material with the checker map texture

1. Download the checker-map.png texture from the world assignment 3 on Canvas
2. Assign a new material to the mesh
 - a. Right-click, [Assign New Material...](#)
 - b. Choose Lambert in the pop-up window
 - c. Name the material
3. Assign the checker texture to the color channel
 - a. In the Attribute Editor of the material click the checker button next to [Color](#)
 - b. Pick [File](#) in the pop-up window
 - c. In the [Image Name](#) field browse for the checker-map.png file
 - d. In the viewport press the “6” hotkey to show textures

3.2 Apply a planar map to your mesh

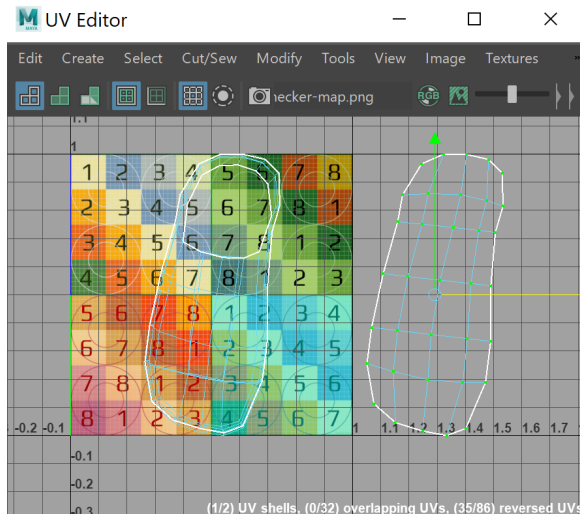
1. Pick one mesh to work with. In this example we will work with the shoe.
2. Open the UV Editor
 - a. [Windows](#) → [Modeling Editors](#) → [UV Editor](#)
3. Apply a planar map
 - a. In the UV Editor, Create → Planar (options)



- b. Use the following settings and press Apply. (depending on how your mesh is oriented you might want to use a different axis to project from)

3.3 Apply more planar maps to selected faces

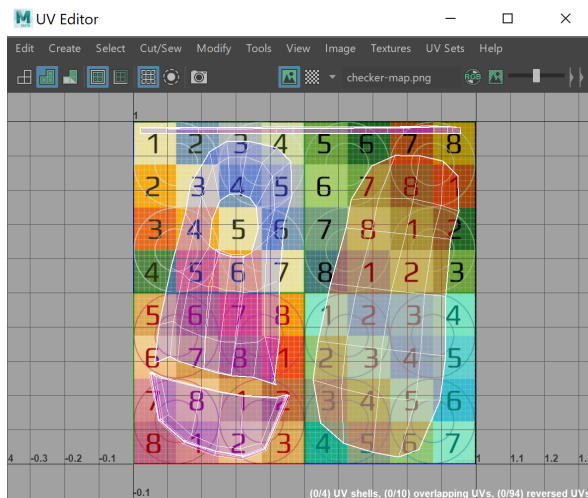
1. Select faces that are overlapping (for example, the underside of the shoes)
2. Apply planar map
3. In the UV Editor move the selected UVs so they don't overlap



4. Repeat this step until there are no more overlapping parts
5. Move and scale the UVs so that the checker map is evenly applied with no stretching

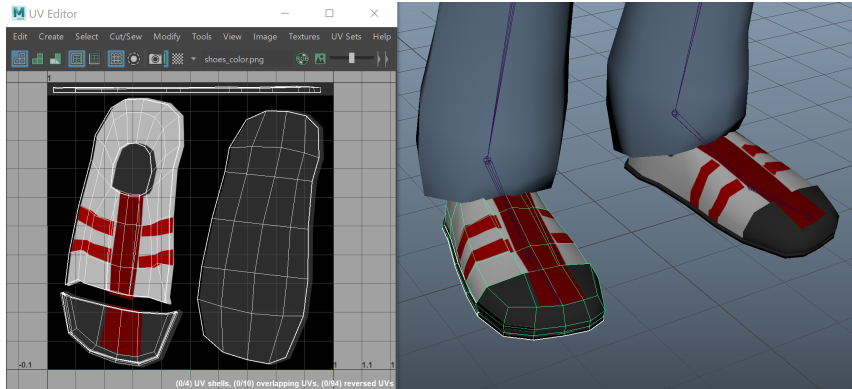
3.4 Fit the UV shells into the 1:1 square

1. Move, rotate and scale the UVs to fit within the textured area in the UV Editor within the coordinates 0 to 1



3.5 Create a UV screenshot and paint the texture

1. In the UV Editor go to **Image → UV Snapshot...**
2. Set **Size X** and **Y** to 1024
3. Set **Image Format** to PNG
4. Browse to a file location and press Apply
5. Open the resulting PNG file and paint textures in an image editor like Photoshop
6. Apply the texture to the material's color to replace the checker map



End of part 3.

Remember to save your scene!

(optional) Add screenshots of your textured meshes to Miro to turn in with your assignment.

Part 4, Copying skin weights

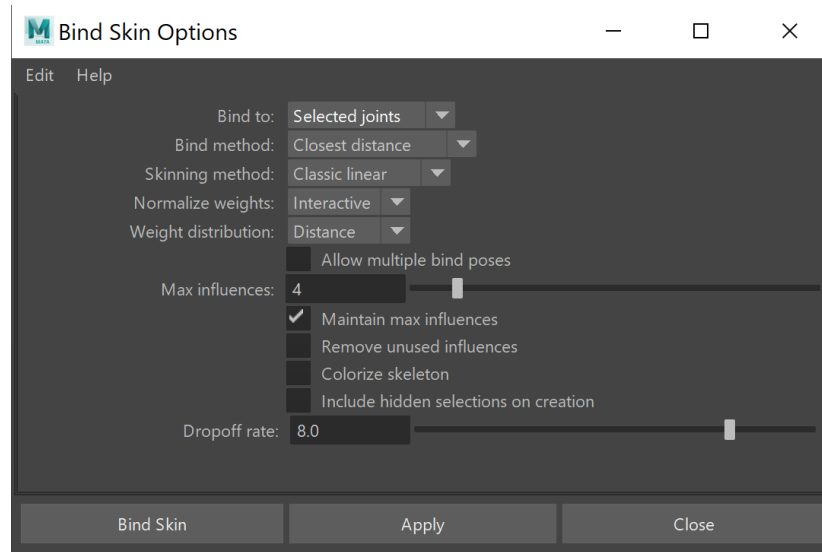
We can reuse the skin weights work we did on the gray model to get a good start on skin weights for the costume model. There might need to be some cleanup work for parts of the costume that are very different from the gray model.

4.1 Finalizing your model

1. Make sure that the skeleton still lines up with the model and move vertices if necessary
2. Combine your model into one single polygon mesh
 - a. Select all of the separate pieces
 - b. Shift-right-click the model, **Combine**
 - c. Name it "gray_model"
3. Mirror geometry
 - a. Look through the front view camera, select and delete the left side faces
 - b. Grid snap the center vertices to the center axis (hold X and move to grid snap)
 - c. Shift-right-click the model, **Mirror**
4. Delete construction history
 - a. Select the model and **Edit → Delete by Type → History**
5. Freeze transformations
 - a. Select the model and **Modify → Freeze Transformations**
6. Delete any unused nodes in the Outliner including transparency faders
7. Delete any unused display layers

4.2 Bind skin

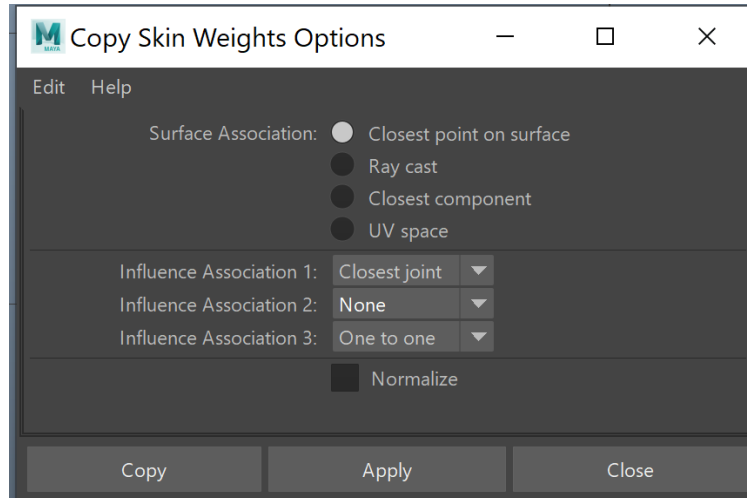
1. Prepare the gray model for skin binding
 - a. Review step 1.8 above for finalizing your model
2. Bind skin
 - a. Select the bind joints
 - i. Select *center_root_bind_joint*
 - ii. Select Hierarchy, [Edit → Select Hierarchy](#)
 - iii. Deselect the end null joints. (use ctrl-click to deselect in the Outliner)
 - b. Shift-select the model (use ctrl-click in Outliner)
 - c. On the Rigging sub-menu go to the bind skin options: [Skin → Bind Skin](#) [options]



- d. Set these options and press Apply
(After binding be careful not to do any more modeling or deleting history)

4.3 Copy skin weights

1. Import your skinned gray model from assignment 4
 - a. [File → Import...](#) (browse for the Maya file)
 - i. Be sure to use namespaces in the import options
2. Copy skin weights to your new costume model
 - a. First, select the imported gray model
 - b. Next, multi-select the new costume model
 - c. On the Rigging sub-menu go to [Skin → Copy Skin Weights](#) [options]



- d. Set these options and press Apply
3. Delete the imported gray model
 - a. Open [Windows → General Editors, Namespace Editor](#)
 - b. Select the imported namespace and press Delete (and Delete again in the pop-up dialog)

4.4 Polish skin weights

1. Check to see how well the copy skins turned out by rotating joints
2. If there are areas of the skinning that don't look good, fix them by painting skin weights.
First, set keyframes to help with painting skin weights:
 - a. Set a keyframe in the bind pose at frame 1
 - i. Set a keyframe on the selected joint with the “s” hotkey
 - b. Move forward to frame 10
 - c. Rotate the joint that causes the skinning problem and set a keyframe
3. Right-click the model and [Paint Skin Weights Tool](#)
 - a. Adjust the skin weights using the [Add](#) and [Smooth](#) brushes
 - b. Fill solid areas using the [Flood](#) tool

End of part 4.

Save your scene as *assignment_5_costume_model.ma* and turn it in with your assignment.

Grading Rubric

Criteria	Achievement levels			
	level 1	level 2	level3	level4
Costume model file format: Maya (.ma)	20 points: (0 incorrect) Maya file is named <i>assignment_5_costume_model.ma</i> file type is Maya ASCII	18 points: (1 incorrect) Maya file is named <i>assignment_5_costume_model.ma</i> file type is Maya ASCII	16 points: (2+ incorrect) Maya file is named <i>assignment_5_costume_model.ma</i> file type is Maya ASCII	0 points: files were missing
Costume model scene (same file as above)	20 points: (0 incorrect) Outliner is clean and has no extra nodes aside from the skeleton, model and reference_grp.	18 points: (1 - 2 incorrect) Outliner is clean and has no extra nodes aside from the skeleton, model and reference_grp.	16 points: (3+ incorrect) Outliner is clean and has no extra nodes aside from the skeleton, model and reference_grp.	0 points: files were missing
Costume model (same file as above)	40 points: (0 incorrect) Costume is modeled to represent the basic costume in the concept art. Solid color materials are applied. Model is combined into one mesh and skin weighted. History is deleted (except for skinning) and the transform is frozen.	38 points: (1-2 incorrect) Costume is modeled to represent the basic costume in the concept art. Solid color materials are applied. Model is combined into one mesh and skin weighted. History is deleted (except for skinning) and the transform is frozen	36 points: (3+ incorrect) Costume is modeled to represent the basic costume in the concept art. Solid color materials are applied. Model is combined into one mesh and skin weighted. History is deleted (except for skinning) and the transform is frozen	0 points: files were missing
Miro Board format: images [Miro]	20 points: (0 incorrect) Miro board has images of the costume model with solid color materials.	18 points: (1 incorrect) Miro board has images of the costume model with solid color materials.	16 points: (2+ incorrect) Miro board has images of the costume model with solid color materials.	0 points: files were missing

Character class 5 - costume model

