

Character assignment 4 - gray model pose test

UW CSE490 summer 2023

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[Introduction](#)

[Part 1. Skin weights](#)

[Part 2. Gray model pose testing](#)

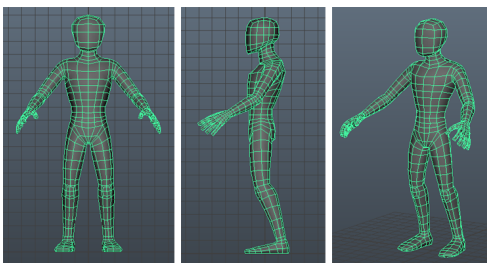
[Grading rubric](#)

Introduction

In this assignment we will start from the gray model we built in the previous assignment. We will assign skin weights to the model so that it follows the skeleton. This will be exported to Unity where we will make poses for our character in the white-box level from the world classes.

Part 1, Skin weights

This is the step in rigging where we make the model follow the skeleton using a **smooth bind**. Each vertex on our model is assigned to follow joints on the skeleton based on **skin weights** values. The vertices can have multiple joint influences and the weight values of all influences will add up to 1.0. It is important to check how the model looks when the joints are rotated so we can use the **paint skin weights** tools to preserve volume of the model and make the shape match how the concept art looks.



Start from the finished grey model scene from the previous assignment

Save it as a new file named
assignment_4_skin_weights.ma

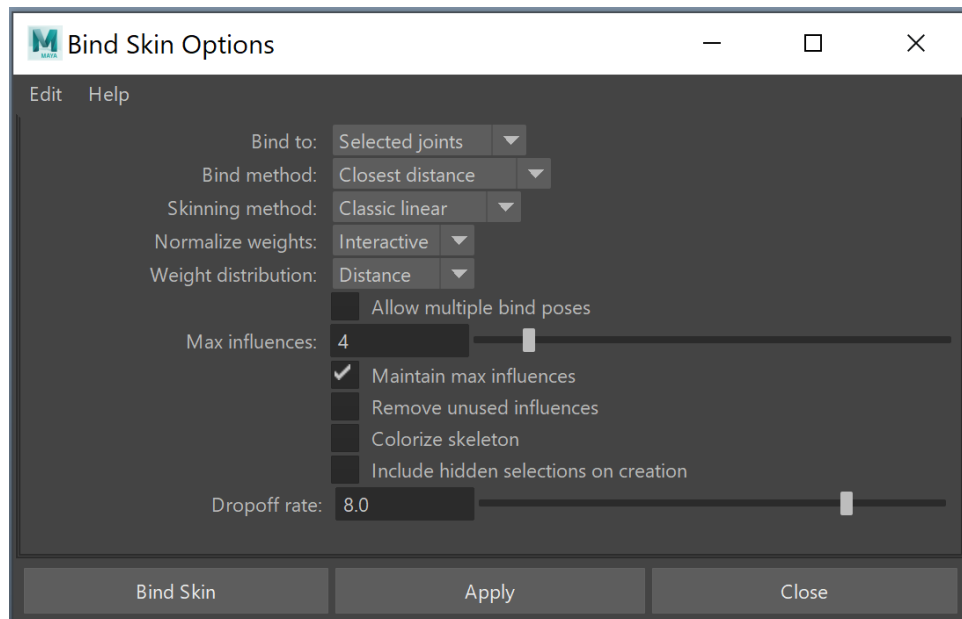
1. Prepare the model for skin binding

- Select the gray model
- Freeze Transformations, [Modify → Freeze Transformations](#)
- Delete History, [Edit → Delete by Type → History](#)

- i. After adding skin weights in the next step we will no longer be deleting history because the skin weights are history that we need to keep
- d. Make sure the Outliner is clean with no unused nodes. There should only be the model, skeleton and reference group. Delete anything else.

2. Apply smooth bind

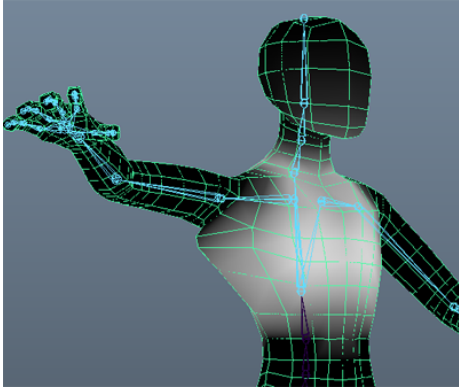
- a. Select the bind joints
 - i. select *center_root_bind_joint*
 - ii. Select all children joints, [Select → Hierarchy](#)
 - iii. Deselect the end null joints. Use ctrl-click to deselect in the Outliner
- b. Shift-select the gray model (or ctrl-select in Outliner)
- c. Go to the skin binding options: [Skin → Bind Skin](#) [options]
- d. Set these options and press **Bind Skin**



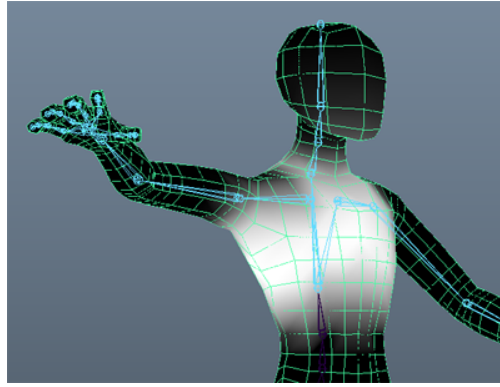
- e. Try rotating bones on the skeleton to test the skin weights. You can go back to the bind pose by selecting the mesh and clicking [Skin → Go to Bind Pose](#)
- f. Remember not to edit the model or delete history because the skin weights will be lost.

3. Paint skin weights

Start with the shoulder and then repeat this process for the other parts of the body

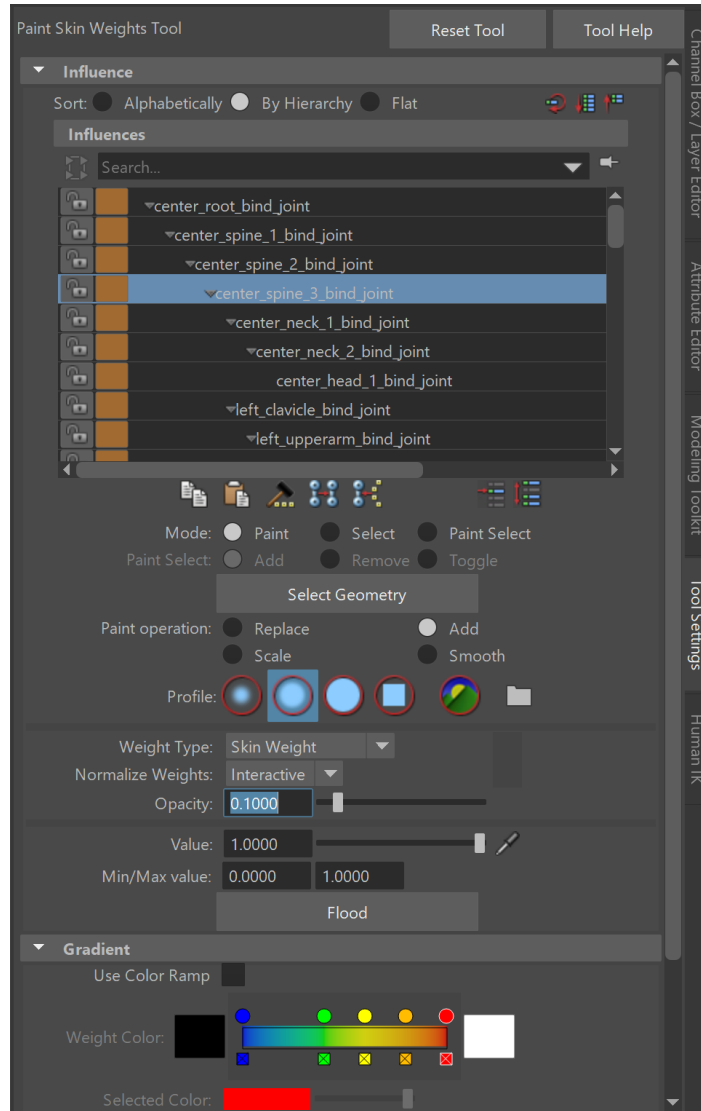


Before

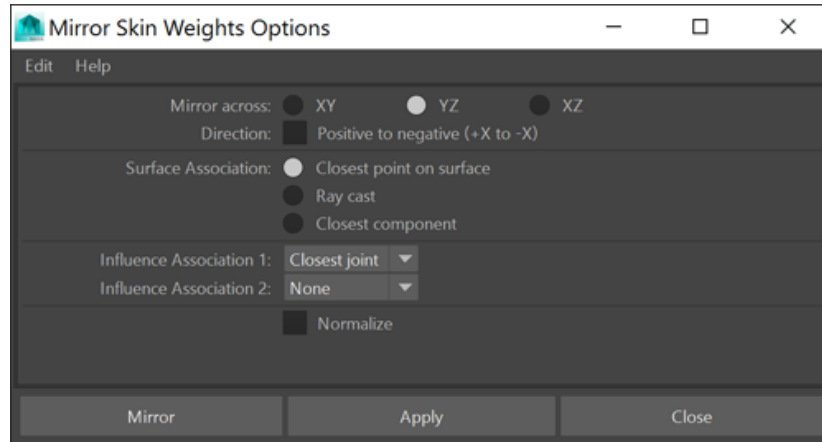


After

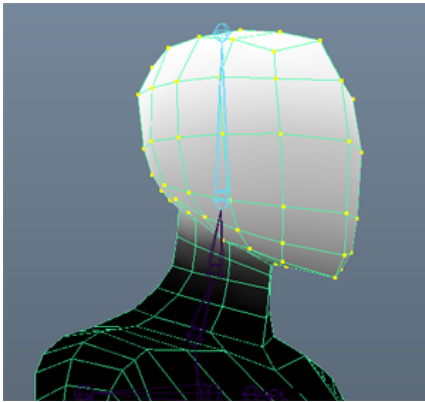
- a. Set keyframes on the shoulder joint to test the range of motion
 - i. Select *right_upperarm_bind_joint* and **set keyframe** on frame 1 by pressing the hotkey “s”.
 - ii. Set the time slider to frame 10. Rotate the shoulder up and **set keyframe**
 - iii. Optionally set more keyframes for the shoulder spaced 10 frames apart
- b. Notice the bulge on the inner chest that forms when the shoulder raises up by scrolling the time slider. Correct this undesired shape by painting skin weights
- c. Right-click on the mesh and choose [Paint Skin Weights Tool](#)
 - i. Right-click on the chest joint and choose [Select Influence](#)
 - ii. Set the following options in the Paint Skin Weights Tool Settings
 1. Paint operation = Add
 2. Opacity = 0.1
 3. Use Color Ramp = false



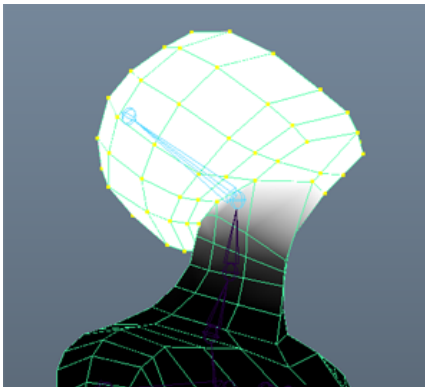
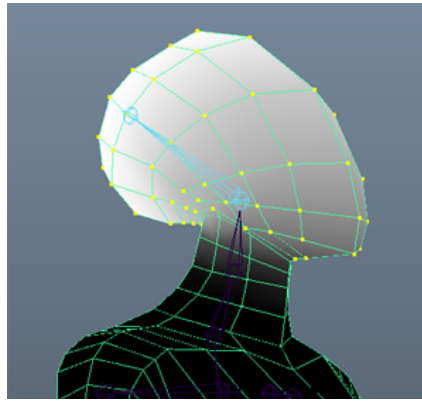
- iii. Use the brush tool to paint on the chest area.
 1. This will add influence and move the vertices closer to the chest. The vertices will become colored more white to show that the weight values have changed.
 2. Adjust the brush size by holding down “b” and dragging left and right with left mouse button
- d. When you are done with one side you can **mirror skin weights** to the other side
 - i. First, go to the bind pose. Select the model and [Skin → Go to Bind Pose](#)
 - ii. Select model, [Skin → Mirror Skin Weights](#) [options]
 - iii. Here are the options to mirror from right to left:



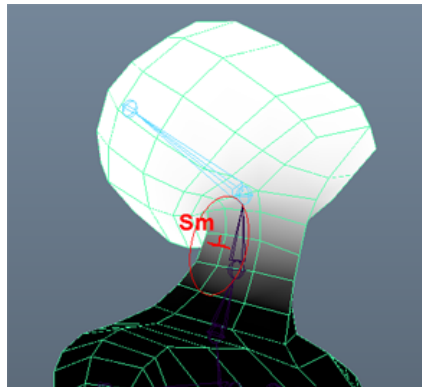
Use the **Flood** tool to fix the head skin weights



Before

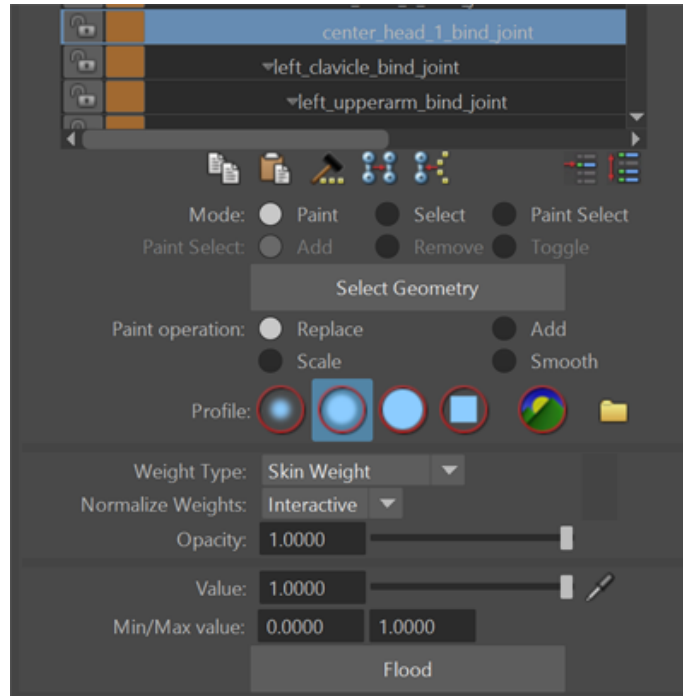


After



Smooth the neck transition

- Set keyframes on the head joint to test it's range of motion
- Select all of the head vertices. It might help to **grow selection** (shift->)
- In the Paint Skin Weights tool set the options to
 - Paint Operation = Replace
 - Opacity = 1



- iii. With the head joint highlighted in the tool window press **Flood**
- d. Use the **Smooth** brush to adjust the neck transition. (first, deselect the vertices)

Finalize your scene by deleting any unused objects in the Outliner. There should only be the skeleton, model and reference_grp when you are finished. Also delete any unused keyframes with [Edit → Delete All by Type → Channels](#).

End of part 1.

Save your scene as *assignment_4_skin_weights.ma* and turn it in with your assignment.

Part 2, Gray model pose testing

Next we can bring our character into Unity and create poses to verify scale and proportions.

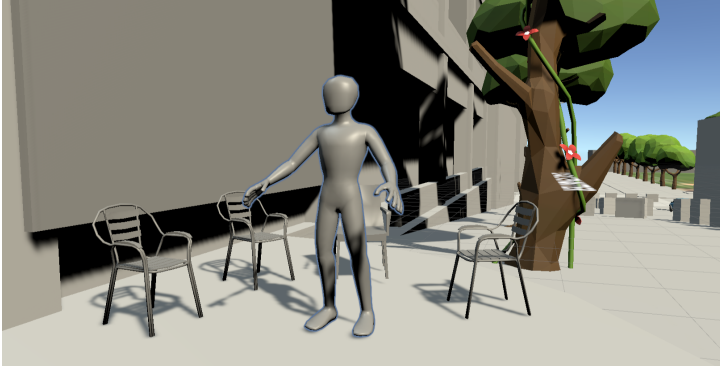
2.1 Export your skinned gray model as FBX to Unity

1. Select your skeleton and model
2. Export selected as FBX
 - a. [File → Export Selected](#) named *assignment_4_skin_weights.fbx*

2.2 Import your character into Unity

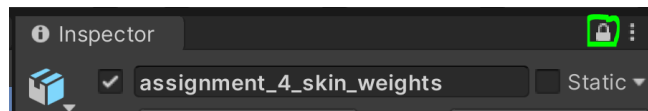
1. Open the Unity project with your animation test scene
2. Drag and drop the FBX into your project folder

- a. Choose a folder location where you will be able to find it such as Assets/Assignments/CharacterAssignment4
3. Open the animation test scene from assignment 2
4. Drag and drop your character into the scene

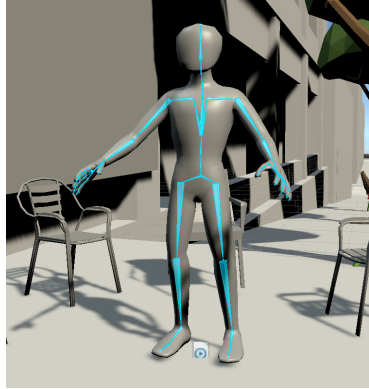


2.3 Set up Bone Renderer to visualize your character's skeleton

1. Open **Package Manager**
 - a. [Window → Package Manager](#)
2. Install the **Animation Rigging** package
 - a. Select [Animation Rigging](#) on the list of packages
 - b. Click **Install**
3. Add the **Bone Renderer** component to your character
 - a. In your scene Hierarchy select your character's top GameObject
 - b. In the Inspector click **Add Component** and type Bone Renderer
4. Assign your skeleton to the Bone Renderer **Transforms** list
 - a. It helps to lock the inspector on the character's top GameObject



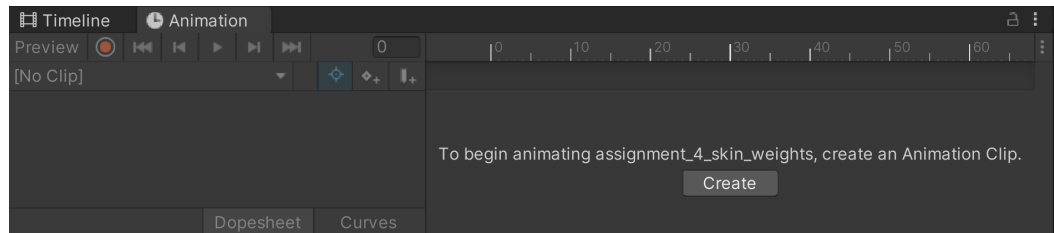
- b. In the scene **Hierarchy** select *center_root_bind_joint* and **alt-click** the arrow to expand the entire skeleton
 - c. Select the entire skeleton and drag it into the Bone Renderer **Transforms** list. (drop your selection onto the "Transforms" label to add them all at once)
 - d. Optionally customize the shape, color and size of the bone renderer



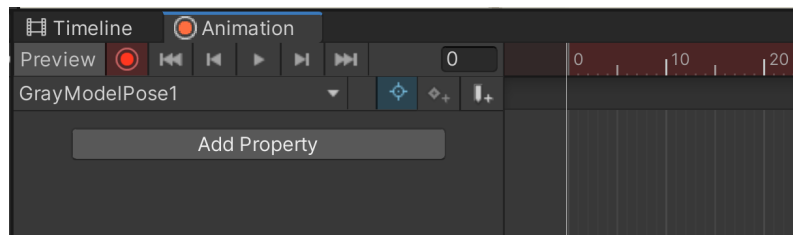
- e. (Don't forget to unlock the Inspector when you are finished)

2.4 Create a pose for your character in a new animation clip

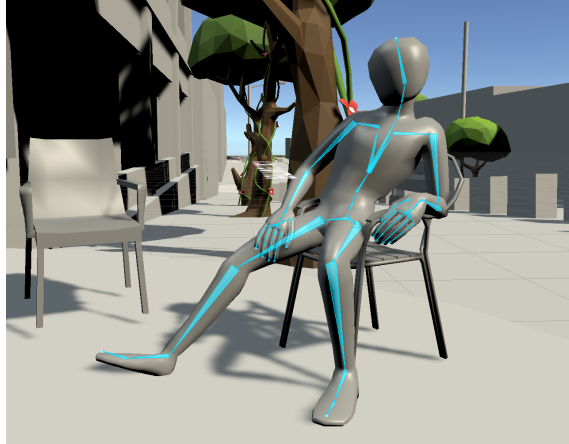
1. Open the **Animation Window**
 - a. [Window](#) → [Animation](#) → [Animation](#)
 - b. Move the Animation Window to a panel where you can see it and the Sceneview
2. Create a new **animation clip**
 - a. With your character selected go to Animation Window and press **Create**



- b. Name the new clip *GrayModelPose1* and save it to your project
5. Set a keyframe on all bones in your skeleton
 - a. Select all of the bones in the skeleton and press **Record** in Animation Window (the red circle button shown below)



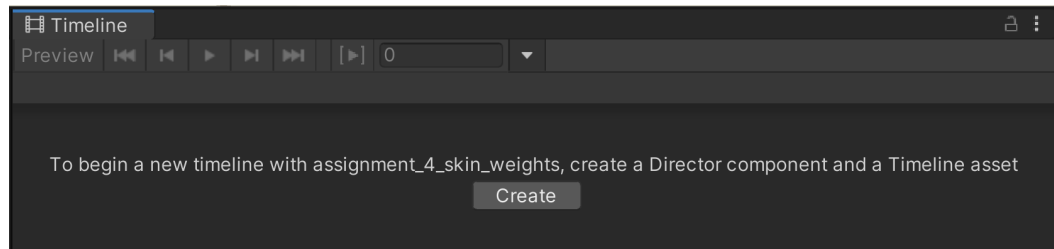
- b. In the **Inspector** on the Transform component **right-click** Position and [Add Key](#)
 - c. Also **right-click** Rotation and [Add Key](#)
6. Pose your character
 - a. (With Animation Window still in Record mode)
 - b. Translate and rotate the root joint
 - c. Rotate the rest of the skeleton
 - d. (Notice that it sets keyframes automatically)



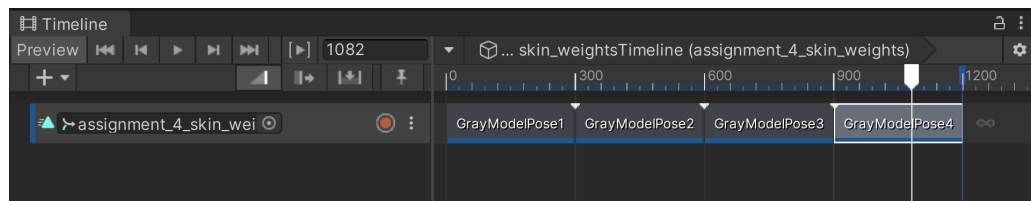
7. When finished making the pose repeat this process to create a total of 4 poses for your character interacting with your environment
 - a. To **create a new clip** go to Animation Window and click the menu where your clip GrayModelPose1 is selected. At the bottom of the menu there is an option to [Create New Clip...](#)

2.5 Create a sequence of your character's poses with Timeline

3. Open the **Timeline** tool
 - a. [Window → Sequencing → Timeline](#)
 - b. Move Timeline to the same panel as Animation Window (you will only need to see one or the other at the same time)
4. Create a new Timeline asset
 - a. With your character selected go to the Timeline window and press **Create**



- b. Save the new Timeline asset to your project
5. Add a new animation clip to the track
 - a. Right-click your character's track and [Add From Animation Clip](#)
 - b. Browse for the first clip GrayModelPose1
6. Add the rest of your pose clips to the sequence
 - a. Right-click the track and Add From Animation Clip



7. Scroll the time slider in Timeline to switch between your poses

Save your Unity scene (it doesn't need to be turned in with your assignment)

Save screenshots of your gray model poses to your Miro board and turn it in with your assignment

Grading rubric

Criteria	Achievement levels			
	level 1	level 2	level3	level4
Skin weights file format: Maya (.ma)	20 points: (0 incorrect) Maya file is named <i>assignment_4_skin_weights.ma</i> and file type is Maya ASCII	18 points: (1 incorrect) Maya file is named <i>assignment_3_gray_model.ma</i> and file type is Maya ASCII	16 points: (2+ incorrect) Maya file is named <i>assignment_3_gray_model.ma</i> and file type is Maya ASCII	0 points: files were missing
Skin weights 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
Skin weights (same file as above)	20 points: (0 incorrect) Model has skin weights. When the shoulder is rotated up the chest does not bulge. When the head is rotated back it stays solid. Skin weights are mirrored.	18 points: (1-2 incorrect) Model has skin weights. When the shoulder is rotated up the chest does not bulge. When the head is rotated back it stays solid. Skin weights are mirrored.	16 points: (3+ incorrect) Model has skin weights. When the shoulder is rotated up the chest does not bulge. When the head is rotated back it stays solid. Skin weights are mirrored.	0 points: files were missing
Miro Board format: images [Miro]	40 points: (0 incorrect) Miro board has 4 screenshots for character poses in the gray box level	38 points: (1 incorrect) Miro board has 4 screenshots for character poses in the gray box level	36 points: (2+ incorrect) Miro board has 4 screenshots for character poses in the gray box level	0 points: files were missing

Character class 4 - gray model pose test

