



Olympoids 2040

COMS30059  
Project report

Olympic diving animation inspired  
by nature, water, and the  
meditation of sport.

2008523

# Contents

Choosing a sport + project vision	2
Character design + modelling	2
Set design + modelling	4
Animation	6
Evaluation	7
References	8
Appendices	8

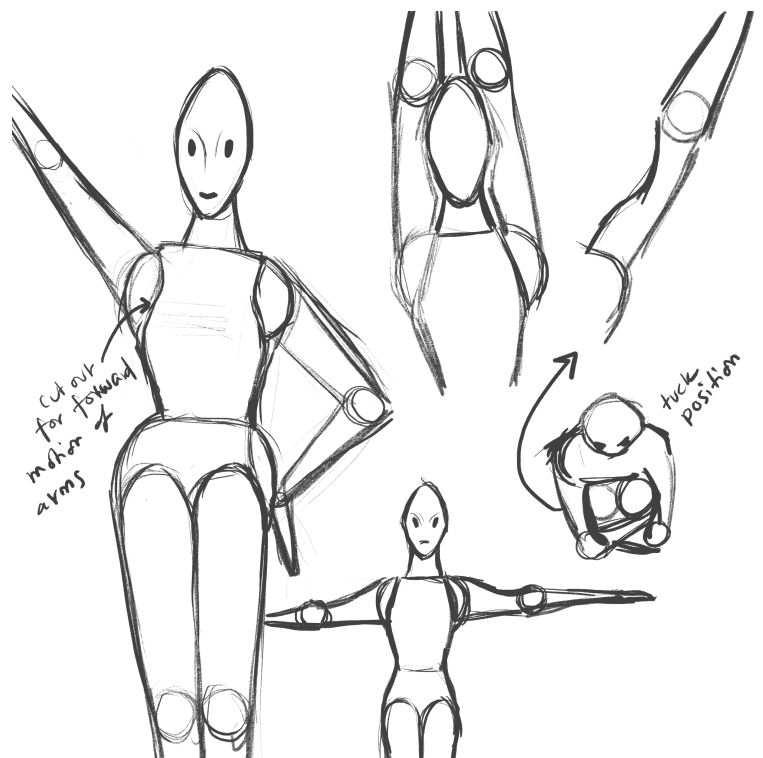
## Choosing a sport + project vision

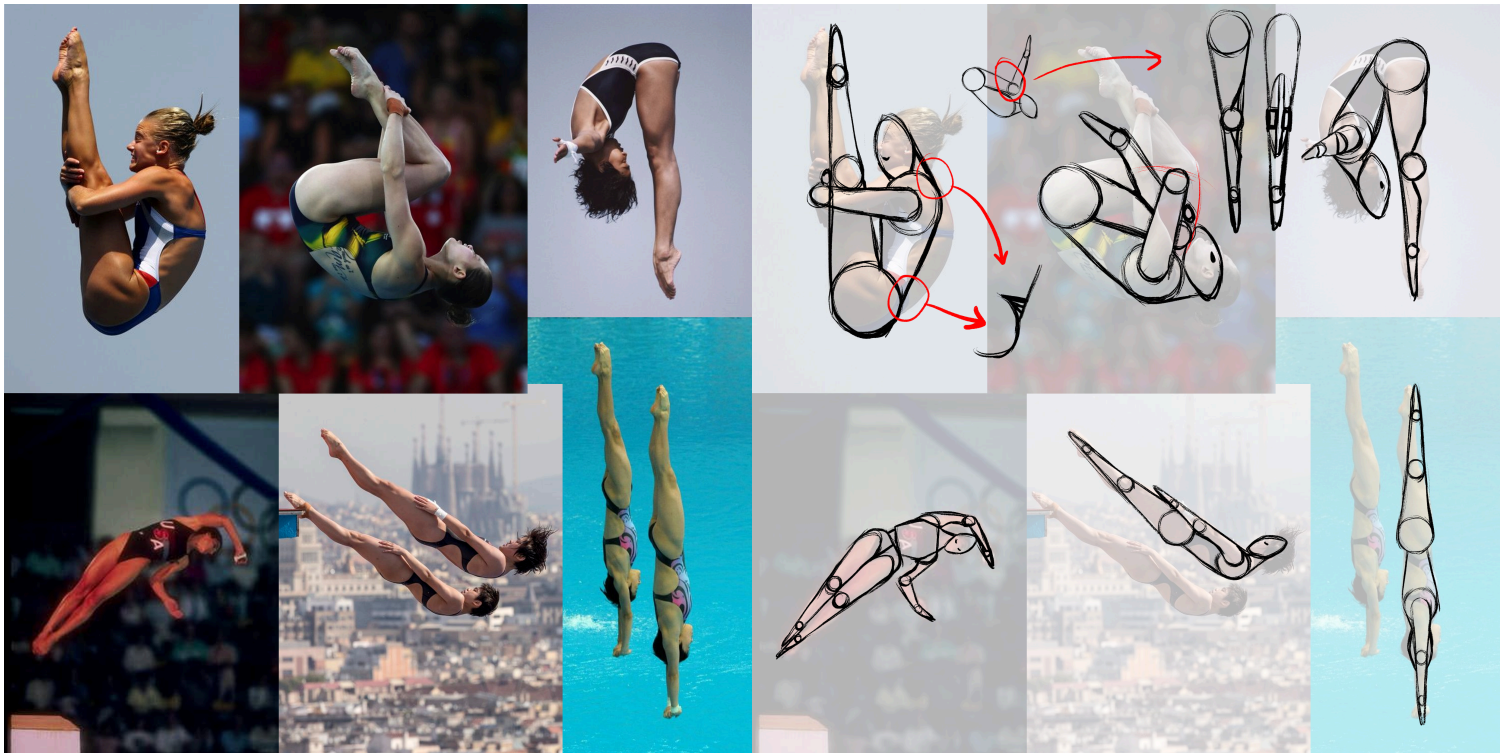
I chose to depict olympic diving in my animation, because I was drawn to its elegance and attention to form. I thought it might present a good opportunity to explore details and beauty. I imagined what this event might look like if it celebrated the meditative focus of sport and the aesthetics of water and nature. Both the character and set were designed to reflect this vision, incorporating pearly textures, shades of blue, and forms reminiscent of plants and dew drops. While the project's vision has been somewhat hindered by my execution capabilities, it was an interesting way to learn about CGI.

## Character design + modelling

Initial drafts for the character design were based on being aerodynamic, to be able to move smoothly through air and water. Additionally, I looked into the different types of diving poses and combinations [1], which led to further design considerations to be made. For example, a cutout on the upper arms that would allow the robot's head to fit in between, allowing for a sharper triangular shape for the top of the body. The torso piece was also adjusted to expand the shoulders' range of motion, among other things.

To flesh out further details, I found photos of every diving pose on Google [2], and traced my robot design over them to make sure they would all look natural. This led to the addition of a cylindrical piece connecting the torso to the hips, as well as cut-outs behind the legs so that the knees could bend more

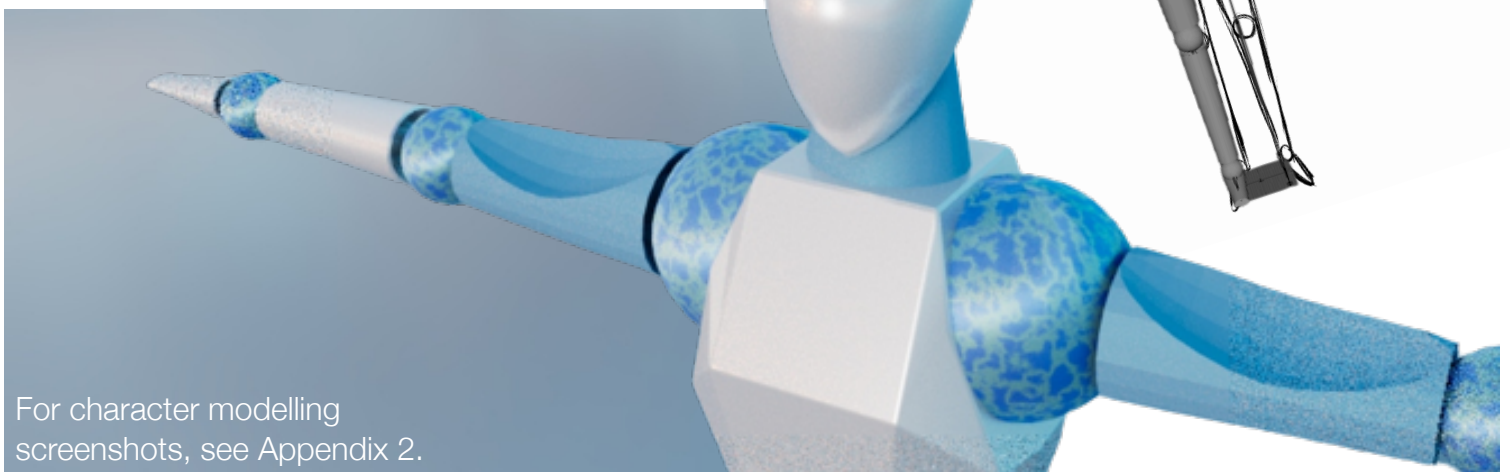




freely without overlapping. While this served as a useful reference and visualisation tool to inspire the design of the robot, it didn't entirely account for movements within human IK and how the design would practically move. Because of this, more modifications were made in the modelling phase. For all character design sketches, see Appendix 1.

Several attempts were made to model the robot, either because it didn't look good or because the geometry did not move as I expected. To combat this, I created a basic walking animation on the control rig, which helped me model the geometry in a better way. I also discarded my initial reference image which was based on the human IK skeleton, and changed the proportions to better reflect my design; making the legs longer, arms shorter, and shoulders more narrow.

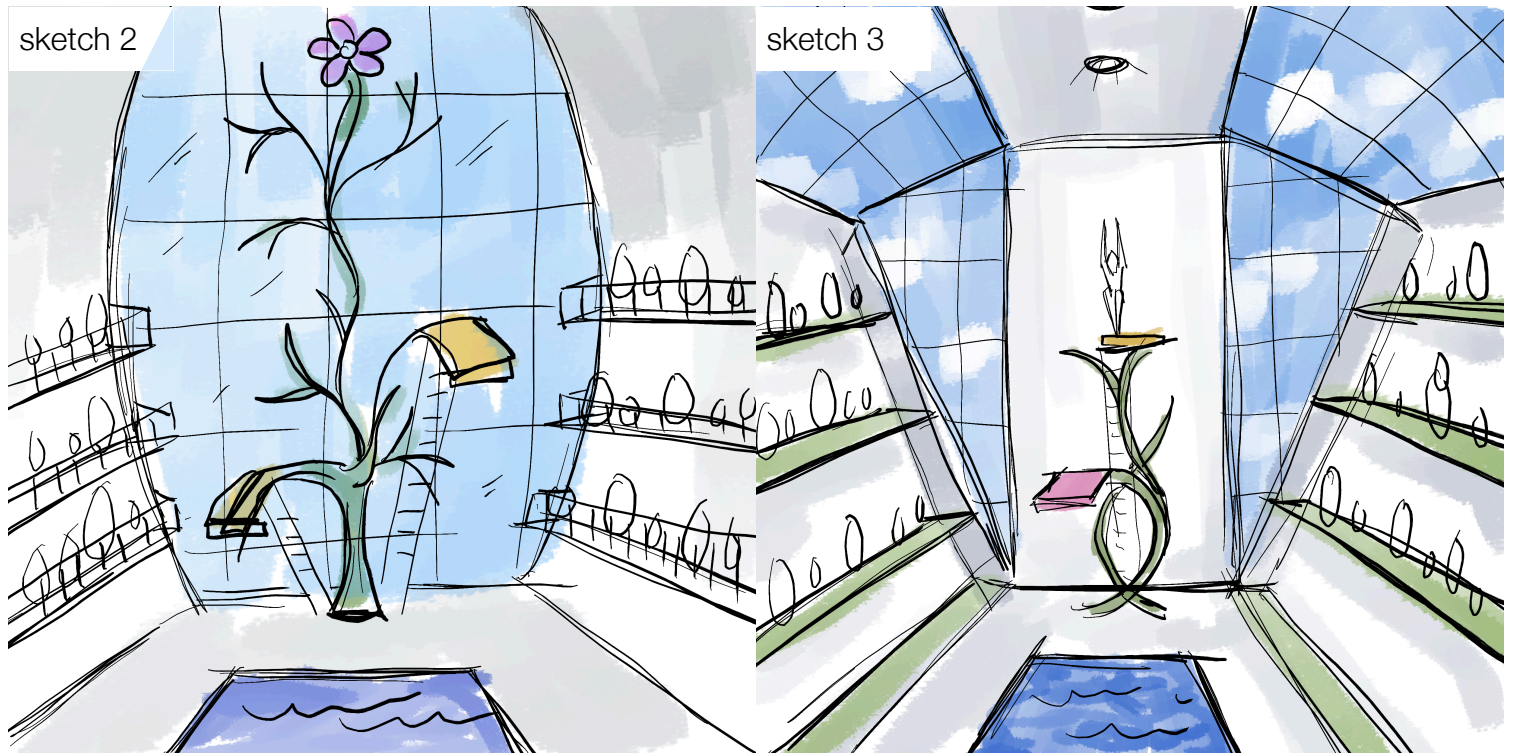
The final model utilised bevels on all sharp edges and boolean unions that helped connect cylindrical pieces to joints while keeping the geometry clean. The shoulders and joints were given a speckled water-like texture, and the overall aesthetics of the robot were centred around blue and pearl.



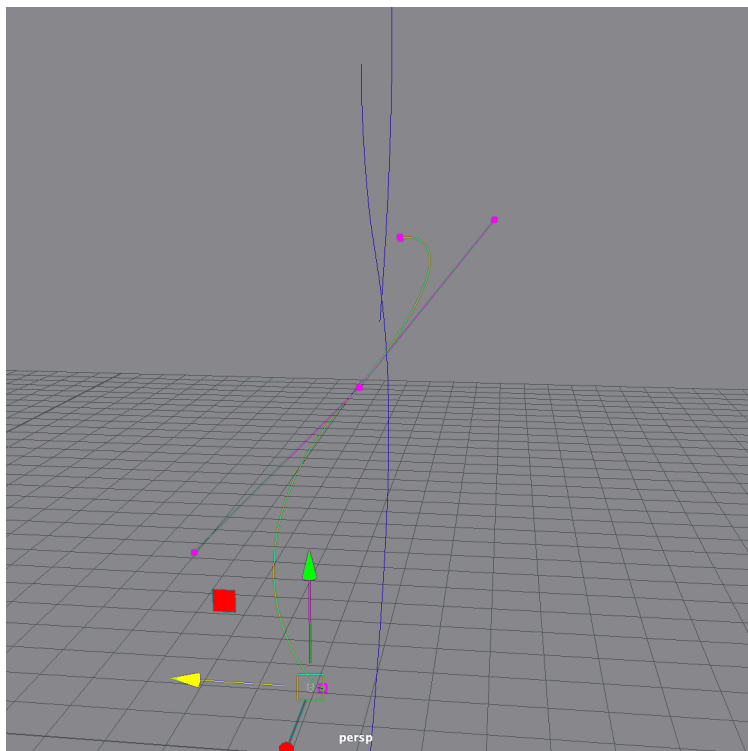
For character modelling screenshots, see Appendix 2.

# Set design + modelling

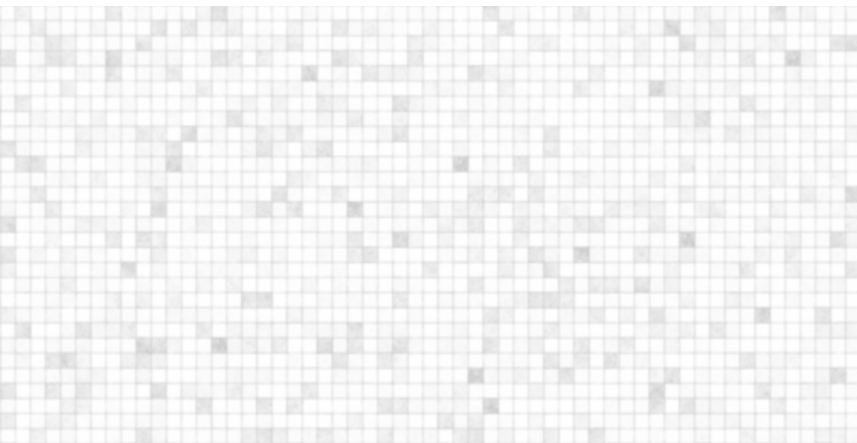
This stage began with more concept sketches, this time with a better consideration for the practicalities of modelling. The set was a swimming pool building with seating and skylights, with a plant-like sculptural centrepiece that formed the diving stand. For all set concept sketches, see Appendix 3.



Some elements in particular posed more of a challenge during modelling. To build the sculptural centre of the diving stand, I drew the shape using bezier curves, then followed a tutorial on extruding a circle along a curve [3], which produced a set of tubes in the shape I wanted. The tube had a few unexpected bumps and dents, but I felt it made it look more realistic.



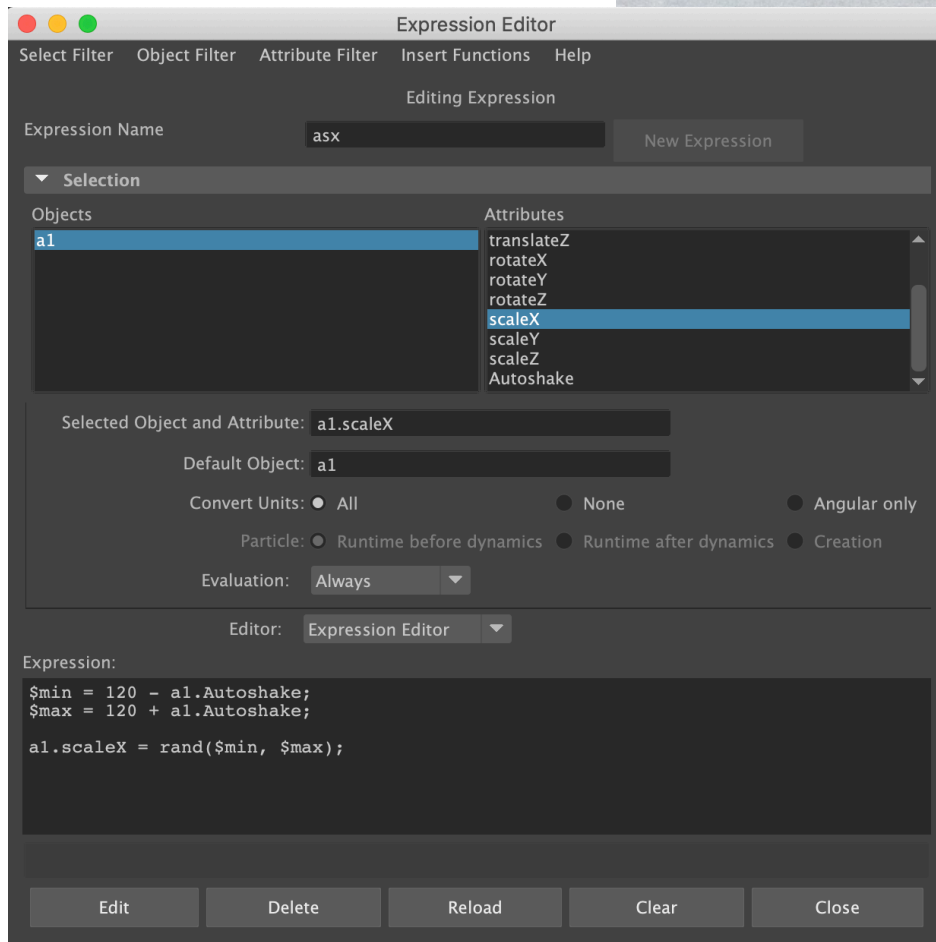
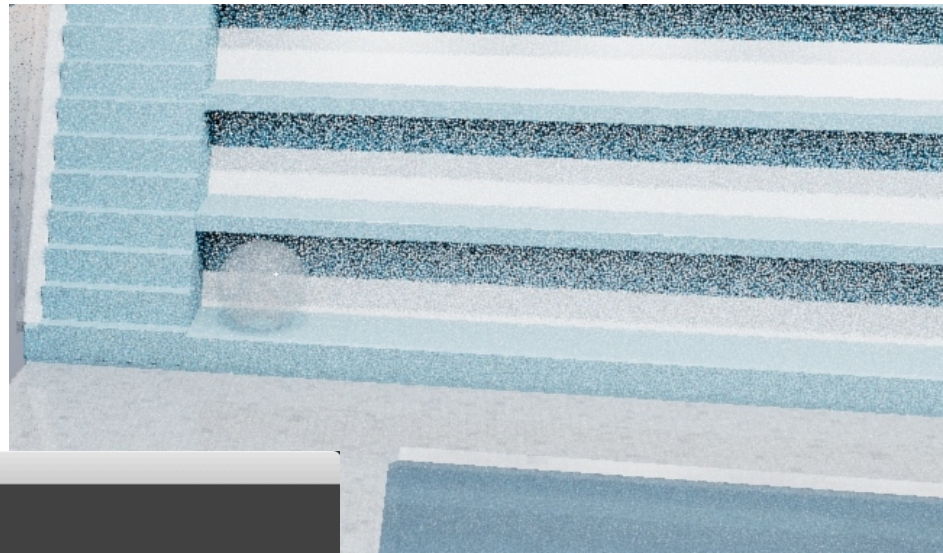
For the floor of the pool, I wanted to include quintessential pool tiles in white. I mapped a texture found online [4] onto the UV of the floor. However, in the final renders the texture is not very visible due to the high reflectiveness of the floor. I also tried adding a water texture to the pool plane but it didn't work.



It was important to me to add an audience, to add the atmosphere of business and excitement that would be found at the Olympics. In my concept sketches, I envisioned them as being glowing blobs of different sizes and colours who moved in the background. However, I found this to be impractical as I couldn't think of a way to make each of them different automatically, and I wasn't sure how to standardise my movement expression to different sized objects.

Consequently, the audience members became large green dew drops, which perhaps fits better with the muted monochromatic style of the set.

To animate them, I added an attribute 'Autoshake,' using which I wrote expressions to change the scale of each blob by a small amount so they appeared to be slightly buzzing in the background.



This idea was taken from a YouTube tutorial [5].

The expression shown on the left was applied to ScaleX, ScaleY, and ScaleZ.

To light the set I used a skydome, with a HDR image of the sky from Polyhaven [6]. I also added 6 bright area lights to the ceiling to replicate the stark, multidirectional lighting of olympic stadiums.

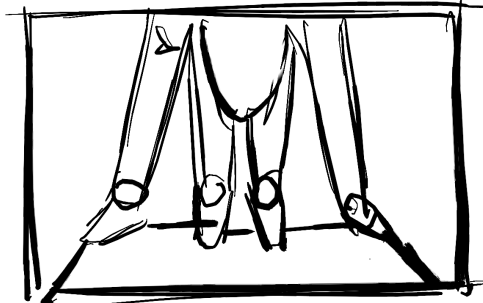


# Animation

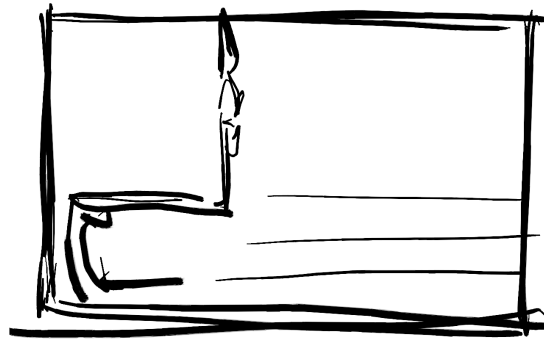
After scouring YouTube, I chose to animate a dive by Quan Hongchan in the 19th FINA World Championships [7]. I liked this dive because it contained both twists and somersaults, making it more complex. Based on this, I created a storyboard that served as a guide for the animation.



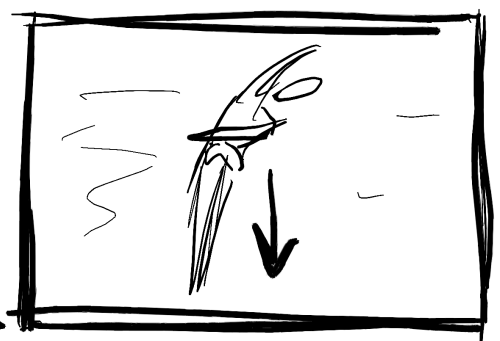
intro to robot, maybe show the set before



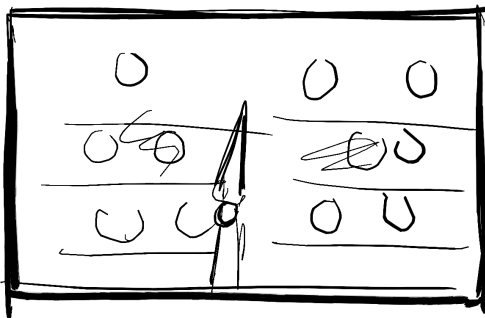
camera pan down



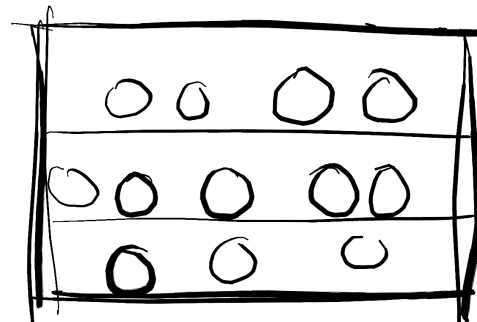
camera cut to side view



frame the dive



splash off screen



change focus to 'applauding' audience:)

I tried to identify the 'turning points' of the dive so I could animate with the least amount of poses for smooth movement. I replicated Hongchan's poses on my robot, adding some dramatic flair with anticipatory movements. However this was extremely challenging, as I found that the control rig would sometimes move in unexpected ways, making the dive warble and jerk. Adding intermediary poses often worsened the problem, but it helped me learn a workflow for fixing these errors, and helped me realise how I might be positioning the robot incorrectly. After being frustrated by perfectionism I animated the camera and fixed the robot's movement based on its view, which saved a lot of time and effort.

# Evaluation

## Geometry:

I think my geometry could have been cleaner; my set had a lot of pasted objects, and objects that could have been combined but weren't. For example, the diving boards and their bases were separate, despite them being the same material. The floor also had odd vertices because of the pool, which made the tiles place sub-optimally.

## Animation:

I wish I hadn't added so many frames between poses to rectify incorrect movements. I suspect the clunky movement may have stemmed from my occasional usage of the rotation tool rather than the move tool.

## Camera effects:

Camera features could have been better utilised. I considered incorporating some depth of field and motion blur effects, but did not have the time to do it.

## Water:

The pool did not resemble real water very closely. It would have been nice to have a realistic splash, but this is something I need to learn.

While there is a large scope for learning and improvement, I loved working on the project and I hope you enjoyed my animation!

## Scale:

I did not have a great sense of scale while designing and modelling the set. For example, the diving boards were designed to resemble small springboards when their scale was more similar to a larger platform. The blobs in the audience also ended up being disproportionately large, along with the stairs and ladders. To improve this, the human-sized robot should have been used as a point of reference earlier in the process.

# References

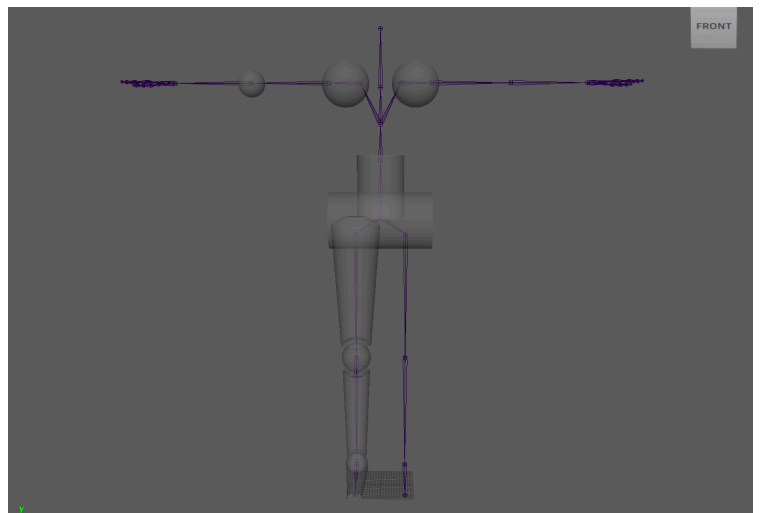
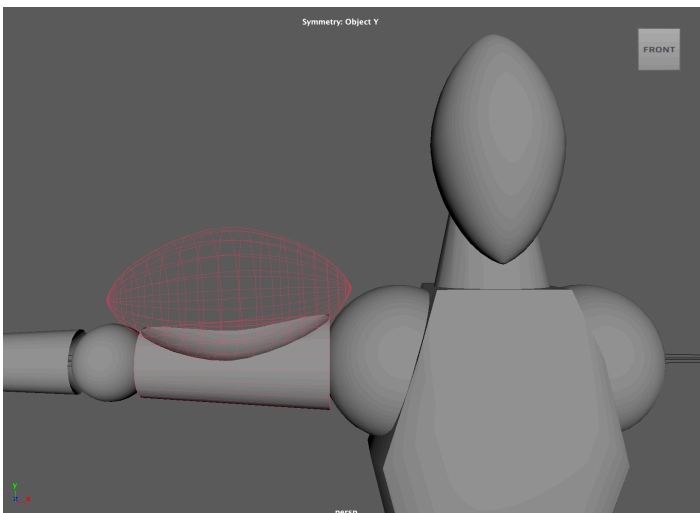
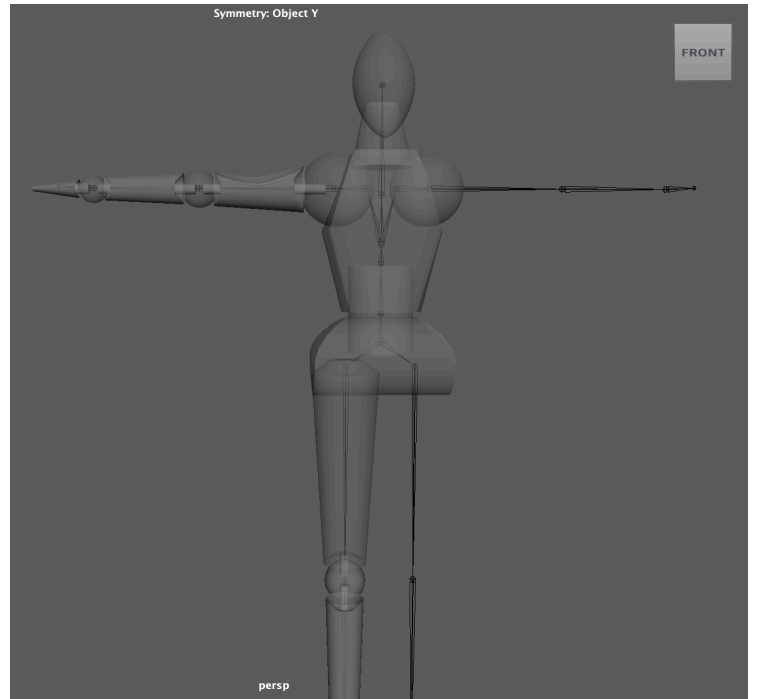
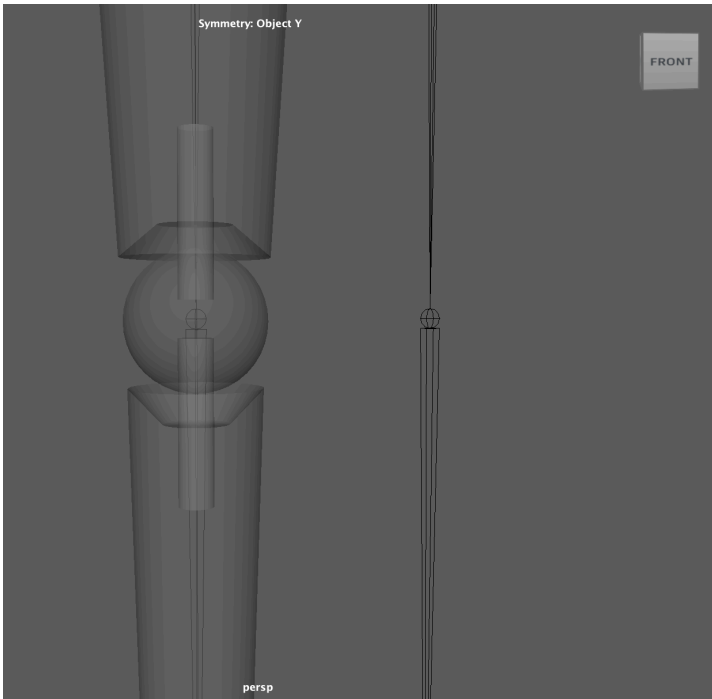
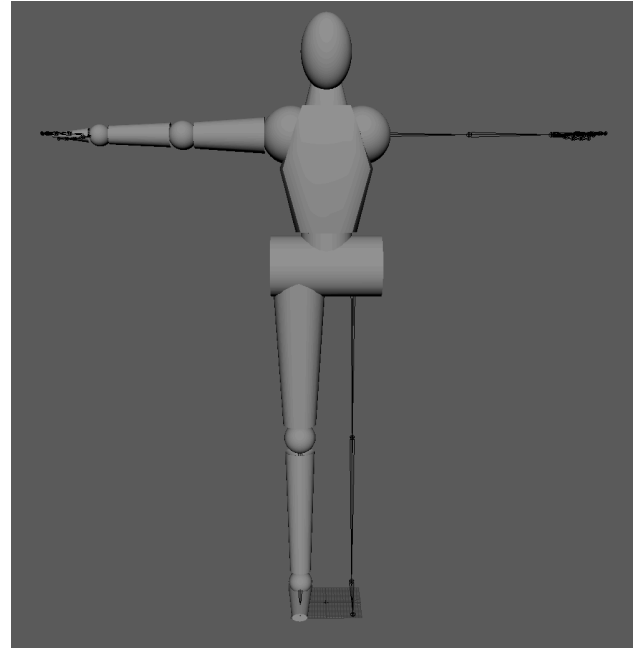
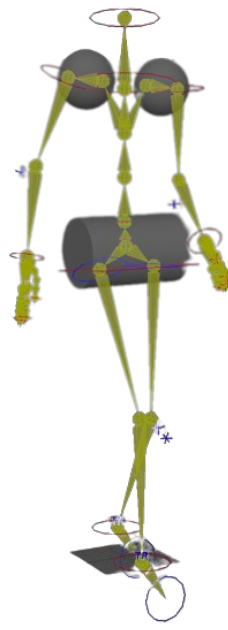
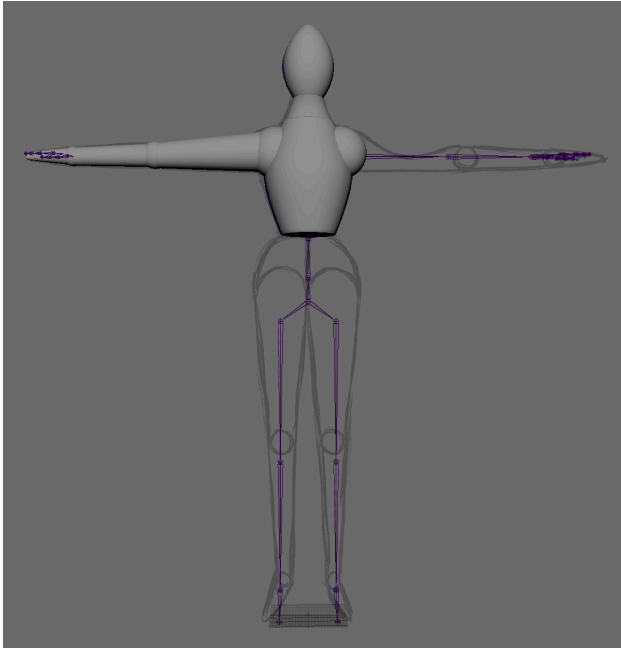
- [1] <https://www.swimming.org/diving/platform-springboard-diving-positions/>
- [2] <https://images.google.com>
- [3] [https://youtu.be/\\_MubcUmvlic](https://youtu.be/_MubcUmvlic)
- [4] <https://www.sharetextures.com/textures/floor/pool-tiles>
- [5] [https://www.youtube.com/watch?v=iEzAdp\\_5UgA&t=2s](https://www.youtube.com/watch?v=iEzAdp_5UgA&t=2s)
- [6] [https://polyhaven.com/a/industrial\\_sunset\\_puresky](https://polyhaven.com/a/industrial_sunset_puresky)
- [7] <https://www.youtube.com/watch?v=nWmLpegT7Bw&t=29s>

## Appendix 1 - Character design sketches





# Appendix 2 - Character modelling



# Appendix 3 - Set concept sketches

