**About Page**

Git Hub link: <https://github.com/Jcmith/3dapp>

**Setup**

The website was created and tested using localhost on xampp and only Apache needs to be running to use the website. The visual studio code live server extension also runs the app as well. This is simpler if xampp isn’t installed or setup. It doesn’t look quite as good however it is practically the same. When it comes to the functionality of the app, I will mention that I wasn’t able to properly sort out the implementation of the models as I would have liked as I spent well over the amount of time making them than I should have. The horse animation bugs out even though it was fine in blender, and they also don’t loop as I would have liked. I will add videos of what the animations look like in blender along with the blender files to the GitHub. Also, the animations need to be paused and then played to active as they automatically play when a user clicked the page. It seems like the embed YouTube videos also won’t play on local host even with /embed/ in the URL.

**About**

For my website I created a mini digital zoo. I created models of three different animals used texture paint to design how they looked then animated them using rigify. The models with their animation were then added into the website using three.js for displaying the models and animations in the website. Finally, each animal was given its own information page which gives the user a chance to learn and interact with the animal by reading facts, watching a video, seeing an image of one and interaction with a 3d model of one.

**Models**

Since this was my first experience with creating, texturing and animating 3d models, after enjoying creating the coke can from the labs, I decided that I wanted to devote more time to learning blender and that I would earn my ‘deeper understanding’ marks by creating more complex models, creating my own textures and creating more in-depth animations. To start my progression of blender I set out to increase the complexity of each model I completed as I gained confidence and knowledge of the software.

The first model that I created was a snake, the reasoning behind this was that it seemed an easier animal to create as it was essentially just as cylinder with one scaled in end for the tail and then shaping the head according to reference photos. A screenshot of a computer

AI-generated content may be incorrect.

Secondly, I chose a cat as it had a lot more complexity that the snake with its legs, tail and detailed facial features. To make the cat I shaped a body and neck/head then extruded the tail, ears and legs before trying to detail the face.

A screenshot of a computer

AI-generated content may be incorrect.

Finaly, I chose a horse as it added a level of complexity to the cat with its muscular figure whilst I could use the skills I learnt from the cat to speed up the process as by this point, I had spent too much time on the first two models. To create the horse, I followed the same method as the cat but this time I spent more time crafting the figure and face so that it looked more realistic and less square as the cat had come out quite flat and I wasn’t satisfied with the shape of the head.

A screenshot of a computer

AI-generated content may be incorrect.

**Texturing**

The next step after creating the models was to texture it. While this step was generally the fastest of the three in blender, I still took time properly texture the model. I had to unwrap the model and then create seams where necessary and then avoid overlaps. Then it was about painting the model by carefully lining up the stencil with the model and then painting over the model and then finely detailing parts with the clone tool.

A computer screen shot of a green snake

AI-generated content may be incorrect.

A computer screen shot of a cat

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

**Animation**

The final step in blender was to animate. Each model needed a rig to be able to animate, with the snake it required learning how to create armature and the successfully parent it to the model and then generating the rig. With the snake this turned out to be difficult as I had to make a armature from scratch and then the generated rig didn’t work as well as I had hoped. For the cat and horse, they had a given armature built into rigify that I used so then it was a lot easier process as I just had to fit it into the model and generate the rig.

The snake was meant to be the simplest model for me to create however the animation might have been the most difficult as I didn’t have a rig to manipulate the animal. As I wanted to make each have a moving motion, I wanted the snake to slither side to side. The first step was making the snake way side to side by inserting frames with a rotation of 45 and -45 then from the offsetting each bone timing to make the snake curve. Getting each bones’ timing correct so that it didn’t curve to much or too little took a lot of trial and error which is why I stopped with the result which wasn’t perfect but did well enough.

A screenshot of a computer

AI-generated content may be incorrect.

For the cat I made a walking animation, this was achieved by the timing of frames where the legs had been moved forwards and the timing of the paws being lifted. Other details like the back moving up and down and the tail moving left to right where also added. A computer screen shot of a cat

AI-generated content may be incorrect.

The horse animation was extended from what I did to create the cat animation by creating a gallop animation where the legs, hooves, head, tail and body had to be repositioned every two frames to create a trot animation and then to bake it to fill the rest of the frames to be exported. A computer screen shot of a horse

AI-generated content may be incorrect.

**Design**

For the design I kept the website easy to use by using a navigation bar and drop-down menu. All the links were tested to make sure that pages directly link. The animal pages were made to be simplistic with clear sections so that it feels easy to use. Links are responsive.

The lighting and camera were added with three.js and recentres if the window is resized.

**Integration**

I have integrated the models and animations into the pages using three.js. I have also as well as images and a video with a player for onside watching of a YouTube video. Text is used across the site to give context and information.

**Interaction**

Models can be manipulated with buttons under the model. The model will play the default animation, then can be paused and played to play the animation; switch model will switch to another animal which can have its animation played. Toggle wireframe will show the mesh edges or full mesh, rotate will move the view around 15 degrees. The lighting can also be manipulated. There is a menu to add a spotlight and change the angle, distance, penumbra, colour. Users can also activate a helper to see where the light will show and to make the light move. They can also zoom in and out and move the camera about.

**Implementation (Testing)**

The testing strategy I chose to use was usability for the user interface. The way I tested the usability was by getting my participant to complete a series of task on the website starting from a point A with the goal to reach a destination or given output B. Two of tasks given were: a. (From the home page) Please navigate to the horse page and play view the horse in wireframe mode.

b. (From horse page) Please now navigate back to the home page and then from the home page to another animal page using a different section of the page to travel there. (Another way of getting to animal pages.)

I chose this strategy as I could both observe the user behaviour with how they interact with the website as well as it offered a chance to get direct feedback about the website and what was good and what could be improved.

Overall, the testing went well as the participant was able to navigate through the website and complete every task but through my observations and post tasks interview, I was able to find areas to improve. Summarised feedback:

Pros – Website linked together completely, smooth and simple flow, worked as expected for the most part.

Cons- Spot UI in an obstructing position of the model and buttons, switch model button not switching back to the original model, animal page layout too congested and hard to follow content.

After reviewing the feedback and observations I acted upon it by making appropriate changes such as moving the spotlight UI to the right of the page and moving the animation over to the left so the UI wouldn’t obstruct the canvas. I also fixed the switch model button so that it would correctly switch between the models and altered the layout so that it displays the content section by section as the user scrolls down.

I have used a MVC design pattern utilising HTML5, JavaScript and CSS as it creates a clear separation of content which leads to easer maintenance and better flexibility to develop the website further.

Accessibility has been considered as I have used contrasting colours, so the website has better visibility, the website has clear header levels so the screen reader can follow the content easy and I use coded buttons meaning those using keyboard accessible tools can still navigate the website.

Technologies used:

Core:

HTML5 – Standardised structure for the content which improves accessibility and maintainability.

CSS – Responsive layouts, animations and modern styling.

JavaScript – Provides modular logic for state management and application behaviour.

Three.js - Abstracts WebGL into an easy-to-use API for creating and animating complex 3D scenes without low-level graphics code.

OrbitControls - Adds intuitive click and drag camera orbiting, zooming, and panning controls for better 3D navigation.

GLTFLoader - Efficiently loads modern, compact glTF/glb 3D model files with materials and animations intact.

Bootstrap 5.3.3 - Supplies a mobile first grid system and prebuilt components to accelerate responsive UI development.

**Deeper Understanding**

1. GitHub linked.
2. More complex models.
3. More complicated textures.
4. More complex animations using rigify.

**Implementation and Publication**

I have added an about page and I have zipped, and my website and I have tested that my folder can be opened in Visual Studio Code when unzipped and works as it should.