



UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO



FACULTAD DE INGENIERÍA

FINAL PROJECT .

ALUMNOS:

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COMPUTACIÓN GRÁFICA E INTERACCIÓN HUMANO-COMPUTADORA

TEACHER: ING. ARTURO PÉREZ D E LA CRUZ

GROUP 01

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Dear members of the selection committee,

It is an honor to present our proposal for the design and development of the virtual zoo, which aims to provide an immersive and educational representation of different animal habitats.

At Virtual Animal, we have extensive experience in creating immersive and educational virtual experiences that allow visitors to explore and learn about the natural world interactively. We believe that our innovative approach, combined with our passion for wildlife, will enable us to deliver the best possible experience for the virtual zoo.

To fulfill the project's objectives, we propose designing and developing an interactive and immersive virtual zoo with elements that simulate each of the proposed habitats. Each habitat will be carefully designed to faithfully represent the natural environment of the exhibited species, incorporating elements that simulate vegetation and the characteristic colors of each ecosystem, along with some animations.

We will create a virtual zoo tour, including elements that simulate each of the proposed habitat spaces within the zoo. The proposed habitats include an aviary, a jungle area (with lions, elephants, and monkeys), and an icy area with penguins. Additionally, a three-dimensional environment will be created to simulate the virtual ambiance as realistically as possible.

To ensure the most enjoyable user experience, we will utilize OpenGL to create a three-dimensional environment that allows visitors to interactively and immersively explore each habitat. This will enable them to appreciate all the details and peculiarities of each environment, along with interactive animations.

In conclusion, the virtual zoo will be an unforgettable experience that combines cutting-edge technology with a passion for wildlife, offering visitors a unique and fascinating glimpse into the natural world and its habitats.

We are confident that our proposal meets the expectations and requirements of the project, and we are committed to working closely with the selection committee to ensure timely delivery and adherence to the budget. We look forward to the opportunity to work with you and undertake this exciting project.

Sincerely,
Virtual Animal

Introduction

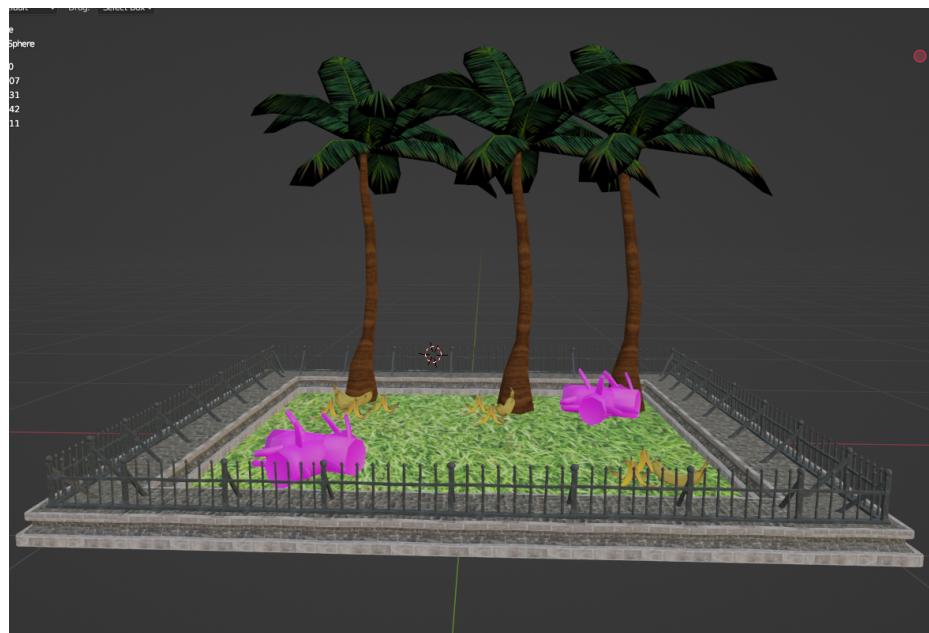
We present the development of a virtual zoo tour, where visitors can explore different habitat spaces of various species. The tour will feature a three-dimensional environment to simulate the virtual ambiance as realistically as possible. To achieve this, we will utilize Visual Studio, 3ds Max, and Blender, which will be instrumental in the development process. We have implemented geometric modeling, hierarchical modeling, and texturing techniques to construct elements based on primitives.

Modeling

Nuestro proyecto final cuenta con la recreación de un zoológico, además de la construcción de cada hábitat propuesto, esto dependiendo de los animales que planteamos para las animaciones.

El zoológico se compone de 5 hábitat como se muestra a continuación:

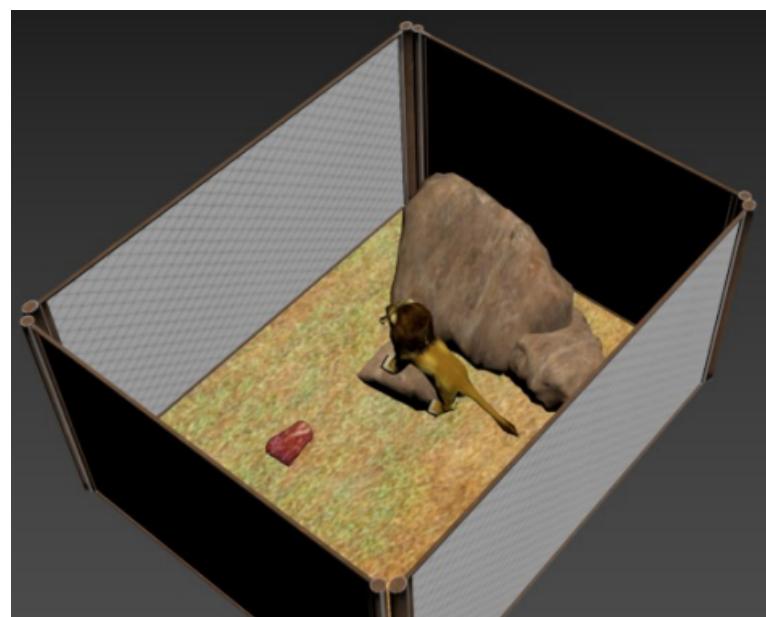
Monkey Habitat:



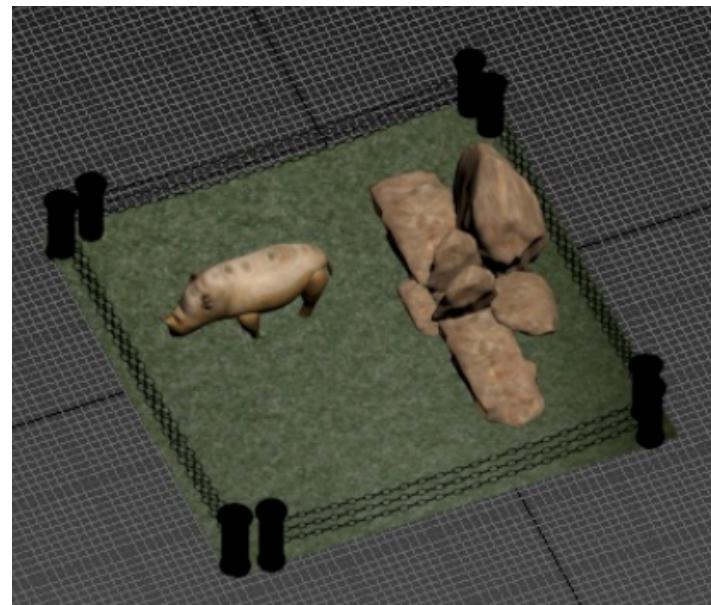
Bird Habitat:



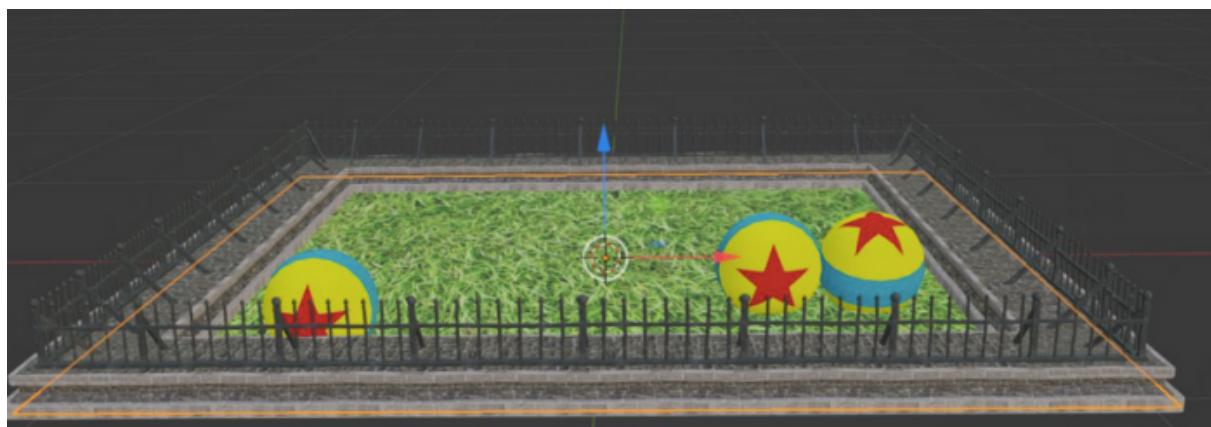
Lion Habitat:



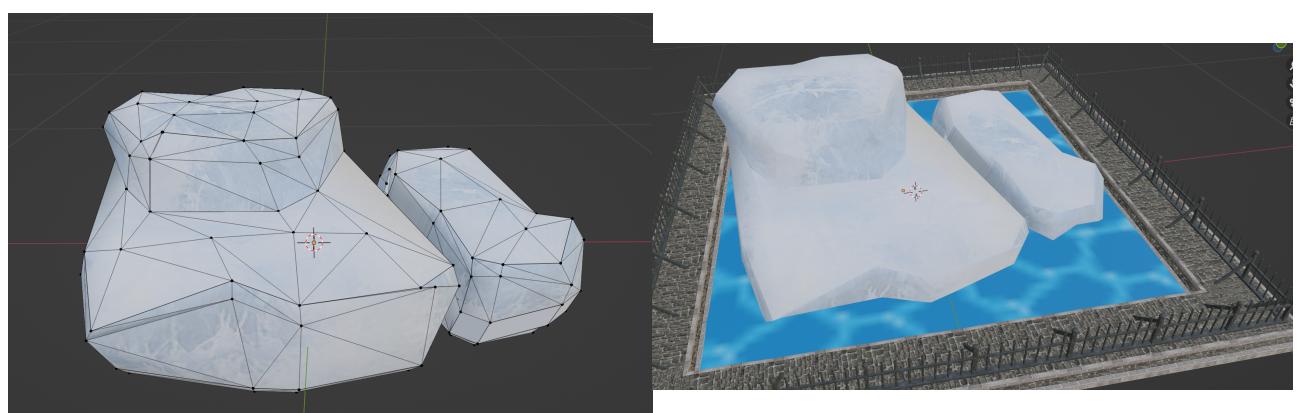
Rhino Habitat:



Elephant Habitat:



Penguin Habitat:



Wolf Habitat:*Interior Geometry*

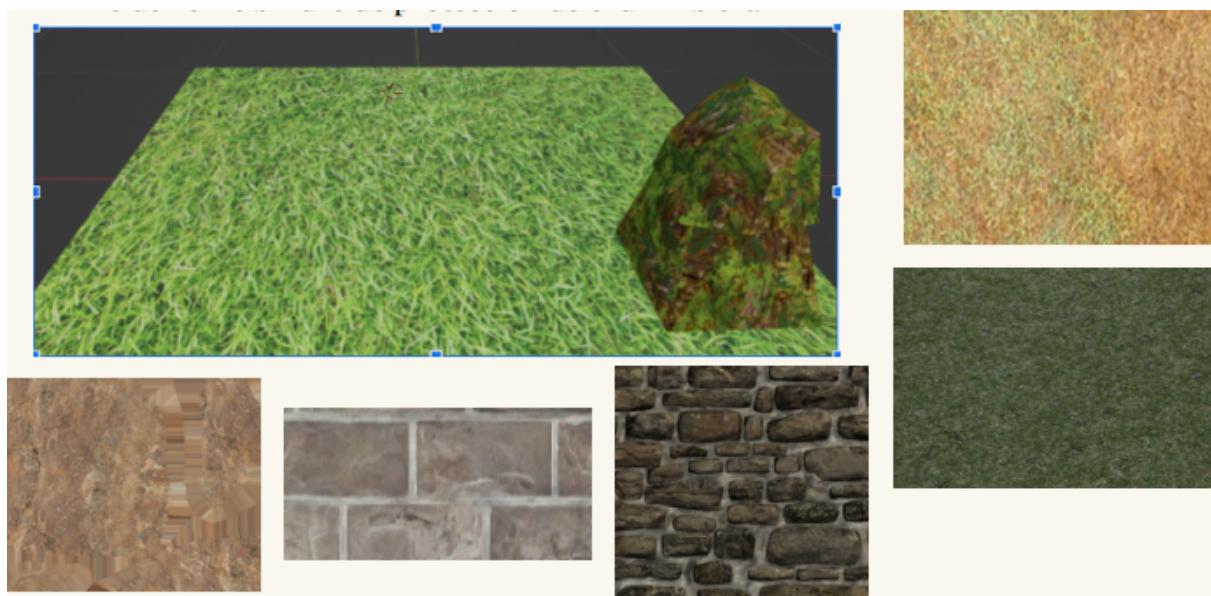
The modeling of each habitat was done taking into account the reference images proposed in the first part of the project, which showed us the layout of each element such as trees, bushes, logs, and even their food.

Based on the specific layout of each habitat, they were constructed using modeling software such as 3Ds MAX and Blender, depending on the preference and expertise of each team member.



Interior Texturing

Regarding the interior textures of the habitats, we decided to adhere to the textures and colors found in reality, such as grass, trees, food, rocks, and even the protective fences of each habitat.



Exterior Geometry

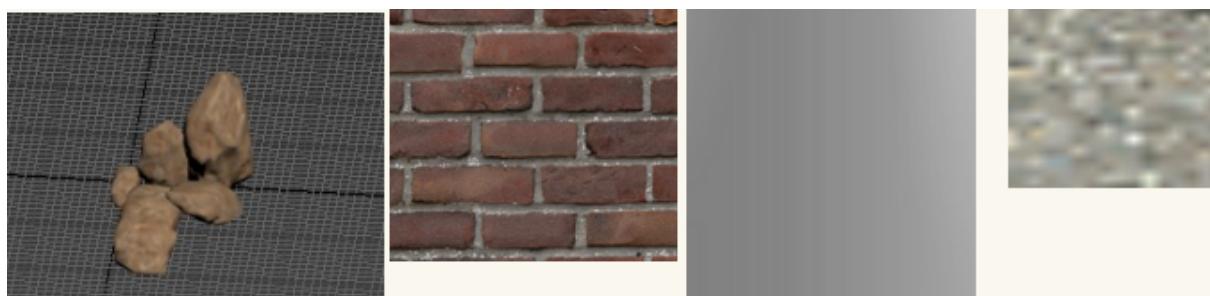
For the exterior geometry, we also decided to closely adhere to the structure of a real zoo.

According to the project requirements, we were tasked with recreating a designated area that would serve as our main setting. Within this area, we marked the locations for each habitat, as well as representative elements such as lamps, bushes, the zoo entrance, and more. All the elements used to create this area and environment were obtained from the internet, with references provided at the end of the document.



Exterior Texturing

The textures for the exterior part (main setting) were chosen to closely emulate the original aesthetics.



Animations

The purpose of our project is to create a virtual experience that resembles a visit to a zoo.

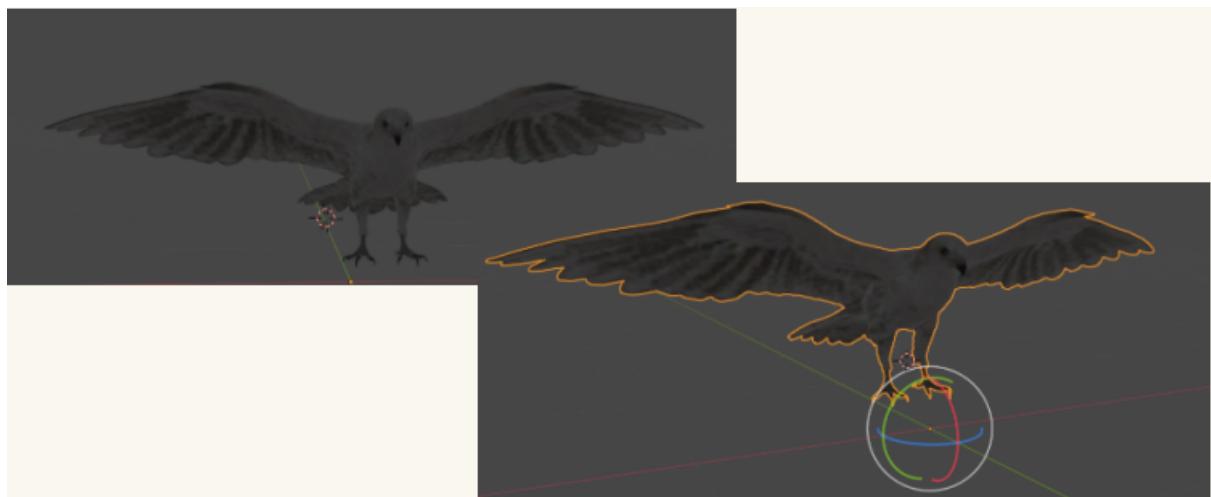
Animation 1

Monkey: We will start with the monkey habitat, where we will incorporate the action of a monkey rubbing its stomach and head, as this is a behavior that monkeys exhibit in real life. Our aim is to provide an immersive experience that closely reflects reality.



Animation 2

In the second habitat, we have birds, and we will include a flying bird that flaps its wings while moving from one place to another.



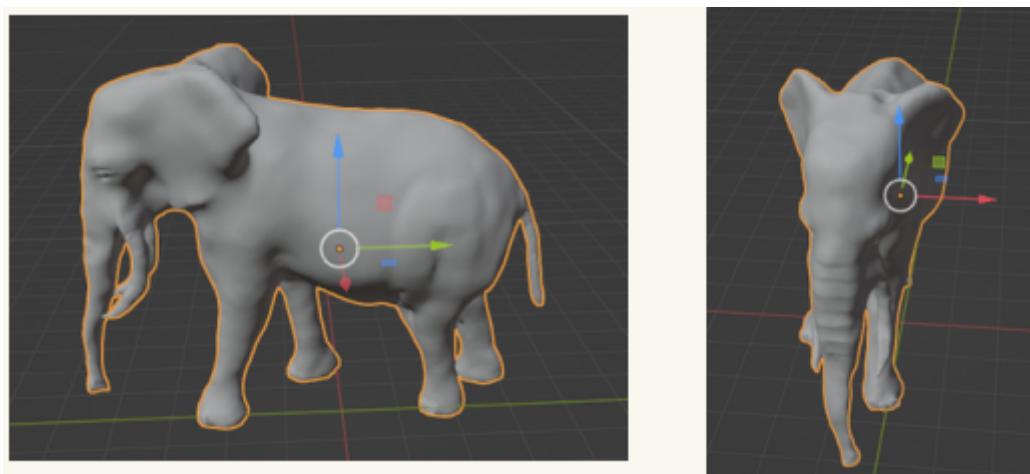
Animation 3

In the lion area, visitors will be able to observe how these animals feed in their natural habitat. To achieve this, we will create an animation that depicts the lion approaching its food and turning its neck to eat.



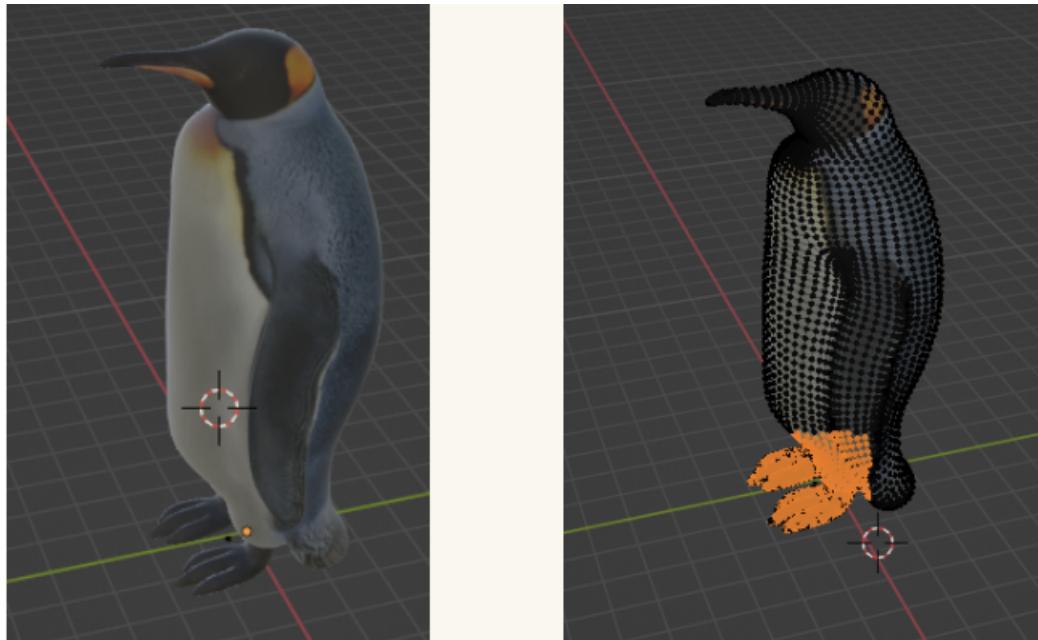
Animation 4

In the elephant habitat, we will design an animation that shows the elephant moving its trunk or ears. These natural movements, which are characteristic of elephants, help create a realistic atmosphere in the virtual habitat.



Animation 5

In the penguin habitat, we have designed an animation that shows a penguin waddling, sliding on its belly, and gliding on the ice before getting back up.



Considerations

The project is designed to work with Visual Studio 2022. If you are using an older or newer version, you will need to make the corresponding configurations in the Properties > General section, specifically in the Windows SDK Version and Platform Toolset settings.

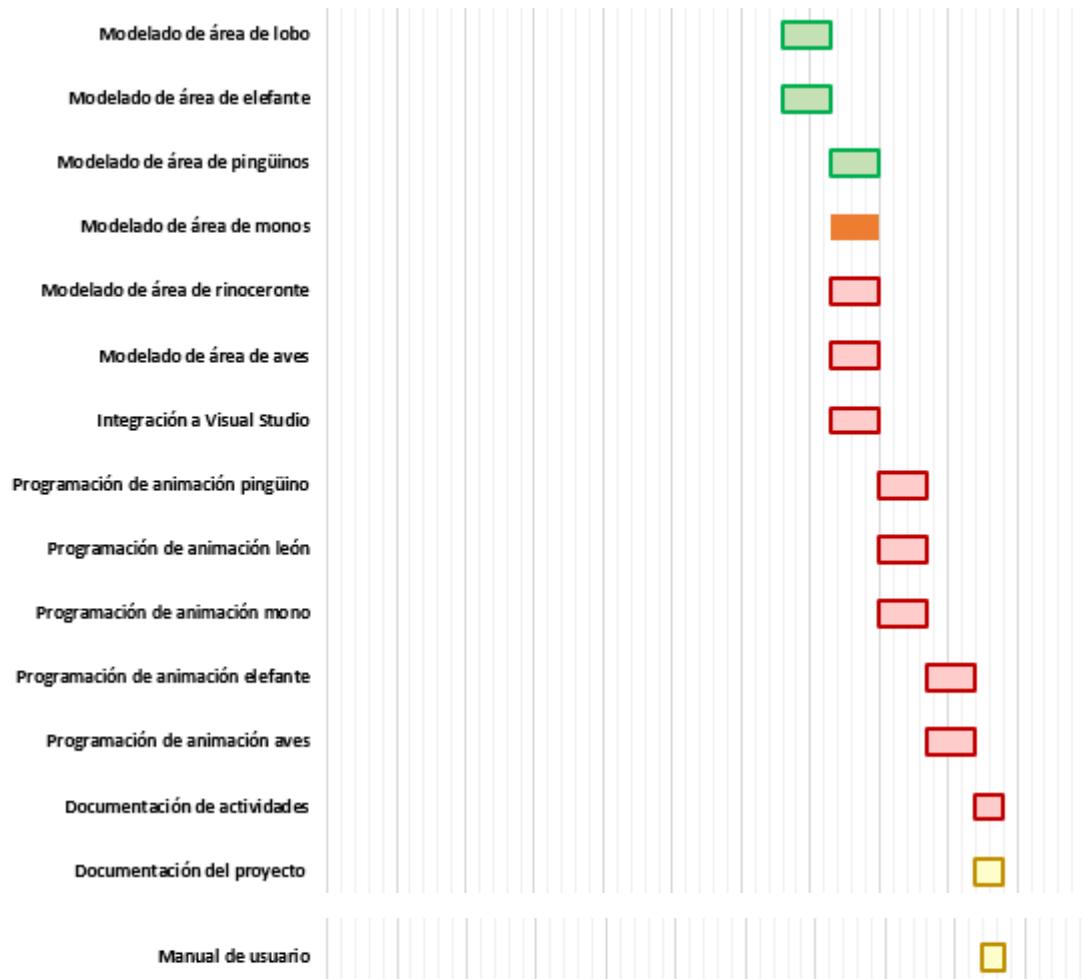
Additional Elements

Audio library OpenAL and sound loading using the irrKlang library.

Activity schedule

For this section, we will use a Gantt chart, which allows us to identify dependencies, schedule work, and keep projects on track. It provides us with control over project planning and allows us to make adjustments easily when needed. For example, if we change a deadline or finish a task ahead of schedule.





To achieve that, it was necessary to assign tasks to each team member for better control, as shown in the table below:

Nombre de actividad	Fecha de inicio	Duración en días	Fecha de Fin	Responsable	Porcentaje de avance
Planeación	03-abr	2	05-abr	Todos	100%
Selección de puestos	03-abr	2	05-abr	Tania	100%
Asignación de responsabilidades	25-abr	5	30-abr	Todos	100%
Definición de canales de comunicación	03-abr	1	03-abr	Tania	100%
Definición de horarios	03-abr	2	30-abr	Kevin	100%
Búsqueda de ideas	03-abr	4	05-abr	Todos	100%
Propuesta de animaciones	03-abr	2	05-abr	Todos	100%
Propuesta de distribución	03-abr	2	05-abr	Tania	100%
Búsqueda de modelos	03-abr	7	31-abr	Todos	100%
Elaboración de presupuesto	03-abr	2	03-abr	Tania	100%
Primera presentación de licitación	24-abr	1	24-abr	Kevin	100%
Modelado de área de leones	30-abr	7	07-may	Tania	100%
Modelado de área de lobo	30-abr	7	07-may	Tania	100%
Modelado de área de elefante	30-abr	7	07-may	Tania	100%
Modelado de área de pingüinos	07-may	7	14-may	Kevin	100%
Modelado de área de monos	07-may	7	14-may	Kevin	100%
Modelado de área de rinoceronte	07-may	7	14-may	Tania	100%
Modelado de área de aves	07-may	7	14-may	Kevin	100%
Integración a Visual Studio	07-may	7	16-may	Todos	100%
Programación de animación pingüino	14-may	7	21-may	Kevin	100%
Programación de animación león	14-may	7	21-may	Tania	100%
Programación de animación mono	14-may	7	21-may	Tania	100%
Programación de animación elefante	21-may	7	28-may	Kevin	100%
Programación de animación aves	21-may	7	28-may	Kevin	100%
Documentación de actividades	28-may	4	07-jun	Todos	100%
Documentación del proyecto	28-may	4	07-jun	Tania	100%
Manual de usuario	28-may	3	07-jun	Kevin	100%

Workflow

We decided to use the GitHub platform, which allowed us to work on different functionalities simultaneously. Each team member will upload their models and animations to the repository, according to their assigned tasks. In the end, all the changes will be merged into the main branch.

Here is the link to the repository:

<https://github.com/kevincitobb/CompuGr-fica>

Costs

The team for this project consists of the following roles:

Project Leader

Programmer

Designer

Considering a workweek of 25 hours for 5 weeks, the estimated costs per person are as follows:

Puesto	Sueldo por día	Horas de trabajo	Días de trabajo	Fechas	Total
Líder de proyecto	\$1,400	6	40	3 de abril a 3 de junio	\$56,000
Diseñador	\$700	6	30	3 de abril a 3 de junio	\$21,000
Programador	\$750	6	30	3 de abril a 3 de junio	\$22,500
Total					\$99,500

Costos Fijos (Servicios)			
Servicio	Costo por mes	Costo por duración del proyecto	
Luz	\$ 200.00	\$ 1,800.00	
Agua	\$ 200.00	\$ 1,800.00	
Internet	\$ 400.00	\$ 3,600.00	
Total:	\$ 800.00	\$ 7,200.00	

Costos Variables			
Consumibles	Costo por mes	Costo por duración del proyecto	
Licencia 3DMax	\$ 2,913.00	\$ 5,826.00	
Licencia Visual S.C.	\$ -	\$ -	
Gimp	\$ -	\$ -	
Total:	\$ 2,913.00	\$ 5,826.00	

Totales por proyecto		
Costos Fijos (servicios)	\$ 7,200.00	
Costos Variables	\$ 5,826.00	
Costos Fijos (sueldos)	\$ 99,500.00	
Utilidades (15%)	\$ 1,953.90	
Total:	\$ 114,479.90	

Licenses or credits

In order to give credit to the models used in the development of this project, the following are provided below:

Models:

Mono:



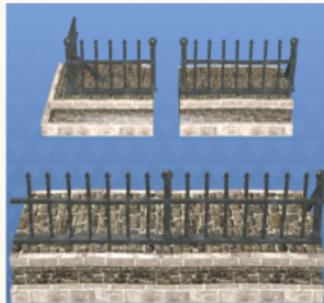
Xbox 360 - X-Men Origins: Wolverine - Monkey - the models resource. (s/f). Models-resource.com. Recuperado el 31 de mayo de 2023, de https://www.models-resource.com/xbox_360/xmenoriginswolverine/model/12700/

Lobo:



PC / Computer - Zoo Tycoon 2 - Ethiopian Wolf Male - The Models Resource. (s. f.). https://www.models-resource.com/pc_computer/zootycoon2/model/16692/

Cerca:



Wii U - Hyrule Warriors - Wrought Iron Fences - The Models Resource. (s. f.). https://www.models-resource.com/wii_u/hyrulewarriors/model/40305/

Cerca metal:



PC / Computer - Grand Theft Auto: San Andreas - Metal Fence - The Models Resource. (s. f.).
https://www.models-resource.com/pc_computer/grandtheftautosanandreas/model/53988/

Palmeras:



PC / Computer - FeralHeart - Palm Tree - The Models Resource. (s. f.). https://www.models-resource.com/pc_computer/feralheart/model/31940/

Bananas:



PlayStation 3 - LittleBigPlanet Karting - Banana - The Models Resource. (s. f.). https://www.models-resource.com/playstation_3/littlebigplanetkarting/model/9733/



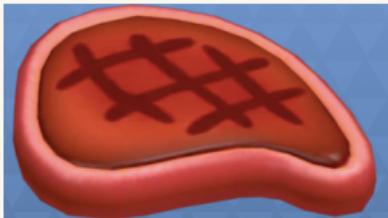
3DS - Code Name: S.T.E.A.M. - Banana - The Models Resource. (s. f.). <https://www.models-resource.com/3ds/codenameteam/model/12309/>

Roca:



PC / Computer - Zoo Tycoon 2 - Sick Dinosaur Poop -
The Models Resource. (s. f.). https://www.models-resource.com/pc_computer/zootycoon2/model/16531/

Carne:



PC / Computer - FeralHeart - Palm Tree - The Models
Resource. (s. f.). https://www.models-resource.com/pc_computer/feralheart/model/31940/

León:

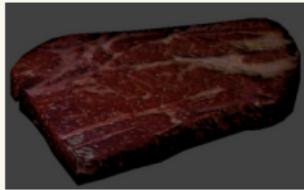


/PC / Computer - Zoo Tycoon 2 - Lion Male - The Models
Resource. (s. f.). Recuperado de: https://www.models-resource.com/pc_computer/zootycoon2/model/15171/

Leona:



PC / Computer, Lion Female, The Models Resource. (s. f.).
recuperado de: https://www.models-resource.com/pc_computer/zootycoon2/model/15173/

Carne:

Vinrax, 2013, Accesorios de comida modelos 3D, recuperado de: <https://www.turbosquid.com/es/3d-models/free-blend-model-low-poly-food/740569>

Rocas:

Ice Kazim, 2020, roca libre modelo 3d, Turbosquid, recuperado de <https://www.turbosquid.com/es/3d-models/3d-rock-model-1577462>

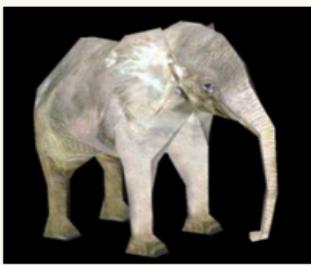
Árboles:

SpaceBrian, 2017, Árbol lowpoly model 3D, recuperado de: <https://www.turbosquid.com/es/3d-models/trees-3d-model-1189906>

Rinoceronte:

White studio 444, 2022, rhino africa for free modelo 3d, Turbosquid, recuperado de: <https://www.turbosquid.com/es/3d-models/3d-rhino-africa-for-free-1954496#>

Elefante:



modelo 3d slon 3ds gratis - TurboSquid 206352. (2003, 29 julio). TurboSquid. <https://www.turbosquid.com/es/3d-models/3d-elephant-model/206352>

Pinguino:



IPenguin V2 Free 3D Model - .obj .stl - Free3D. (s. f.). <https://free3d.com/3d-model/penguin-v2--128210.html>

Hielo:



WPC / Computer - Zoo Tycoon 2 - Large Ice Floe - The Models Resource. (s. f.). https://www.models-resource.com/pc_computer/zootycoon2/model/16685/

Halcón:

Vfalah01, 2021, Pubg Mobile Falcon -modelo 3d, Turbosquid, recuperado de: <https://www.turbosquid.com/es/3d-models/3d-pubg-mobile-falcon-1812506#>

Jaula:

IBenAwesomeness3, 2022, Bird Cage, sketchfab, recuperado de: <https://sketchfab.com/3d-models/bird-cage-f6728642ef5f421db83335be4a8bdf86>

Hábitat Halcón:

TheBanditOfRed, 2020, Small Beach Rock, sketchfab, recuperado de: <https://sketchfab.com/3d-models/small-beach-rock-3ace899d98b740e89bbfb50cc5c14247>

3D's MAX licencia de estudiante:

Descargas de software gratuito para estudiantes | Autodesk Education Community. (s. f.).
<https://www.sonda-mco.com/educacion/>

Once again, we are confident that our proposal meets the expectations and requirements of the project, and we are ready to work closely with the selection committee to ensure that the project is delivered on time and within budget. We hope to have the opportunity to work with you and carry out this exciting project.

Sincerely,
Virtual Animal

Individual Comments

Peñaloza Lugo Tania Lizeth

Task Summary:

Lion Habitat:

Design and 3D modeling of the lion habitat, incorporating characteristic elements like rocks and vegetation.

Creation of an animation depicting a lion approaching its food and turning its neck to eat, imitating natural behavior.

Elephant Habitat:

3D modeling of the elephant habitat, considering the distribution of elements like logs and vegetation.

Development of an animation showing an elephant moving its trunk or ears, recreating their characteristic movements.

Wolf Habitat:

Design and 3D modeling of the wolf habitat, replicating the natural landscape and incorporating suitable elements.

In this project, one challenging aspect for me was to find the models in 3D because sometimes they lacked the textures or the model was incomplete. The second difficult part was the animation. The animation has two components that proved challenging. First, cutting and separating the 3D model sometimes was difficult because of the polygons of the figure. On the other hand, animation in Visual Studio using keyframes was complicated when the parts on the model did not fit with the zoo environment, or they moved differently than expected due to incorrect pivot points. So, I adjusted the placement of the model's pieces to align with the proper pivot points, and then translated the model in Visual Studio accordingly.

As part of this project, my primary focus was on the lion and elephant habitats. I created detailed 3D models of these habitats, including rocks, vegetation, and other characteristic elements. Additionally, I developed animations to bring the habitats to life, with the lion animation depicting its feeding behavior. I also took on the challenge of designing and

modeling the wolf habitat, incorporating the natural landscape and animating the wolves' behavior.

I have expanded my knowledge by practicing everything I learned during the computer graphics course. Furthermore, I conducted research to learn how to integrate sound into my project. Finally, the effective communication and organization within the team are always important for successfully completing a project.

Hernández Castañeda Kevin Reynaldo:

Task Summary:

Monkey Habitat:

3D modeling of the monkey habitat, based on provided reference images.

Creation of an animation showing a monkey rubbing its stomach and head, replicating realistic behavior.

Bird Habitat:

3D modeling of the bird habitat, following guidelines for element distribution such as trees, bushes, and food.

Development of an animation showcasing a bird flying and flapping its wings, symbolizing movement between different areas.

Rhino Habitat:

Design and 3D modeling of the rhino habitat, considering the terrain and vegetation typical of their natural habitat.

In this project, my responsibilities encompassed the design and development of multiple habitats. I started by working on the monkey habitat, creating a 3D model and animating a monkey's realistic behavior. I then moved on to the bird habitat, incorporating various elements and simulating the bird's flight. Finally, I tackled the rhino habitat, designing the environment.

Together, our team successfully designed and developed a virtual zoo featuring various animal habitats. Each collaborator took on multiple tasks, ensuring the creation of immersive and realistic environments. With our combined efforts, we are confident that the project meets the expectations and requirements set forth.