



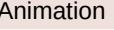
Project Log



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University	Universidad Nacional Autónoma de México
Faculty	Engineering Faculty
Subject	Laboratory of Computer Graphics and Human-Computer Interaction
Professor	José Roque Román Guadarrama
Group	11
Semester	2022-2
Name of Project	Gotham City - Voxel Art
Deadline	May 2022
Repository	https://github.com/Ari3839/Gotham.git



Log

Aa	Name	🕒 Archivo	📅 Date	☰ Tags
 <u>Initial Model Load</u>			@April 15, 2022	 Geometry
 <u>Initial animations</u>			@April 29, 2022	 Animation

Aa Name	📎 Archivo	📅 Date	🏷️ Tags
 <u>Draft</u>	<u>Boceto_PF.pdf</u>	@March 27, 2022	Animation Avatar Geometry Illumination Routes
 <u>Finished models</u>		@March 31, 2022	Avatar Geometry
 <u>Gant Diagram</u>	<u>Diagrama de Gantt.xlsx</u>	@March 27, 2022	Animation Avatar Geometry Illumination Routes
 <u>Music</u>		@April 24, 2022	Bonus
 <u>Ground texture</u>		@April 14, 2022	Avatar
 <u>Instances with primitives</u>		@April 3, 2022	Avatar
 <u>Texture/color</u>		@April 8, 2022	Avatar
 <u>Proposal Document</u>	<u>PropuestaProyectoFinal_CGeIHC.pdf</u>	@March 21, 2022 → March 22, 2022	Animation Avatar Geometry Illumination Routes
 <u>Avatar Inspiration</u>		@March 28, 2022	Avatar
 <u>Main character sketch</u>		@March 29, 2022	Avatar
 <u>Creation of the repository on Github</u>		@March 24, 2022	Geometry
 <u>Starting lights</u>		@April 23, 2022	Illumination

Aa Name	🕒 Archivo	📅 Date	⠇ Tags
 <u>Skybox</u>		@April 16, 2022	Illumination
 <u>Textures with light</u>		@April 23, 2022	Illumination
 <u>Animation pt2</u>		@May 1, 2022	Animation
 <u>New models</u>		@May 3, 2022	Animation Geometry Routes
 <u>Avatar animation</u>		@May 4, 2022	Animation Geometry Routes
 <u>KeyFrames Animation</u>		@May 4, 2022	Animation Routes
 <u>Corrections</u>		@May 8, 2022	Animation Bonus Geometry Illumination Routes
<u>Documentation</u>		@May 13, 2022	Animation Bonus Geometry Illumination Routes
 <u>Torous</u>		@May 15, 2022	Bonus

The proposal Document was sent before 10 a.m.

The general idea is a fragment of Gotham City, it describes the necessary elements required by the lineaments:

- Geometry
- Avatar
- Routes
- Illumination

- Animation

The proposal was accepted, but I'm supposed to check the original ideas of the avatar because it cannot be imported (only secondary characters) and the idea of the illumination (I'm not really sure I'm gonna be able to simulate the batsignal at the scenery for this category).



Ing. Jose Roque RG 21 mar
recuerda que el avatar no
puede ser importado; buen uso
de herramienta para solucionar
el problema presentado, no
vemos reflejos y sombras en la
materia, eso es de
Computación Gráfica
Avanzada,



Ing. Jose Roque RG 21 mar
Propuesta Aceptada. Para el
boceto recordar usar
simbología para representar
todos los elementos a
implementar en el escenario.

Comments on classroom



24th March. Creating the repository in Github

Due to the fact that we were asked for 2 models that we could use in the project in the practice report 6 of the laboratory, I thought it convenient to create the project repository at that moment to have access to these models from different devices and keep track of versions in case of errors and make the necessary changes to those items.

Ari3839 / Gotham (Private)

Code Issues Pull requests Actions Projects Security Insights Settings

main 1 branch 0 tags Go to file Add file Code

Ari3839 Adding models ... 7556dcf 2 days ago 6 commits

Modelos_obj Adding models 2 days ago

Modelos_vox Adding models 2 days ago

README.md Initial commit 3 days ago

README.md

Gotham

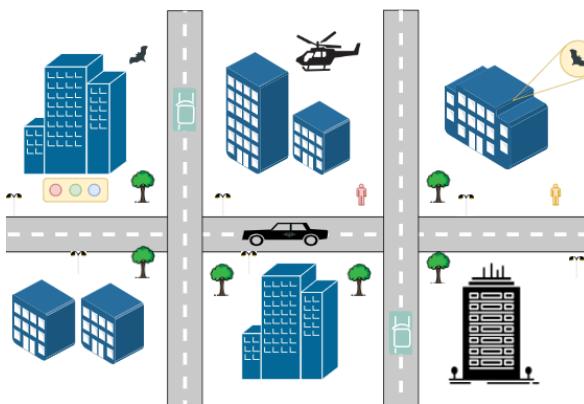
Proyecto de computación gráfica 2022-2: Gotham estilo Voxel Art



27th March. Draft

Before 3:00 p.m., a sketch idea was delivered that covered the 5 main elements requested in the guidelines document from an aerial view and with corresponding symbols.

It is worth mentioning that I chose a very small fragment of the city in the hope that I could add more elements in the future (benches to sit on, traffic lights, a train, a blimp, etc.), however, I recognized the deadline time, my burden in other subjects and activities, besides the fact that I am doing the project alone, so I did not include too many elements in the initial sketch.



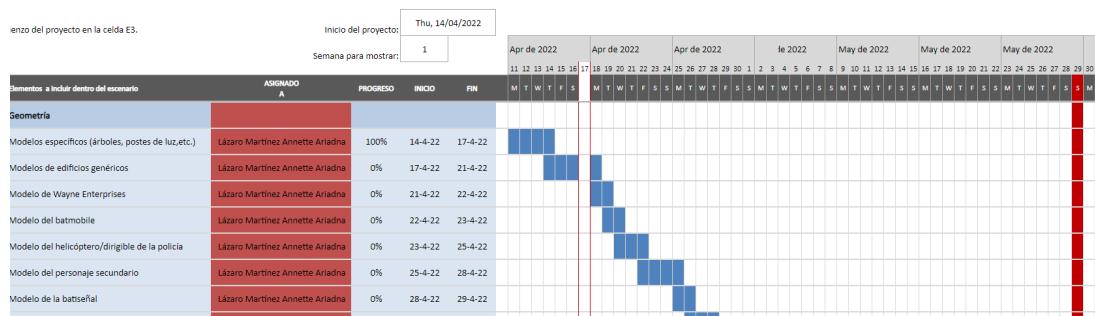
27th March. Gantt Chart

An Excel file with the Gantt Chart template provided and the project activities included for each of the 5 requested elements was delivered before 3:00 p.m.

Gotham City - Voxel Art

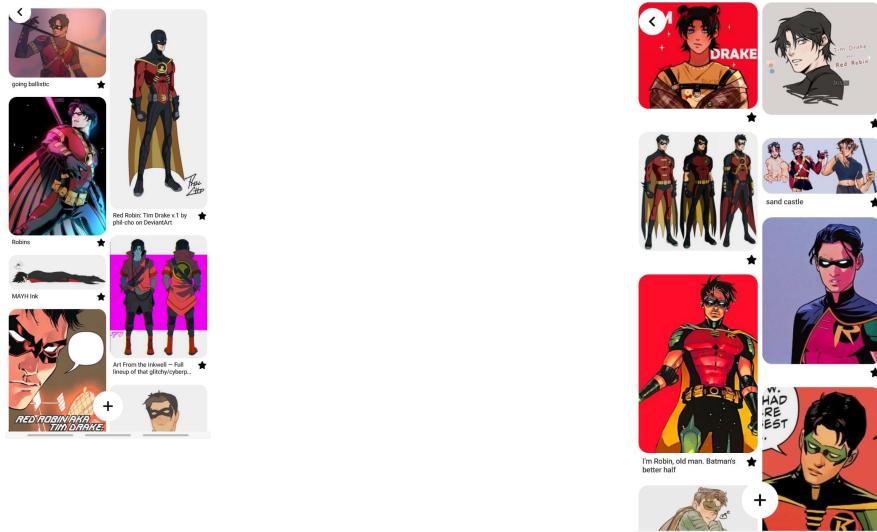
UNAM-FI CGeIH 2022-2
Integrantes del equipo

Lázaro Martínez Annette Ariadna



28th March. Avatar Inspiration

Since the character is a comic book character, he has undergone a lot of design changes over the years, however, it seemed appropriate to depict him as Red Robin and not Robin or Drake. Also, I combined some designs for the final model.



29th March. Avatar sketch

By this point, I had already made the models for the secondary characters, so I already had a skeleton for humanoids and just played with the design of the suit until I came up with a version that convinced me.



First Design



Final Design



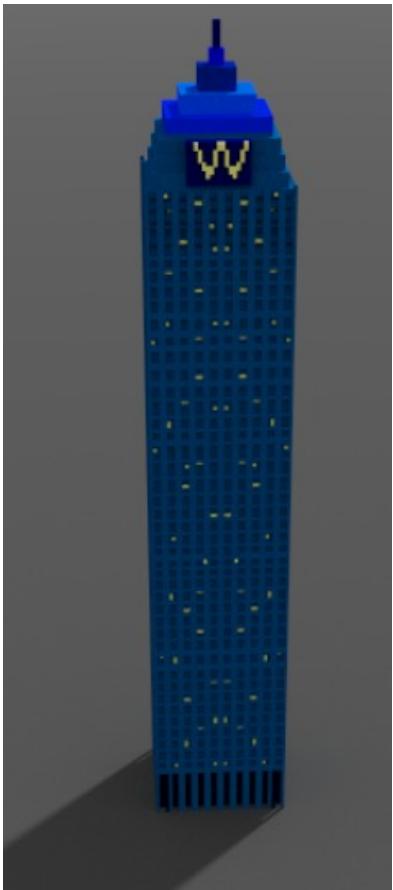
22nd March-31st March Finished models

After making the Gantt chart, I realized how little time we had (not counting Easter), so I decided to make as many models as I could over the weekend, taking advantage of the fact that we didn't have a lab class that week.

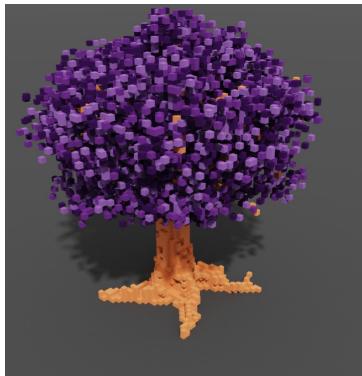
The first models I made were mainly used to familiarize myself with the interface, so the last models I made without the help of tutorials, just following a generic idea and adding final touches, for example, dirt stains that gave the appearance of being in Gotham City.

I saved the models in .vox format, editable from MagicaVoxel in case it was necessary to modify the colors or elements, as well as .obj to optimize them from 3DS Max and be able to import them into OpenGL.

I uploaded both formats to the Github repository and updated as many times as necessary.



Wayne Enterprises



Jacarandas Tree



Batmobile



Dirigible Gotham City Police
Department



Jason Todd AKA Red Hood

It is worth mentioning that I made the different models in no specific order, so the completion dates are very arbitrary and I can only mention start and end dates, in addition to the fact that even at the end I made changes to some colors in the models or optimizations with 3DS Max to modify the pivots.

Also, making a model of the main character (avatar) allowed me to take screenshots that will help me to make the 2D texture of said character.



3rd April - Instances with primitives

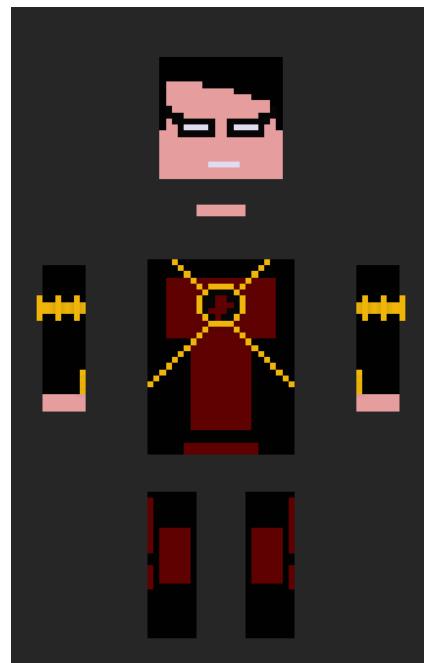
For this activity I used pure OpenGL cubes, however, since each element should have a different texture location, a cube was created for each of the body parts. It is worth mentioning that the model in MagicaVoxel allowed me to scale the elements much more easily, however, the positioning for the model hierarchy was a bit more complicated.

Once the stage models were integrated, it was necessary to resize the avatar, however, the Magical Voxel scale was followed to modify both the sizes and the positions, so no problems arose for this.



8th April - Texture/color

Due to the task that they asked us in the theory class to elaborate the texture of our avatar, I decided to try the texture elaborated with the instances that I had of the avatar. It was necessary to comment on some of the body parts while checking the correct texturing of the avatar.



Frontal view



14th April - Ground texture

The texture of the floor was the only one I got from the internet, from then on even the textures for both skyboxes were made by me. The loading of these textures was done with the initial load of models during Easter.



15th April - Initial Model Load

This activity took much longer than specified, since each and every one of the objects that were raised somewhere on the stage had to be accommodated, not only making the positioning, but also

the necessary transformations and the hierarchy of models if necessary.

Due to the above, I modified several models and added others as I got inspiration if necessary, even days before delivering the final project.

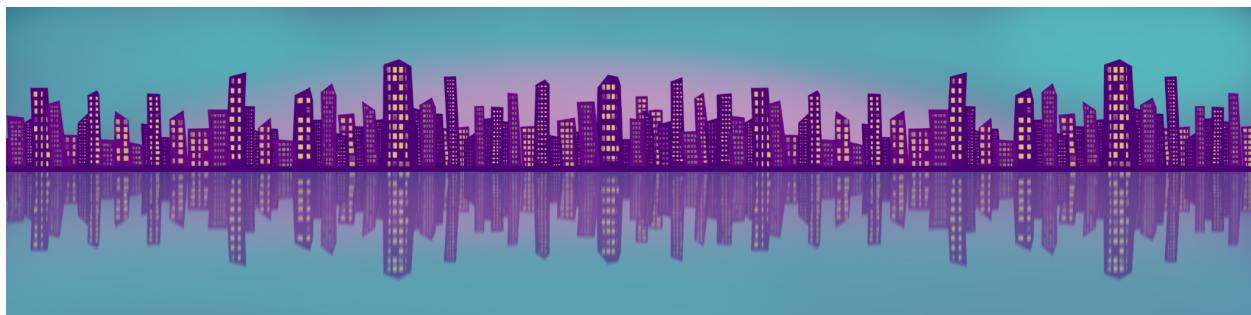


15th April - Skybox

On this date, the day and night Skybox was handcrafted using the iOS Procreate software. The skybox was instantiated to change according to an aggregate count variable, however the day skybox was later modified to better show this effect. In one of the later modifications the ambient light was also modified to better focus the day-night cycle.



Final night Skybox



Final Day Skybox

Gantt Chart Activities:

- Set day/night cycle
- Change of the Skybox according to the cycle



16th April - Cameras

From this moment on, the initial files of the camera were modified to be able to create the two requested instances (one linked to the floor and the other aerial), as well as to change between cameras by keyboard and to be able to return to the previous information with the change of cameras. It is worth mentioning that comments were used in these classes to also be able to use the original camera provided that allows movement in all axes, to facilitate the positioning and modification of the objects on the stage.

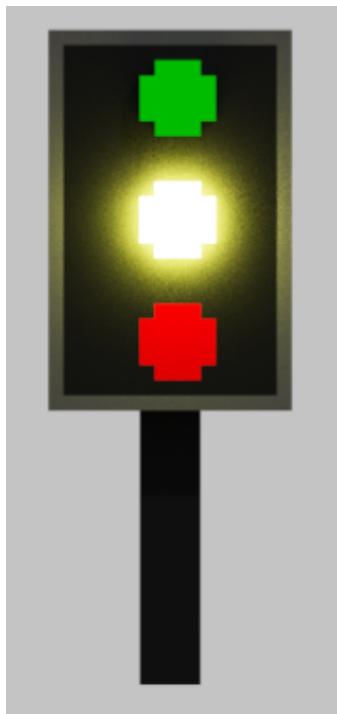
Gantt Chart Activities:

- Primary camera definition
- Secondary camera definition
- Movement by keyboard
- Implementation of the change of cameras (saving the position)



23rd April - Textures with light

After doing the first lighting practice, I realized that you couldn't include too many lights with OpenGL, so I opted to render some lights from the model in MagicaVoxel, take screenshots, add the textures to modified cubes from blender and append the models so that they change according to the day-night cycle. Most of these elements are signs on the buildings, but I also modified the texture of the Wayne Industries tower.





23rd April - Starting lights

After completing both lighting labs, I decided to add my stage lights according to the OpenGL limit and what was requested in the project, as follows:

Point lights:

- Helicopter
- Airship
- batsignal

Spotlights

- light show

Gantt Chart Activities:

1. Light modeling for the spotlight show
2. Implementation of the show spotlight
3. Implementation of luminaires according to the cycle



24th April - Music

The 'extra time' I had allowed me to search how to implement audio with OpenGL, for which I found a video on Youtube, which, although it was in another language and had no subtitles available, showed the libraries used and the code included to reproduce audio in an OpenGL project. It was necessary to make changes to the code of the project, since the configuration of the video was different from that of my project, however, it was possible to include music.

Before committing to the repository, I included instances for each of the characters (Tim, Jason, and Dick), so I had to find music that reminded me of those characters (I even asked for recommendations on a Discord server).

- Bohnes - Middle Finger
- Fall Out Boy - Where Did The Party Go
- HarryStyles-AsItWas
- The Batman - Michael Giacchino
- twenty one pilots Stressed Out



29th April - Initial animation

After doing the basic and complex animation practice, I made the following animations:

Basic animation:

- Movement of the batmobile around Wayne industries. The translation of the car in the XY plane with straight lines, the rotation of the tires, and the movement is postponed with the number keys.

Complex animation:

- Movement in the 3 axes of the bird. In the XZ plane it performs a spiral movement, in Y it only ascends or descends progressively. It also performs rotation and movement of the wings.
- Movement in the XZ plane of the airship and rotation of the model. The point light of said object moves with it when it has the night cycle.

Gantt Chart Activities:

1. Batmobile keyboard movement
2. Flying animal motion algorithm



1st May- Animations pt2

It was added the stage model and the corresponding movement of the light show that turns on and off with the keyboard (keys 3 and 4), the models of the bat-signal were added so that it is shown only at night, along with the rotation on its axis. The animations of the secondary characters (Dick and Jason) were added, so that they are only performed once per program, and are activated with the keyboard (N and R keys).

NOTE: See the benches of the building where N is. Avatar animation is missing. Will motion be added to another element? —> ok

Gantt Chart Activities:

1. Minor Character Movement Algorithm



3rd May- New Models

It was necessary to add models for the keyframed animation that is planned for the helicopter and airship, the objects that the avatar will use for its animation were also added, and the conditions to start the animations of the secondary characters were modified.

NOTE: the camera must be the floor camera —> ok

NOTE 2: Pivot changes for helicopter and avatar members must be done—> ok



4th May- Avatar animation

There where added variables, conditionals, models, etc. required for avatar traversal/animation when certain keys are pressed. The implementation of the hook can be improved.

The functionality to restart the animation was later added.

The operating keys are 7 and 8 at the moment

NOTE: Check the audio —> in the Alpha version it is functional together with the animations

NOTE 2: The 2 animations with KeyFrames are missing —> In the next version they are completed



4th May- Keyframes animation

The animation of the helicopter by KeyFrames is already functional, even reading and saving information from text files, but they must be done by keyboard first.

The variables, functions, files and others necessary for the animation of the airship through keyframes have been added. Variables are read and stored from a file, they only need to be programmed with the keyboard.

NOTE: Increase the number of frames that can be stored —> ok

NOTE 2: Play around with the positions to get the desired result —> ok



8th May- Corrections

Changed character animations to repeat.

The sphere files were also removed, and the README file was modified to display the documentation.

All the elements requested in the project are already available, including geometries, models, animations, lighting, textures, music, changes according to the day and night cycle or the key that is handled.



13rd May - Documentation

After the previous delivery of the final project, the necessary modifications were made and later the documents for the delivery were made (manuals, log, Github evidence, video, etc.)



15th May - Torus

On this date, the documentation of the class corresponding to the toroid that was requested from us was added.