UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO

FACULTAD DE INGENIERÍA

DIVISIÓN DE INGENIERÍA ELÉCTRICA (D.I.E)

# Laboratorio Computación Gráfica e Interacción Humano Computadora

## Proyecto Final: Manual de usuario y documentación (En Inglés)

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Alumnos:

| | |
|---|---|
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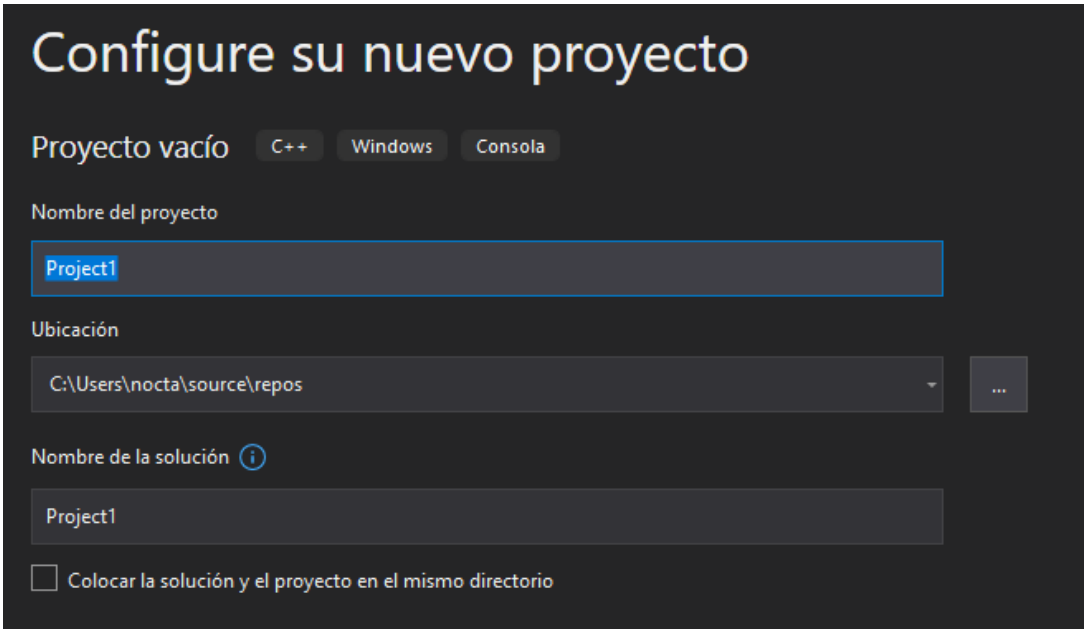
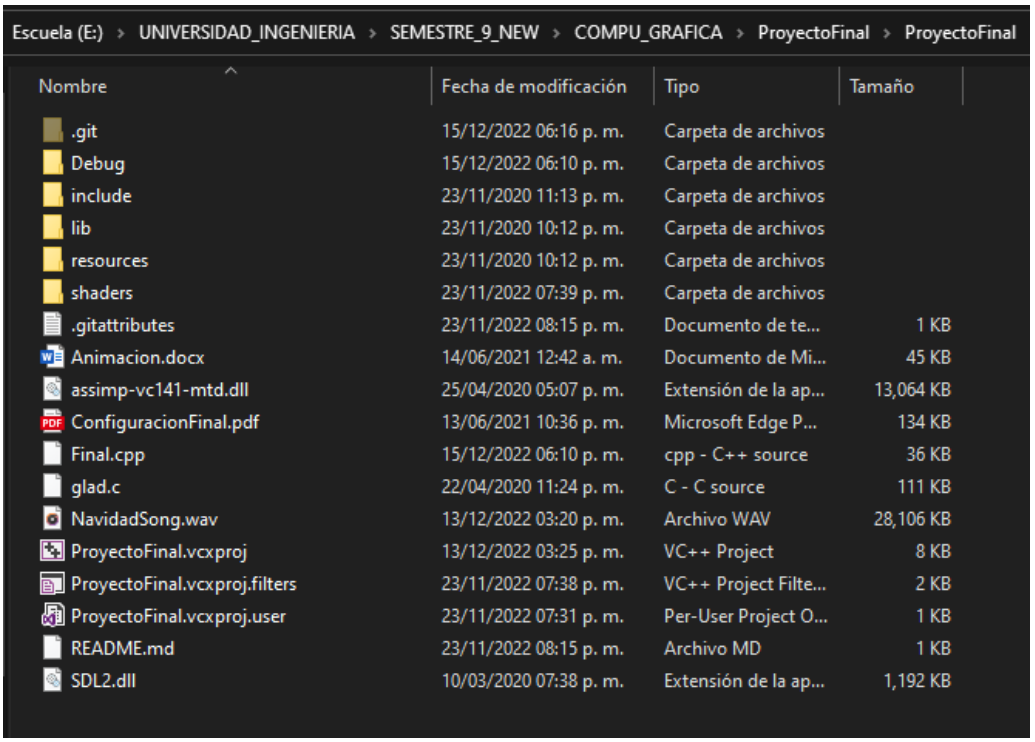
**Manual de usuario: Configurando el proyecto.**

Para poder configurar correctamente el proyecto, se deben realizar los siguientes pasos:

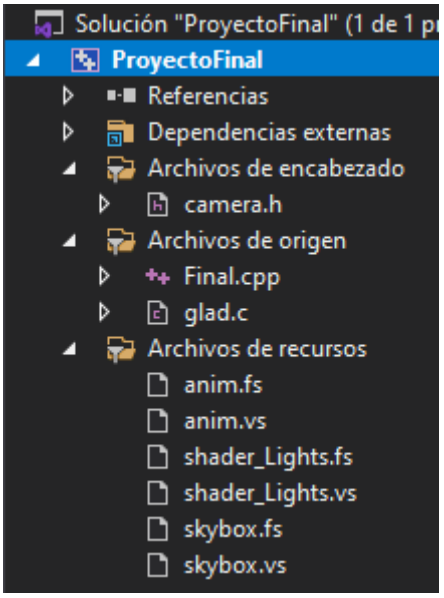
1. Se debe de crear un **proyecto** vacío utilizando **Visual Studio**, preferentemente la versión de 2019 para el lenguaje C++. El nombre del proyecto "**ProyectoFinal**", y debe ser el nombre de la solución.



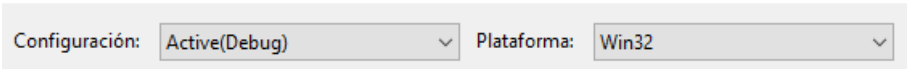

2. Con el proyecto creado, vamos a la ruta donde se creó y nos ubicamos en la carpeta que contiene los archivos generados por default (.vcx). En esta carpeta es donde se debe **clonar el repositorio de github provisto a continuación**, ya que este repositorio tiene todos los ficheros necesarios para la ejecución del programa. Al realizar la clonación del repositorio, se debe obtener una estructura como la siguiente:
   Link Repositorio: https://github.com/CesarYCG/ProyectoFinal



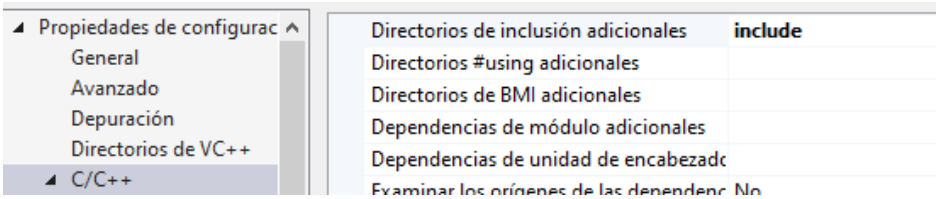
3. Finalmente, se hará uso del manual de configuración final para poder agregar las bibliotecas y archivos en la solución como se muestra a continuación.



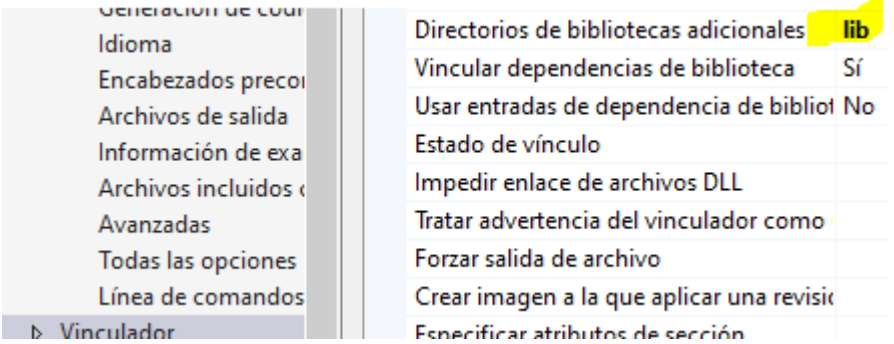

4. Y en las propiedades de la solución se deben realizar las siguientes configuraciones:
   a. La Configuración y Plataforma es Active(Debug) y Win32 respectivamente.




   b. Para la pestaña C/C++ se adiciona **include** en Directorios de Inclusión adicionales

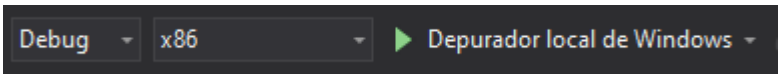



   c. Para el vinculador:




   d. Para el vinculador, en **entrada,** se deben adjuntar las siguientes dependencias: SDL2.lib;SDL2main.lib;assimp-vc141-mtd.lib;opengl32.lib;glfw3.lib;kernel32.lib;user32.lib;gdi32.lib;winspool.lib;comdlg32.lib;advapi32.lib;shell32.lib;ole32.lib;oleaut32.lib;uuid.lib;odbc32.lib;odbccp32.lib;%(AdditionalDependencies)

   Se aplican los cambios y finalmente, se verifica que en el IDE de desarrollo se tengan las siguientes selecciones:



Una vez creado el entorno para su funcionamiento y ejecutado, se tiene la siguiente distribución de teclas:

- W, A, S, D permiten mover la cámara del proyecto.
- La tecla “1” reproduce la pista músical
- La tecla “O” reproduce una animación.
- La tecla “ESC” cierra la ejecución del programa.

**Activity Timeline**

For the current project an activity timeline was necessary. As it shows below, the activities for the project were left since September. Explanation of every phase is described below.

| | | SEP | OC | TU | BRE | NOV | IEM | BRE | DICI | EMBRE |
|---|---|---|---|---|---|---|---|---|---|---|
| **Fase** | **Actividad** | 30 | 1-7 | 8-14 | 15-28 | 1-7 | 8-14 | 15-28 | 1-7 | 8-15 |
| | Búsqueda de idea general | | | | | | | | | |
| Creativa | Propuesta de diseño | | | | | | | | | |
| | Búsqueda de modelos | | | | | | | | | |
| | Modelado | | | | | | | | | |
| Desarrollo | Integración a Visual Studio | | | | | | | | | |
| | Programación de animaciones | | | | | | | | | |
| | Documentación de actividades | | | | | | | | | |
| Document ación | Documentación del proyecto general | | | | | | | | | |
| | Manual | | | | | | | | | |
| | Costos de proyecto | | | | | | | | | |

Starting from the initial concept, we chose the option to make our own design for the house. For this one, the application HomeByMe - Inicio was very useful. With this tool and the specifications given, we create the design proposals and take the best of every idea given by the team members to end up with a final but practical and professional-looking model.

By using the HomeByMe Tool, we ended up with the following design:

And mapped from a schematic view, it looks as it follows:


Finally, it's important to say that this **prototype doesn't count with Christmas tematic objects because of the limitations of the app**. Further during development, these items were added and in some cases, replaced the original models of the prototype in order to follow the requirements of the project.

During the **development phase** we used modeling tools as 3DS MAX 2023 and BLENDER to customize, adjust and in some cases, create our models for the project. During this time we took many .obj files and we applied textures, color and other properties as rotation, translation and scaling to get the desired models.

During the integration to Visual Studio project, we relied on **Github** cloud coding platform in order to keep a single well developed flow of work. Because of Github capabilities, everyone was able to work remotely on the project and improve them through commits and pull requests. Setting up the project for everyone was also easy using this tool, because everyone could get the mandatory files (source codes, images, etc) to compile the project without configuration errors.

Finally, for the **documentation phase** we use the material and data generated by the used tools described above. With HomeByMe, we took photos of the final prototype proposal and with Github, we took control of the finished activities to write it in the present document.

**Activities realized by César Yair Calderón Guevara**
For this project my main activities are described below:

First, I setted up the application base in Github for my companions to clone in and work on it during the development stage. It was not a hard task since I have experience working on GitHub with many personal and professional projects.

I recreated models for parts of the house, in particularity for the garage, one bathroom and the kitchen. I use mostly free 3D models but I was required to use 3DS Max to charge the models and modify them in order to fulfill the project requirements.

For the models, I created:

- A fully equipped kitchen, with a fridge, a microwave and furniture filled with textures to give a better appearance in the designs made.
- Snowmans, downloaded from a webpage without textures in order to apply color textures to give a better appearance and dynamism.
- For the garage I downloaded a model of a car and modified it to give a repairing stage appearance. There's also a lambo model used during the laboratory practices.
- For the bathroom I used models generated by my partner Miguel Angel, saving time and effort into making new models.

I also designed the main prototype of our project using the HomeByMe web application. It's a free navigable application that can let you create a building and insert a large variety of furniture and interesting assets, giving a professional ending view. The link of the prototype created is listed below:
https://home.by.me/es/project/noctan_lovo-2365/casacgeihc1

Finally, I created the documentation for the project, written mainly in English because I considered it a good practice to prove my writing skills. During this process I watched the commits made with my partners and asked them to put their information in Spanish in order to translate them with my skills. The less I used the translator, the best.

In my opinion, the development and deployment of the project was a great challenge for me because I never used modeling tools as 3ds max and thinked of instancing models inside a virtual environment created in C++ application. I enjoyed modeling objects, searching for textures to be applied and playing with the code in order to create animations and clean the code in the process.

For the complexity of the task, I must confess my time management wasn't very good, because I lost plenty of time fixing bugs and thinking how to manage in order to successfully add my models into the project without messing up the work of my companions or even mine itself. I learned a lot here, not only for the coding and modeling process, but also for managing to get the tasks done in time.

**Activities realized by Luna Colmenares Miguel Angel**

For this project I recreated the house base structure (walls, floor ceiling, pool, garden) using Blender for the modeling and later, I used 3ds max to put texture on them. The above required textures for windows, doors, walls, floor and the other parts of the base structure. I used mostly free models from the internet and a few of them were modified for our needs.

Since I made the base forms for the rest of the structure, I had to look for textures for the floor and the rest of the environment in the project. In order to modify my assigned models, Blender helped me a lot to aggregate the structures, while I was using 3ds max to put textures on them.

Finally, the animation of the flying sledge was on my own and it required some time to prepare the model and then give the movement in the sky.

In conclusion, I can say the implementation and creation of the models needs to be realized in detail because, sometimes, we only need a few parts of an entire model and we need to clean it or separate the wanted part from the unwanted ones to get our designs. Translation, escalation and rotation were useful operations that helped me instance models inside OpenGL C++ code. I also managed pivots in order to better manipulate source code with my models. Finally, a challenge I face up was the texturized process, because some models didn't get any to be applied, or needed to be redone from start.

**Activities realized by Jaime Moreno Duran**

In this project I mainly managed the modeling and programming process for the garden, bedrooms and bathrooms plus creating a christmas tree. For the project I considered elevating the ceiling to get a better appreciation of the items related to the project.

I looked for the models around internet pages and I downloaded the free versions of them. With 3ds max and blender i was able to instance the objects for the christmas tree, a few beds and a set of elements for a bathroom such as toilet, jacuzzi and a sink. I watched out for scales to make them proportional and I put them using scaling, rotate and translate properties in OpenGL.

I also looked for dresser and wardrobe models to fulfill the bedrooms as it was needed. Creating models and applying textures for the desktop objects like computers, I was capable of recreate a PC model and a full bedroom in time.

In my opinion, it was very challenging the time spent between modeling, applying textures and instancing the models inside OpenGL. Because of the complexity of some models and textures not correctly applied, I had to look further into my imagination to find out the best way to do the tasks.

**Activities realized by Tania Lizeth Peñaloza Lugo**

The models that I have created require the Blender software. I used theFree 3D models, CGtrader and Turbosquid webpages to download free models which helped me to create the models for the project. I had to apply textures and create elements such as cubes and cylinders in order to get the models ready to be charged in the cpp application.

My principal tasks were creating a full piece for the living room and I had to think big because there was so much detail on them. I had to take elements as DVD, the console and remote control to recreate them using textures and precharged models.

For elements such as the tv screen or the chairs, I recreated them from scratch using cubes, it was easy because of the shape given in the prototypes. A hardest task was creating the plants because I had to look over the internet for textures to be applied because the models didn't come with any.

I recreated a full bedroom with bunk beds, for this it was necessary to use a model from the internet. I had to face several errors in order to put correctly my models in the project, some of them caused by the absence of textures or a bad mapping in the .obj files.

As a comment, I found the project very laborious, the task of modeling, exporting and putting into the project took me several hours and facing the problems in order to fix them took me more. I made a few mistakes exporting my Blender models and that caused errors in the project or a gray looking in the cpp code.

**Tools For Development**

The tools used during the development of the project were, mainly:

- GitHub
- HomeByMe
- 3DS MAX
- Blender
- GIMP

**Technical Cost**

For the final cost of the project, we consider the following points:

- Time Spent (In hours)
- Hardware used (CPU and GPU capacity to create the project)
- Complexity (How difficult was to create the project)
- Required supplies like electricity, internet, food and equipment.

Considering the points mentioned above, we made an estimation in US dollars with a fee of $10 dollars per hour. Calculating time spent in development as well as calculating the consumption of our hardware and services, we sell our project for 2000 USD.

The main reason for the price was the use of electricity, internet and time spent programming and modeling to put it into the project. It has to be mentioned: due to the problems faced and the inability to end up with the project with the required instances, the project price is lowered.

**Models utilized**
In order to give proper credits to the original authors of the used models, below you can find the links to their downloadable content.

Modelos extraídos del Dormitorio 3:
https://www.turbosquid.com/es/3d-models/3d-model-guitar-1889507
https://www.turbosquid.com/es/3d-models/mueble-3d-model-1506916
https://www.turbosquid.com/es/3d-models/wooden-cabinet-interior-furniture-3d-1776696
https://www.turbosquid.com/es/3d-models/rustic-nightstand-furniture-wood-model-1327302
https://www.turbosquid.com/es/3d-models/bed-desiree-lov-max-free/928835

Modelos extraídos del Comedor:
https://www.turbosquid.com/es/3d-models/table-long-3d-1676699
https://www.turbosquid.com/es/3d-models/chess-board-chess-men-chess-3ds-free/444455
https://www.turbosquid.com/es/3d-models/3ds-max-wenge-table-chairs/500989
https://www.turbosquid.com/es/3d-models/3d-custom-poker-chips-1321316
https://www.turbosquid.com/es/3d-models/free-3ds-model-books-papers-pen/541553

Modelo de trineo:
Trineo:https://www.turbosquid.com/es/3d-models/free-christmas-scene-3d-model/566549

Modelos extraídos del Baño 2:
https://www.turbosquid.com/es/3d-models/dresser-bedside-table-model-1423140
https://www.turbosquid.com/es/3d-models/shower-3d-model-1524283
https://www.turbosquid.com/es/3d-models/houseplant72coronamax-3d-1851473

Modelos usados para el Patio:

https://free3d.com/es/modelo-3d/christmas-tree-v2--519851.html

https://free3d.com/es/modelo-3d/christmas-tree-38182.html

https://free3d.com/es/modelo-3d/low-poly-tree-24775.html

https://www.turbosquid.com/es/3d-models/free-max-mode-realistic-garden-furniture/732812

Modelos usados para la Cocina:

modelo 3d Cocina sencilla gratis - TurboSquid 1247385

Kitchen Free 3D Model - .3ds .obj .blend .fbx .mtl - Free3D

Modelos usados para el Garaje:

modelo 3d 1987 Sol Sheath Mid Engine Sports Car gratis - TurboSquid 1983227

modelo 3d bicicleta de baja poli gratis - TurboSquid 1793840

modelo 3d Motor del cepillo gratis - TurboSquid 359743

modelo 3d NEUMÁTICO gratis - TurboSquid 1634840

modelo 3d LLave inglesa gratis - TurboSquid 1343629

modelo 3d Escalera Ladder gratis - TurboSquid 1998486

Modelos usados para estantería y muñeco de nieve:

modelo 3d ESTANTERÍA gratis - TurboSquid 1550714

https://www.turbosquid.com/es/3d-models/3d-sleigh-1661225

modelo 3d Calcetín para regalo de Norvedem. gratis - TurboSquid 1354042

modelo 3d Sombrero de Navidad pintado a mano gratis gratis - TurboSquid 1236195

modelo 3d Regalo de agradecimiento de Navidad y año nuevo de muñeco de nieve GRATIS gratis - TurboSquid 1664834

Modelos usados para el Cuarto:

https://www.turbosquid.com/es/3d-models/free-max-mode-realistic-garden-furniture/732812

https://www.turbosquid.com/es/3d-models/3d-bed-room-1998581

https://www.turbosquid.com/es/3d-models/tv-set-3d-model-1912950

https://free3d.com/es/modelo-3d/wood-desk-93009.html

Modelos usados para Sala:

https://free3d.com/3d-model/low-poly-isometric-room-1-704614.html

https://www.cgtrader.com/items/133651/download-page

https://www.turbosquid.com/3d-models/houseplant72coronamax-3d-1851473

https://www.cgtrader.com/items/4091340/download-page

Modelos usados para Recamara:

https://www.cgtrader.com/items/882048/download-page

https://www.cgtrader.com/items/2838402/download-page

https://www.cgtrader.com/items/2090190/download-page

https://www.turbosquid.com/3d-models/bed-model-1730746

https://www.cgtrader.com/free-3d-models/furniture/chair/ahrend-230-seat

https://www.cgtrader.com/free-3d-models/architectural/decoration/canvas-painting-with-frame-030

Modelos usados para Patio trasero:

https://www.cgtrader.com/items/1007832/download-page

https://www.cgtrader.com/items/2532584/download-page

https://polyhaven.com/a/wooden_planks