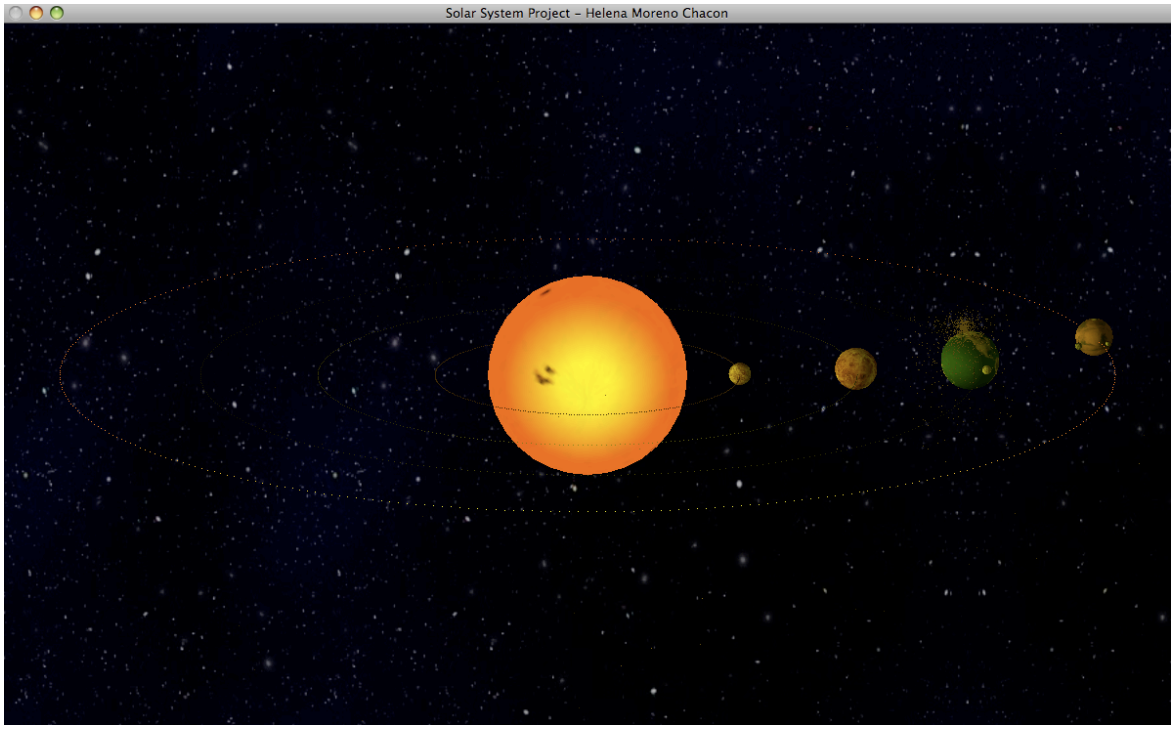
SOLAR SYSTEM SIMULATION

OPENGL & C++



Helena Moreno Chacón

Final Project - Solar System Simulation

This is a simulation of a "interior" Solar System based on OpenGL and C++.

I have programmed it under Mac OS, using XCode as development tool. Due it, I did not use some libraries as “glaux.h” and “window.h” (included in Windows OS), and the headers of the libraries are written with other path, for example:

#include <**OpenGL**/gl.h> / / Header File For The OpenGL32 Library

It works as fine as under Windows. But if you want to use the code on Windows, to have to change the path of the libraries.

In my simulation I have included the following objects:

- **The Sun**

- **4 planets around Sun:** Mercury, Venus, Earth and Mars.

- **3 satellites** around theirs planets: the Moon (around Earth), Deimos and Fobos (around Mars).

- **A “comet”**: using particles.

- **The dotted "orbit"** of each planet. It is not necessary, but I used it to make proves.

- **The background** of the galaxy.

I calculated approximately the size of each planet and their distance to Sun using data from astronomical web pages.

Also I have programmed the following behaviors:

- **Illumination:** It becomes from a point immediately in front of Sun, and illuminates all objects. I put some red color in the light, to makes it more realistic.

- Each object has its own **texture**: I downloaded all textures from Sun, planets and satellites from http://planetpixelemporium.com/earth.html

- Each planet has its own **duration of year** (translation around Sun).

- Each planet has its own **duration of day** (rotation on its axis): Venus is the one planet that rotates in the opposite way of the others planets, so I changed its rotation velocity (slower) to appreciate it.

- The **particles** of the queue ‘s comet has its own behavior, and all the information of each one is stored in a array of structures of particles.

I calculated approximately each “planet year” and “planet day” using data from astronomical web pages.

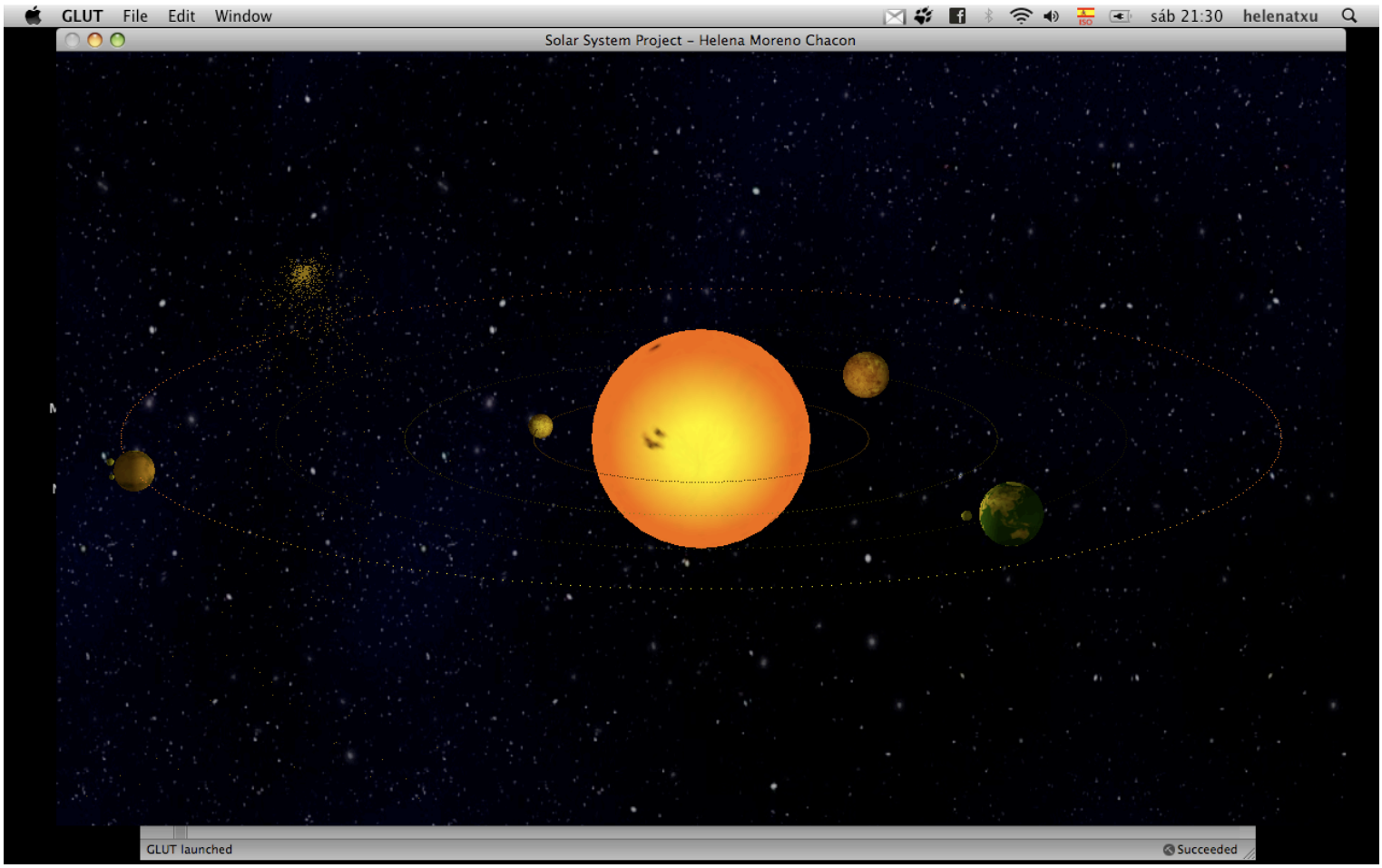
Animation Control: you can control the animation speed pressing the keys "Up" and "Down" during the animation.

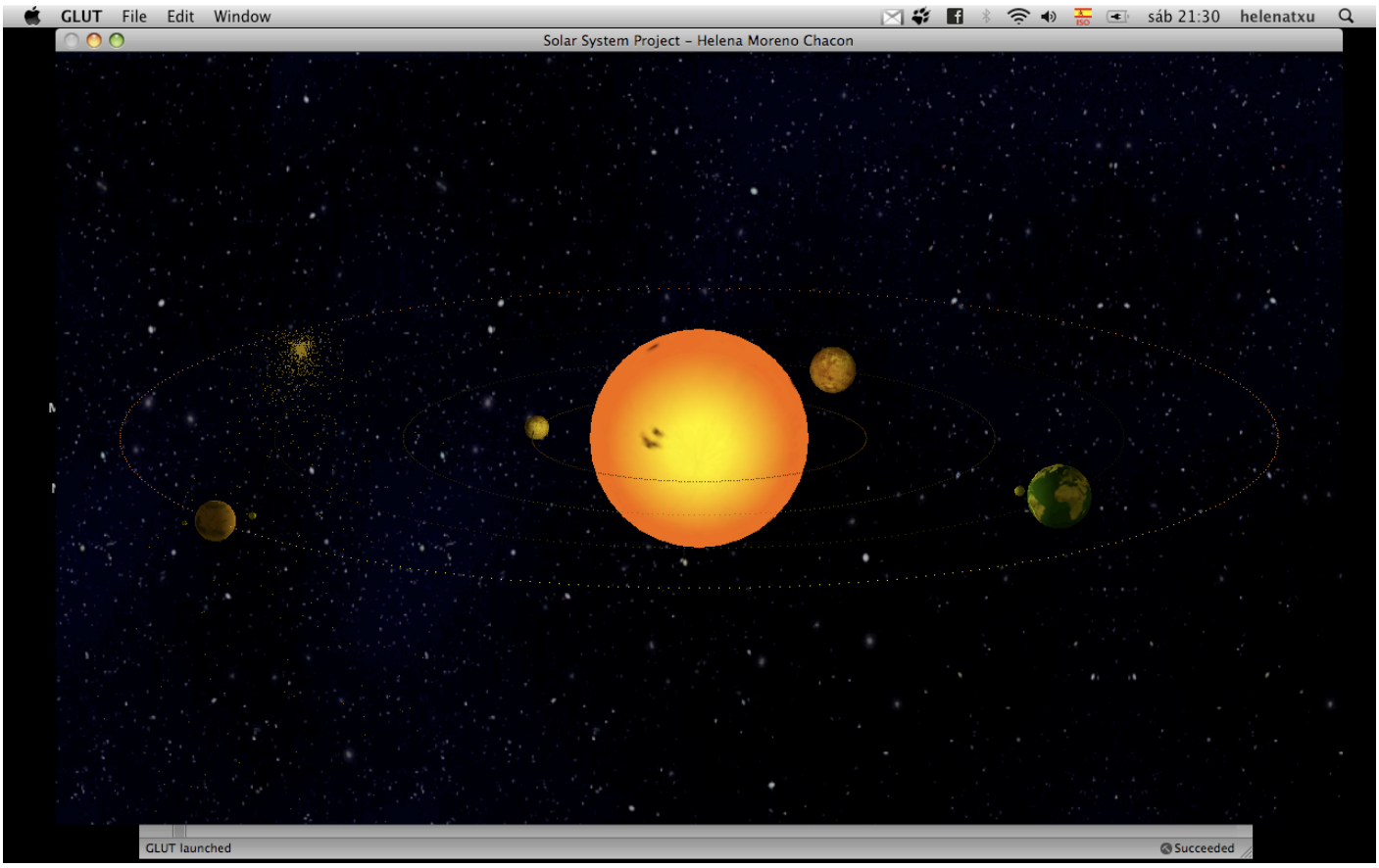
Background of the galaxy: I add a texture with stars and I moved one light to the background to illuminate it.

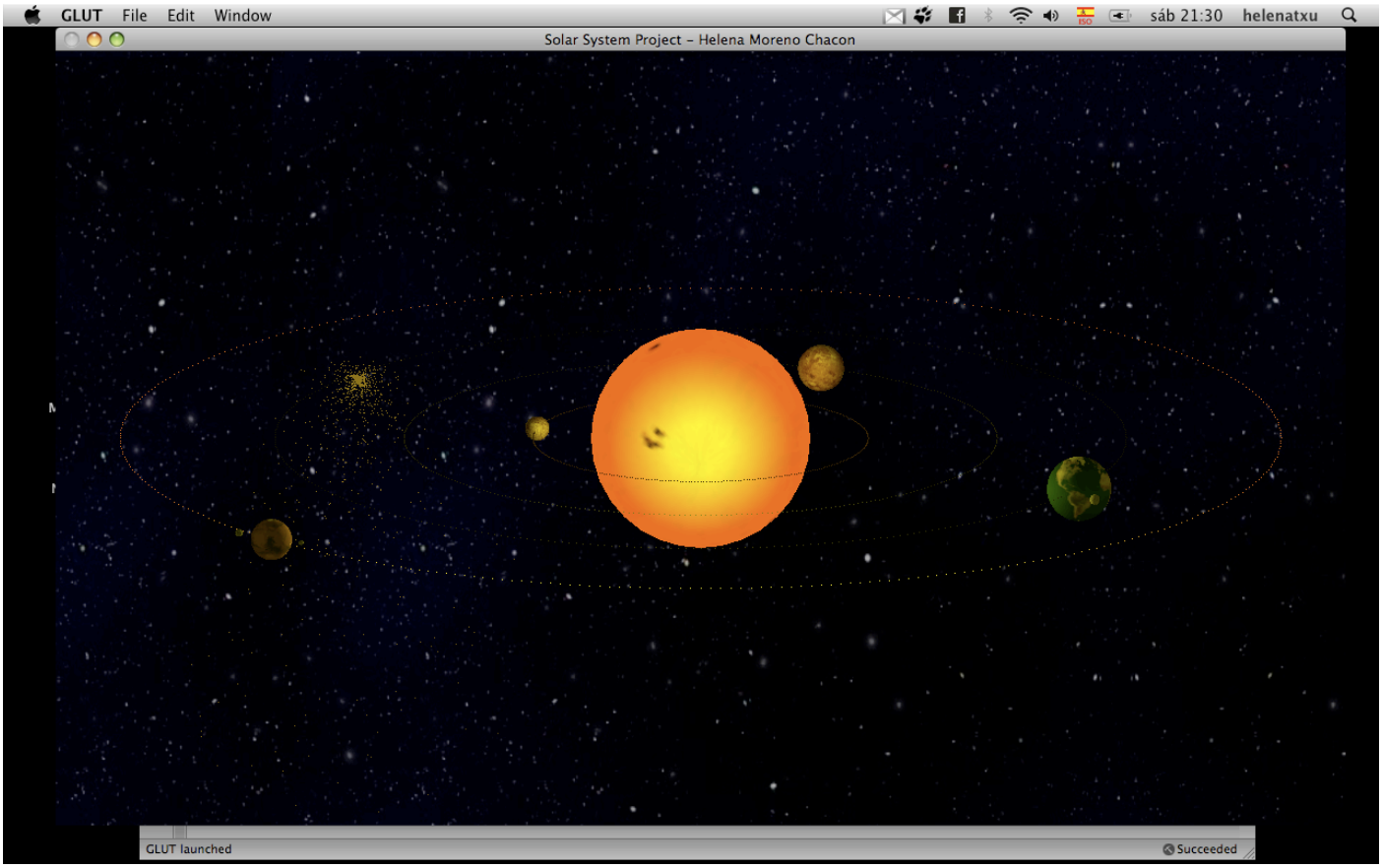
Screen Shots:

- The First Screenshot (on the first page) was taken few moments after the animation start.

- The Second, Third and Fourth Screenshot were taken some seconds after the animation start.







(Continues in the next page...)