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**Qatar University**

**Collage of Engineering**

**CMPS 373 - Fall 2021**

**Computer Graphics**

**Instructor:** Dr. Osama Halabi

**Course Project**

**Solar System**

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# Statement of the goals

In this project, I aim to simulate the outer space with its beautiful stars, and the Solar System in our Milky Way Galaxy.

# Description

Firstly, the Sun, moon, and all other seven most common planets are positioned in their correct places around the Sun. Moreover, each planet is simulating how it is rotating in the real, such it is rotating around itself. By having this rotation we make the Night and the day, such the only source of light is coming from a pint light which is the Sun, and each planet will have a half facing the sun and it’s light (day half of the planet) and the other half obviously will be dark (Night). All of that is involving the rendering area of computer graphics.

In addition, interaction area of computer graphics is involved by making the user able to move around, zoom in, zoom out, rotate to see the solar system from any degree he likes. Additionally, the user can click (R) to toggle between two options, (the plates are rotating around the sun), or (the planets are in fixed positions). Arrows up, and down are controlling the speed of movement for the whole scene

The environment is live rendered. It consists of the small stars in the outer space which are placed in random places to give the realistic feeling if the space picture.

I have designed many of the models (planets and stars) using blender, and I used Assimp library to import model with all different models’ formats.

The code doesn’t need any special instructions to run. Everything is organized, structured, and named well.

One of challenges that I have faced is how to set the best values for the equation of point light, that balance between the light Intensity, and how far the ray can go -r- (to reach the far way planets and light them). Also, applying the rotation of all planets (each by his speed and in his orbital) and all of them around the sun, was also a little challenging.

A group of planets in space

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Figure 1 Program Running

# Resources

* <https://www.solarsystemscope.com/textures/>
* <https://solarsystem.nasa.gov/resources/all/?order=pub_date+desc&per_page=50&page=0&search=&condition_1=1%3Ais_in_resource_list&fs=&fc=&ft=&dp=&category=>
* <https://learnopengl.com/Model-Loading/Assimp>