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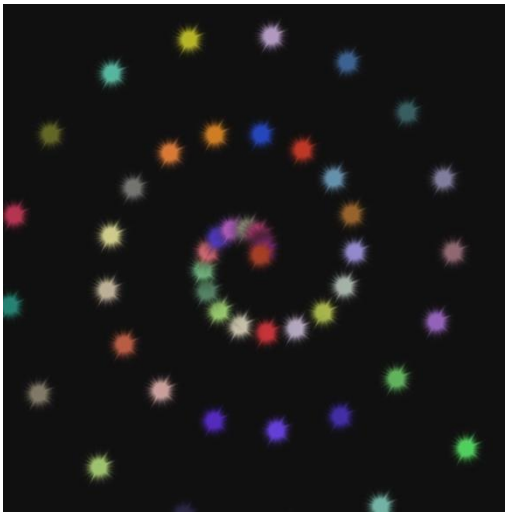
FUNDAMENTALS OF COMPUTER GRAPHICS - PROJECT 2 REPORT

The purpose of this project is to implement an OpenGl program in which multiple stars rotate around a center point and extend to the outer ring. The stars must be of different colors.



VIDEO CAPTURE

The video capture of my program named screenrecord.mp4, is available from the root of the folder.

REQUIREMENTS

- GCC 5 or later
- CMake 3.9 or later
- OpenGL, GLUT and SOIL libraries.

The code hasn't been tested on Windows but should work on Visual Studio 2015 and later.

BUILD AND USAGE

From the folder in which you found this report, please enter the following command lines.

```
1.   mkdir build && cd build
2.   cmake ..
3.   make
```

Once the compilated was successful, you can execute the program. Here is the usage of the program.

```
        ./assignment2 [--width=x] [--height=y] [--title="Assignment 2"]
```

FLAGS – OPTIONS	*DESCRIPTION*	*DEFAULT*
width, w	Set the width of the window	900
height, h	Set the height of the window	900
title, t	Set the title of the window	"Assignment 2"

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SOFTWARE DESIGN

In order to implement future project easily, I define a simple application design. Those three classes are singletons avoiding any multiple instances.

ALGORITHM IMPLEMENTED

Using the formula to generate an Archimedean Spiral, first, we will store all possible positions into a vector of glm::vec2 in the function StarEngine::InitStars. Indeed, we compute only once the positions.

$$r = a + b\theta$$ with a and b, two real numbers

The class Star contains a color generated randomly and represented by a glm::vec3; and the current index in the pre-computed positions vector represented by an integer.

50 stars are created and store in a vector of Star. The main update loop of StarEngine::Update progressively generate the stars one by one until 50, and then, it loops on the vector of Star, displays the current star and increment its index position. If the index is superior to the total number of pre-computed positions, it resets the index to zero : the star goes back to the middle of the window.

This method provides the impression of infinite loop and expansion of the spiral.

OTHER FUNCTIONNALITY

By pressing the key ESC or the key Q, you close the program properly.