OpenGL Project

HumanGL

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Summary: *This project is an introduction to hierarchical modeling.*

Version: 3

Contents

Chapter I

Foreword

These are the lyrics of September by Earth, Wind and Fire :

Do you remember the 21st night of September?
Love was changing the mind of pretenders
While chasing the clouds away

Our hearts were ringing
In the key that our souls were singing.
As we danced in the night,
Remember - how the stars stole the night away, yeah yeah yeah.

Hey hey hey,
Ba de ya - say do you remember
Ba de ya - dancing in September
Ba de ya - never was a cloudy day

Ba duda, ba duda, ba duda, badu
Ba duda, badu, ba duda, badu
Ba duda, badu, ba duda

My thoughts are with you
Holding hands with your heart to see you
Only blue talk and love,
Remember - how we knew love was here to stay

Now December found the love that we shared in September.
Only blue talk and love,
Remember - the true love we share today

Hey hey hey
Ba de ya - say do you remember
Ba de ya - dancing in September
Ba de ya - never was a cloudy day....there was a
Ba de ya - say do you remember
Ba de ya - dancing in September

Ba de ya - golden dreams were shiny days

Now our bell was ringing, aha
Our souls were singing.
Do you remember every cloudy day - yau !

There was a
Ba de ya - say do you remember
Ba de ya - dancing in September
Ba de ya - never was a cloudy day....there was a
Ba de ya - say do you remember
Ba de ya - dancing in September
Ba de ya - golden dreams were shiny days

Ba de ya de ya de ya
Ba de ya de ya de ya
Ba de ya de ya de ya - De ya.... x2

This subject won't be easier if you are listening Disco, but that's freakin' cool.
And if you're feeling bad about some difficulties, just think about Travolta.

Chapter II

Introduction

Since OpenGL 3.0 the native matrices and their associated functions (glRotate, glPush-Matrix and so on..) are deprecated.
In this project, you must implement your own matrix stack and matrix transformations in order to make a skeletal animation.

Chapter III

Objectives

This project is an introduction to hierarchical modeling and matrix stack manipulation. You will learn to use matrices in order to link different parts of a model and make them move together in a logical way.

Chapter IV

General instructions

A `Makefile` or a similar build system is required. Only the contents of your repository will be evaluated.

You can use the graphic library of your choice (SDL2, Glut, SFML..).

You need to use your own matrices and transformations with at least OpenGL 4.0.

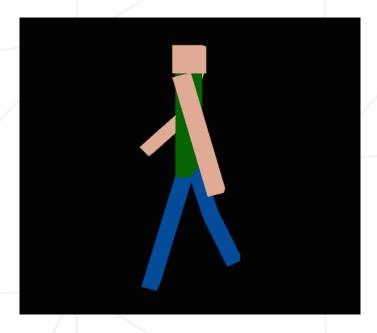You are free to use whatever language you want.

Chapter V

Mandatory part

Body parts should be correctly articulated using your matrix stack. If the torso rotates, all the limbs must follow accordingly. Therefore, if the upper arm moves, only the forearm should follow. When you modify the size of a limb, related parts must automatically reposition themselves.

Your model will have the following parts :

- a head
- a torso
- two arms with

    ○ upper arm
    ○ forearm

- two legs with

    ○ thigh
    ○ lower part

It should be able to walk, jump and stay put.

Chapter VI

Constraints

Each body part will be drawn by one and only one function call. This function will draw a 1x1x1 geometric shape at the origin of the current matrix. Otherwise you will not get all the points.

> **i** Upper and lower part of the same member are indeed two different parts.

Chapter VII

Bonus part

When your hierarchical model is completely working, it will be easy to add:

- More body parts.

- Other move patterns (Disco dance, Kung-fu fighting, ...).

- A kick-ass graphic interface where you can for example modify body part size, change their color, etc...

There will be some points dedicated to these bonuses and some more for your creativity.

> The bonus part will only be assessed if the mandatory part is PERFECT. Perfect means the mandatory part has been integrally done and works without malfunctioning. If you have not passed ALL the mandatory requirements, your bonus part will not be evaluated at all.

Chapter VIII

Submission and peer-evaluation

Turn in your assignment in your `Git` repository as usual. Only the work inside your repository will be evaluated during the defense. Don't hesitate to double check the names of your folders and files to ensure they are correct.

Be prepared to:

- Obviously, run the program and demonstrate the different movement patterns.

- Modify limb sizes. This must be easy to achieve, either in your code or at runtime.

- Show your drawing function, its calls, and explain how it works.

- Explain your hierarchical model and the resulting matrix stack.