

# **Intro to Computer Graphics**

Project A => 3D Assemblies

**CHICKEN TRAVELING AROUND**

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Hi! Welcome to the Project Report for the subject Introduction to Computer Graphics.

The following report is presented to fulfill the requirements of Project A as part of the course.

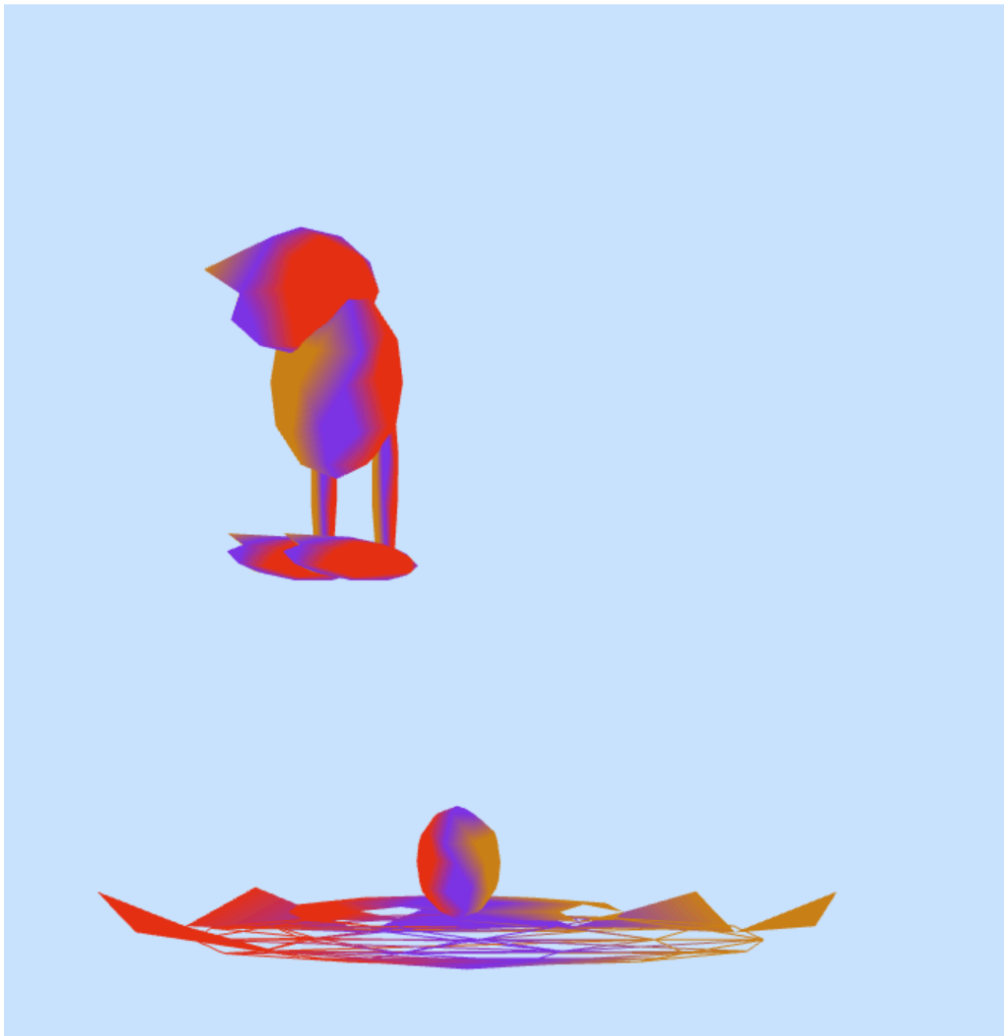
Please find the following available in the subsequent pages of this report:

- (1) User's guide to navigating the project
- (2) 'Results' section to showcase the screenshots
- (3) Accurate Scene-Graph to show all the 3D parts used in program
- (4) Files for the project submitted

Thanks!

## >> User's Guide for Project

Please find the following detailed instructions for User controls for the Chicken traveling in Canvas screen:-



Sample screenshot of Project A (reference)

## >>> GOALS

- > Below is provided a brief with detailed explanation about the project presented.
- > In this project you can view 2 assemblies, a Chicken traveling around with moving/flexing joints and a Nest assembly with Egg.
- > Also User inputs and other interactions are provided as instructions for the User in the HTML page for reference.
- > Scene-graph is also given at the end with respect to the program created for this project.

## >>> PROJECT REQUIREMENTS FULFILLED

### **=> 3D PARTS Drawn:**

The following 3D Rigid parts have been created by drawing from the list of vertices in the VBO:-

- >> Chicken - Head, Body, Legs, Feet
- >> Nest - Egg, Nest Base, Nest Mesh, Nest tray

### **=> Rasterized per vertex colors:**

As can be observed from the Sample screenshot, varying variables have been used for Rasterized effect to output 3 Gradient colors on screen (red, violet, brown).

### **=> User onscreen Interactions:**

Details regarding User interactions are given below and on the HTML page to the User for reference.

### **=> Traveling Assembly:**

The Chicken Assembly is observed to travel continuously on screen for the given angle parameters, without requiring any interaction from the User.

### **=> Flexing/Spinning Joints:**

The following parts of Chicken have continuous on screen flexing/spinning joints as can be observed:-

- >> Body
- >> Legs
- >> Feet

### **=> Different 3D Assemblies:**

Two different 3D assemblies can be seen here as constructed, drawn from the same vertex in the VBO:

- >> Chicken
- >> Egg Nest

### **=> 2 or more Sequential flex joints:**

The following sequential joints can be observed to be continuously flexing for the Chicken:-

- >> Body —>> Legs —>> Feet

### **=> Keyboard/Mouse interaction:**

Details regarding this are given under as User interaction details under.

### **EXTRA CREDITS:**

#### **=> Slider controls:**

A slider bar is presented in HTML page to change the RGB colors on certain parts of the Assemblies.

#### **=> User-adjustable color features:**

Both Keyboard and User controls are available to adjust colors on the 3D Assemblies.

#### **=> Flex Angle button:**

A 'Start Again Now' HTML button is provided to restart the Chicken assembly from first position.

#### **=> Scene-Graph:**

Required Scene-Graph is given below for your reference.

## **>>> USER CONTROLS**

### **=> HTML User Controls:**

(a) View Model anticlockway: Chicken takes steps in the anticlockwise direction, to change the it's viewing angle while traveling.

(b) View Model clockway: Chicken takes steps in the Clockwise direction, to change the it's viewing angle while travelling.

(c) Start Again Now (Flex Angle): Chicken starts to flex, from the first position when you click this.

(d) Slider bar: Try the 2 gradient colors on the Chicken, that changes according to position of slider chosen by you.

The variables affected here are R1,B1,B2 and G2 which increase in value (0.005) as the user slides the position from minimum (0) to maximum (1).

### **=> Keyboard Interaction:**

(a) UPPER ARROW: Increases blue saturation (B2 Value) in the middle part of the Chicken by 0.25.

(b) DOWN ARROW: Increases red saturation (R2 Value) in the middle part of the Chicken by 0.25.

(c) LEFT ARROW: Increases red saturation (R1 Value) in the right part of the Chicken by 0.25.

(d) RIGHT ARROW: Increases blue saturation (B1 Value) in the right part of the Chicken by 0.25.

(e) PRESS 'A': Sets the 'red' attribute (R1 Value) in the right part to 0.7

(f) PRESS 'D': Sets the 'blue' attribute (B1 Value) in the right part to 0.7

### **=> Mouse Interaction:**

(a) DRAW the Egg: Go to the canvas area and click on the egg/nest area that you see

Now you can drag it around and place it anywhere on the screen!

Once you find a position click again there.

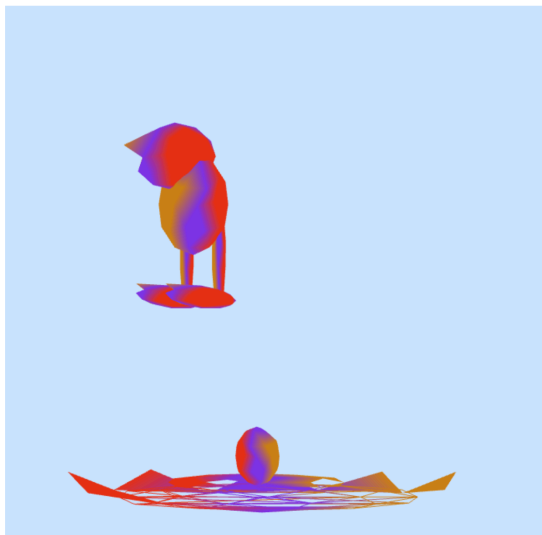
## >>> RESULTS (SAMPLE SCREENSHOTS)

### > Rasterized Effect

In this screenshot we can see 3 gradient of colors for the 3D assemblies (red, purple and brown) applied though varying variables in the program.

### > 3D Assemblies

We can observe a) Chicken Assembly and b) Egg Nest Assembly here below

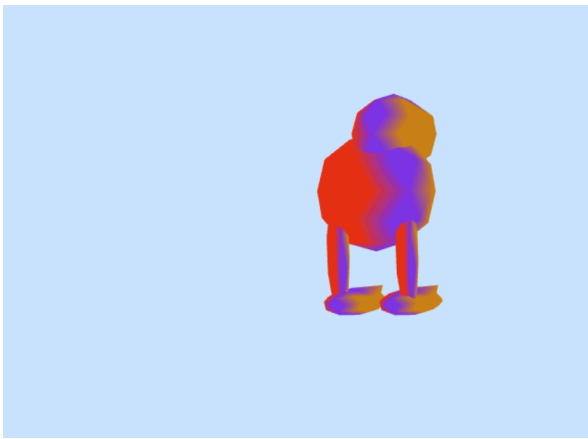


3D Assemblies with Rasterized effects

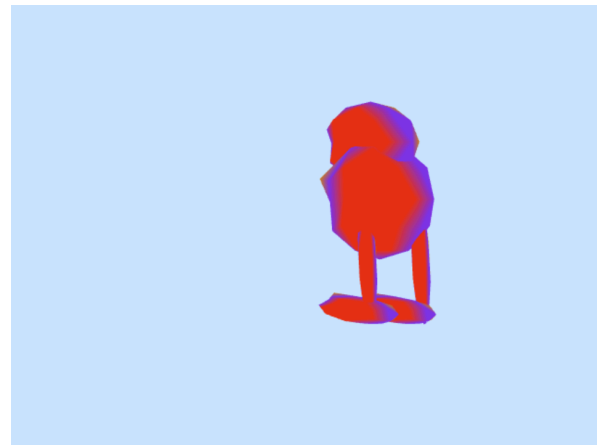
### > Traveling Assembly

The chicken is observed to travel in the Canvas screen. Screenshots of different positions of travel are given here.

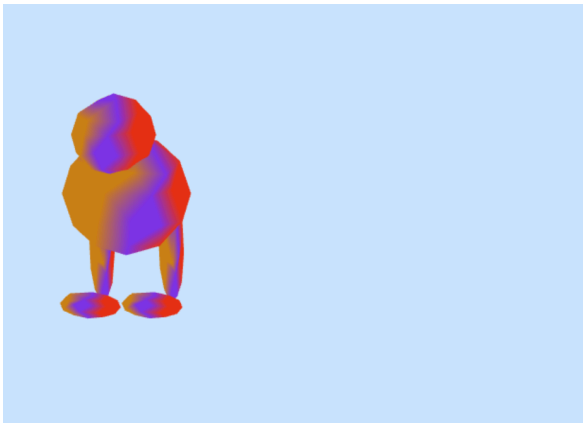




Position 1



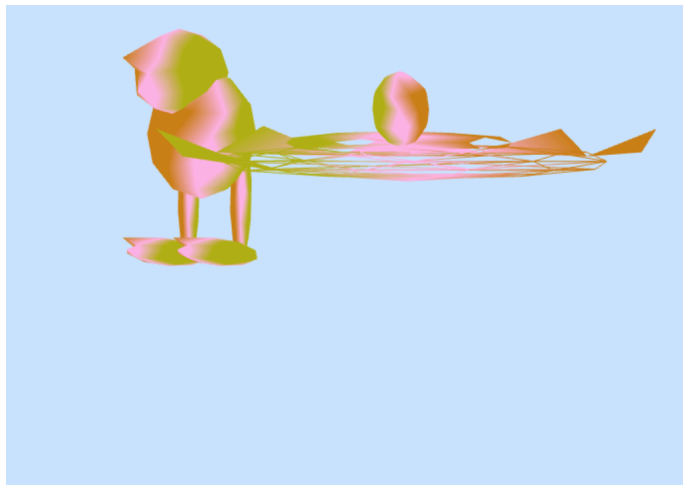
Position 2



Position 3

#### > Mouse Interaction

As can be seen below we can drag and drop the Nest Egg assembly anywhere in Canvas screen.

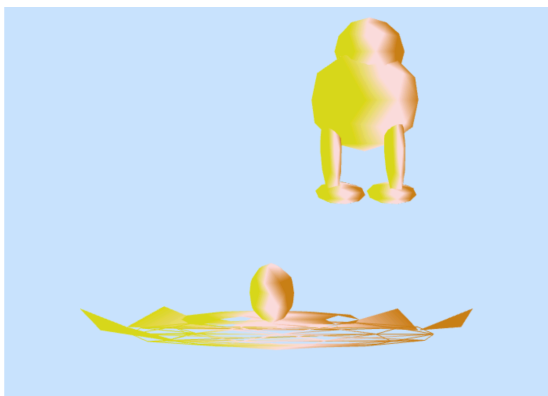


Drag and drop mouse

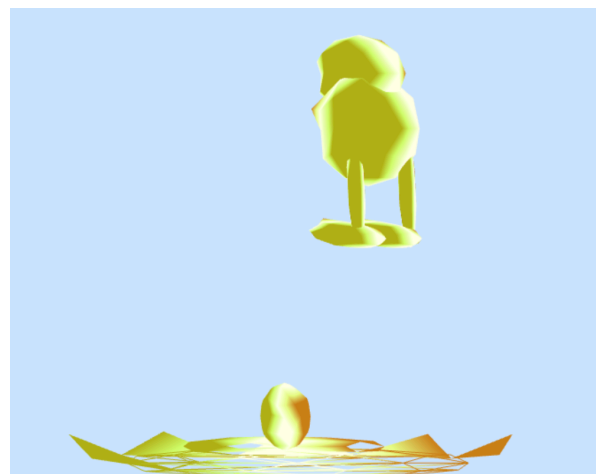
### > Keyboard Interactions

UP/DOWN/LEFT/RIGHT ARROW / 'A' Key / 'D' Key

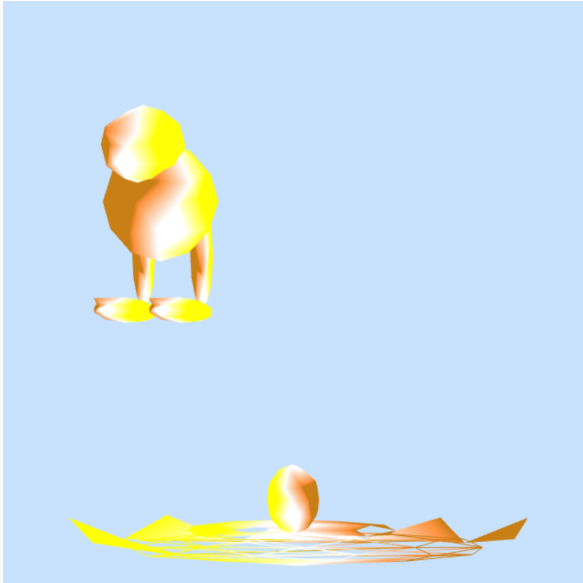
The combination of the above keys can give multiple effects on the assemblies to the User.



Color 1



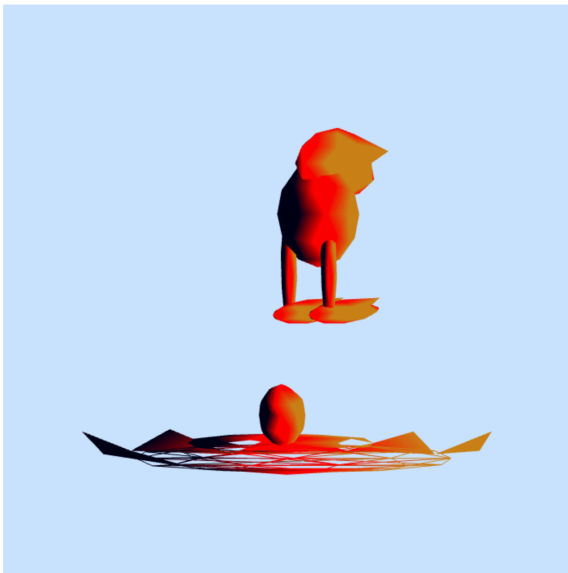
Color 2



Color 3

## > Slider Value

Adjusting the slider can give us a range of colors on the Assemblies

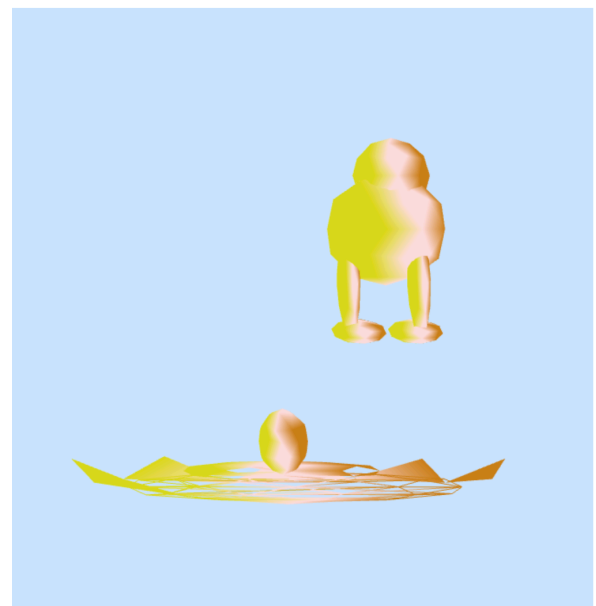


View model anticlock way << View model clock way >>



Try the slider bar here!

Slider 1



View model anticlock way << View model clock way >>



Slider 2

>>> SCENE-GRAPH

