

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JNANA SANGAMA”, BELAGAVI – 590 018



PROJECT REPORT ON

“COLOR COMBINATION”

Submitted in partial fulfilment of the requirement

for the award of the degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted By

GANAVI S Y : 4GH20CS016

Under the Guidance of

Dr Vasanth kumara M, BE, MTech
Assistant Professor

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

GOVERNMENT ENGINEERING COLLEGE, HASSAN - 573201

2022-23

GOVERNMENT ENGINEERING COLLEGE HASSAN – 573 201

Affiliated to VTU, Belagavi & Approved by AICTE, New Delhi

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING



CERTIFICATE

Certified that the **Project work** entitled “**COLOR COMBINATION**” carried out by **Ms.Ganavi S Y (4GH20CS016)** a bonafide students of **Government Engineering College Hassan** in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the **Visvesvaraya Technological University, Belagavi** during the year 2022-2023. It is certified that all correction / suggestions indicated during internal evaluation has been incorporated in the report. The Project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Dr.Vasantha Kumara M
Guide

Dr. Vani V G
HoD, Dept. of CSE

Name of the examiners

1.
2.

Signature with date

DECLARATION

I, **GANAVI S Y** student of Sixth semester B.E, **GOVERNMENT ENGINEERING COLLEGE, HASSAN** bearing USN **4GH20CS016** hereby declare that the Project entitled “**COLOR COMBINATION**” has been carried out by me under the supervision of our Guide, **Dr. Vasantha Kumara M** B.E., MTech, Department of CS&E, GEC Hassan, have submitted in partial fulfilment of the requirements for the award of the Degree of B.E in CS&E by the Visvesvaraya Technological University, Belagavi during the academic year 2022- 2023. This report has not been submitted to anyother Organization/University for the award of degree or certificate .

Date:

Place: Hassan

Project Associates

GANAVI S Y

ACKNOWLEDGEMENT

I consider it a privilege to whole-heartedly express our gratitude and respect to each and every one who guided and helped us in the successful completion of this Project Report.

I am very thankful to the Principal **Dr. Geeresh D P**, for being kind enough to provide me an opportunity to work on a project in this institution.

I also thankful to **Dr. Vani V G**, HOD, Department of Computer Science, for her co-operation and encouragement at all moments of my approach.

I would greatly mention the enthusiastic influence provided by **Dr. Vasanth Kumara M**, Assistant Professors, as Project Guide for his ideas and co-operation showed on us during our venture and making this Project as a great success.

I would also like to thank our parents and well-wishers as well as our dear classmates for their guidance and their kind co-operation.

Finally, it is our pleasure and happiness to the friendly co-operation showed by all the staff members of Computer Science Department, GECH.

Project associates:

Ganavi S Y(4GH20CS016)

ABSTRACT

- Main aim of this Mini Project is to illustrate the concepts of color combination and usage of OpenGL library.
- Our project demonstrates what happens when the primary colors i.e Red, Green and Blue are combined.
- All the permutations and combinations of colors are taken care of.
- We have used input devices like mouse and key board to interact with program.

TABLE OF CONTENTS

| | |
|--------------------------------------|--------------|
| Acknowledgment | i |
| Abstract | ii |
| Table of Content | iii |
| | |
| 1. INTRODUCTION | |
| 1.1 Overview of Computer Graphics | 04 |
| 1.2 History | 04 |
| 1.3 Application of computer graphics | 05 |
| 1.4 About OpenGL | 05 |
| | |
| 2. REQUIREMENT SPECIFICATION | |
| 2.1 User Requirements | 06 |
| 2.2 Functional Requirements | 06 |
| 2.3 Hardware Specification Details | 06 |
| 2.4 Software Specification Details | 07 |
| | |
| 3. DESIGN | 08-13 |
| 3.1 Basic Design | |
| 3.2 Modules & their Description | |
| 3.2.1 Header Files | |
| 3.2.2 Inbuilt Functions | |
| 3.2.3 User defined functions | |

4. IMPLEMENTATION **14**

4.1 Platform

4.1.1 Ubuntu platform

4.1.2 Windows

4.2 User Interactions

4.3 Modules

5. IMPLEMENTATION **15**

6. SNAPSHOT **16-18**

7. CONCLUSION **19**

8. REFERENCES **20**

CHAPTER 1

INTRODUCTION

1.1 Overview of Computer Graphics

The term computer graphics includes almost everything on computer on computer that is not text or sound. Today nearly all computers use some graphic and users except to control their computer through icons and pictures rather than just by typing. Computer graphics is the field of visual computing, where one utilizes computers both to generate visual images synthetically and to visual and special information sampled from the real world. The term Computers has several meanings:

- The representation manipulation of pictorial data by a computer.
- The various technologies used to create and manipulate such pictorial data.
- The sub-field of Computer Science which studies methods for digitally synthesizing and manipulating visual content.

Computer Graphic deals with generating images with the aid of computers. Today, computer graphics is a core technology in digital photography , film , video games , cell phones and computer display , and many specialized applications generated imagery(CGI).

1.2 History

The phrase “Computer Graphics” was coined in 1960 by William Fetter, a graphic designer of Boeing. The field of computer graphics developed with the emergence of graphics hardware.

The first major advance in computer graphics was the development of the Sketchpad by Ivan Sutherland. Further advances in computing led to greater advancement in interactive computer graphics. In 1959, the TX-2 computer was developed at MIT’s Lincoln Laboratory.

1.3 Application of Computer Graphics

- Computational biology
- Computational physics
- Computer-aided design
- Computer simulation
- Digital art Education
- Graphic design
- Video games

1.4. About OpenGL

- The Computer Graphics is one of the most effective and commonly used methods to communicate the processed information to the user. It displays the information in the form of graphics objects such as pictures, charts, graphs and diagram instead of simple text.

- **OpenGL** is a low-level graphics library specification. It makes available to the Programmer a small set of geometric primitive points, lines, polygons, images, and bitmaps. OpenGL provides a set of commands that allow the specification of geometric objects in two or three dimensions, using the provided primitives, together with commands that control how these objects are rendered.

- Since OpenGL. drawing commands are limited to those that generate simple geometric primitive (points, lines and polygons), the OpenGL utility (GLUT) has been created to aid in the development of more complicated three-dimensional objects such as a sphere, a torus, and even a teapot. GLUT may not be satisfactory for full-featured OpenGL application, but it is a useful starting points for learning OpenGL.

- **OpenGL** API-based application can run on systems ranging from consumer electronics to PCs, workstations and super computer , As a Result, application can scale to any class of machine that are minimum.

CHAPTER 2

REQUIREMENTS SPECIFICATION

System requirements are expressed in software requirement document. It is the official statement of what is required of the system developers. Requirements document includes the requirement definitions and the requirement specification. The software requirement document is not a designed document. It should set out what the system should do without specifying how it should be done.

System Requirements specification in our project are:

2.1 User requirements

- The package provides good user interface.
- The system design should be based on functions.
- The packages should be flexible.

2.2 Functional requirements

- User should provide main containing all functions.
- Interface is required.
- Presentation of the function should have a clearcut approach.
- There should exist interaction between user and system.

2.3 Hardware Specification Details

- RAM:4GB RAM.
- Keyboard: Normal keyboard (QWERTY).
- Processor: Intel 386 onwards Compatible Hardware.

2.4 Software Specification Details

- Operating System: Windows
- Compiler: C++ Compiler.
- Language Tool: OpenGL
- Libraries: GL/gl.h, GL/gluts, Gl/glu.h,
- Documentation Tools: codeblocks

CHAPTER 3

DESIGN

The Graphics Package is designed using the in-built graphics library. The objects, which are drawn, are stored as functions that can be used according to the requirements.

3.1 Basic Design

The Analog Clock project has been developed in C that also provides an in-built graphics library through "GL/glut.h".

3.2 Modules and their descriptions

3.2.1 Header files

- **"stdio.h"**: This is the header file that includes the functions like printf(), scanf() for read and write operations. It also includes the file handling like open(), close(), etc.
- **"stdlib.h"**: This is used to get some standard libraries.
- **"GL/glut.h"**: This is to include the graphics built in OpenGL, function and utilities to build and implement our customized graphics packages.
- **"string.h"**: This is the header file that include the strings like date ,day and also bitmap character() to read strings.
- **"math.h"**: The math.h header defines various mathematical functions and one macro. All the functions available in this library take double as an argument and return double as the result.
- **"time.h"**: It contains definitions of functions to get and manipulate date and time information.
- **"GL/gl.h">**: It is also Graphics Library and it allows you to create interactive programs that produce color image of moving three-dimensional objects.
- **"sys/timeb.h"**: It defines that it includes seconds, minutes and hours portion of time.

3.2.2 Inbuilt functions

- **glClearColor():**

- **glClearColor(GLfloat red, GLfloat green, GLfloat blue, GLfloat alpha);**

- Description: This function sets the color value that is used when clearing the color buffer. The background color for the display window is chosen in RGB mode with the open GL routine.

- **glClear():**

- **glClear();**

- Description: This function clears the particular buffer.

- **glColor3f():**

- **glColor3f(TYPE R, TYPE G, TYPE B);**

- Description: This function sets the present RGB (or RGBA) colors.

- **glVertex2i():**

- **glVertex2i();**

- Description: This function defines a line segment.

- **glutBitmapCharacter():**

- **glutBitmapCharacter(void* font, int char);**

- Description: This function renders the character with ASCII code char at the current raster position using the raster font given by font.

- **glutInitWindowSize ():**

- **glutInitWindowSize();**

- Description: This function requests that the size of graphic window can be realtered.

- **glutinit():**

- **glutinit(int argc, char *argv);**

- Description: This function initializes GLUT.

- **glutInitDisplayMode():**

- **glutInitDisplayMode(unsigned int mode);**

- Description: This function requests a display with the properties in mode.

- **glutinitWindowPosition():**

- **glutinitWindowPosition(int x, int y);**

- Description: This function specifies the initial position of the topleft corner of the window in pixels.

- **glutCreateWindow():**

- **glutCreateWindow(char *title);**

- Description: This function creates a window on the display.

- **glutPostRedisplay():**

- **glutPostRedisplay();**

- Description: This function requests that the display callback be executed after the current callback return.

- **glutDisplayFunc():**

- **glutDisplayFunc(void(*func)void);**

- Description: This function registers the display function that is executed when the window needs to be redrawn.

- **glOrtho2D():**

- **glOrtho2D(GLdouble left , GLdouble right , GLdouble bottom , GLdouble top , GLdouble near , GLdouble far);**

- Description: This function defines the orthographic viewing volume with all parameters measured from the center of the projection plane.

- **glutKeyboardFunc():**

- **glutKeyboardFunc(unsigned char key , int x , int y);**

- Description: It controls the movement .

- **glutMainLoop():**

- **glutMainLoop();**

- Description: This function causes the program to enter an event processing loop.

- **glBegin():**

- **glBegin(GLenum mode);**

- Description: This function is used to starts the collection of vertices.

- **glPointSize():**

- **glPointSize(GL float size);**

- Description: This function is used to set the point size attributes.

- **glutTimerFunc():**

- **glutTimerFunc();**

- Description: This registers the timer callback func to be triggered in at least milliseconds.

- **glutReshapeFunc():**

- **glutReshapeFunc();**

- Description: This function sets the reshape callback for the current window.

3.2.3 User Define functions

- **init():**

- **init();**

- Description: This function sets the viewing position, and point size.

- **display():**

- **display(void);**

- Description: This function will display the output.

- **drawPoint():**

- **drawPoint(point p);**

- Description: This function is used to create vertices to draw points in plane.

- **drawLine():**

- **drawLine(double x, double y, double angle);**

- Description: This function is used to draw a line for clock.

- **addDate():**

- **addDate();**

- Description: This function is used to add a date and day in a clock.

- **drawMarks():**

- **drawMarks(void);**

- Description: This function is used to draw dotted marks for a clock.

- **glutClock():**

- **glutClock();**

- Description: This function is used to draw clock structure.

- **reshape():**

- **reshape(int w , int h);**

- Description: This function is used to change the size of clock or clock hand as it needed.

- **redraw():**

- **redraw();**

- Description: This function is used to change the position of the clock hand as it needed way.

CHAPTER 4

IMPLEMENTATION

4.1 PLATFORM

4.1.1 UBUNTU PLATFORM

Ubuntu is a free and open-source operating system and Linux distribution based on Debian. Ubuntu is offered in three official editions. Ubuntu Desktop for personal computers, Ubuntu server for server and the cloud, and Ubuntu core for internet of things devices and robots. New releases of Ubuntu occur every six months, while long-term support releases occur every two years, and the most recent one is, 20.04 LTS.

4.1.2 WINDOWS

Windows is a graphical operating system developed by Microsoft. It allows users to view and store files, run the software, play games, watch videos, and provides a way to connect to the internet. It was released for both home computing and professional works.

In 1993, the first business-oriented version of Windows was released, which is known as Windows NT 3.1. Then it introduced the next versions, Windows 3.5, 4/0, and Windows 2000. When the XP Windows was released by Microsoft in 2001, the company designed its various versions for a personal and business environment. It was designed based on standard x86 hardware, like Intel and AMD processor. Accordingly, it can run on different brands of hardware, such as HP, Dell, and Sony computers, including home-built PCs.

CHAPTER 5

IMPLEMENTATION

5.1 USER INTERACTIONS:

This program includes interaction through keyboard.

- S ◇ Start the Project
- R ◇ Toggle Red Light
- G ◇ Toggle Green Light
- B ◇ Toggle Blue Light
- Q-> Quit

5.2 COMMAND TO EXECUTE THE PROGRAM:

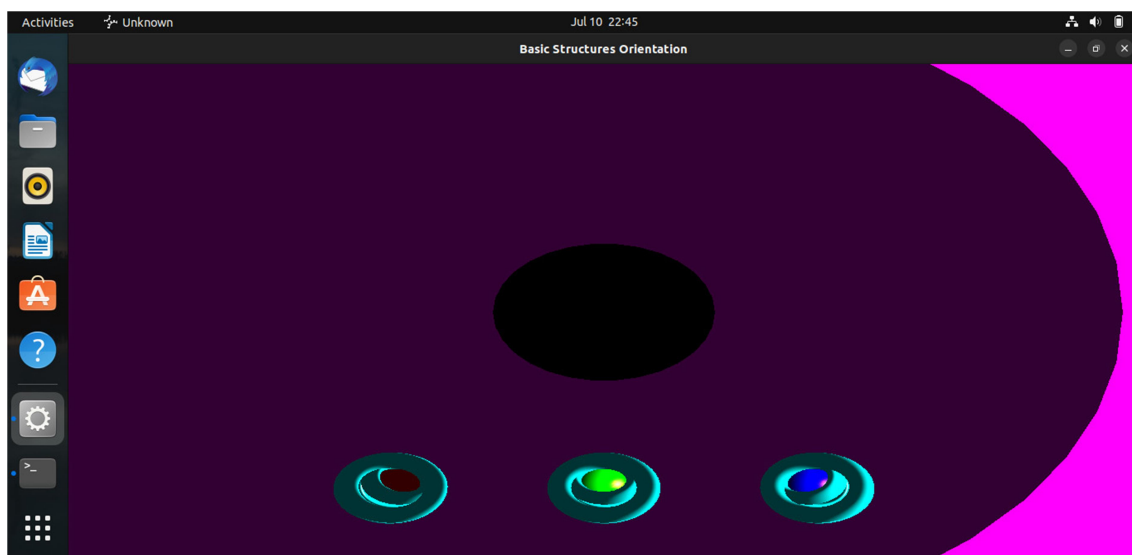
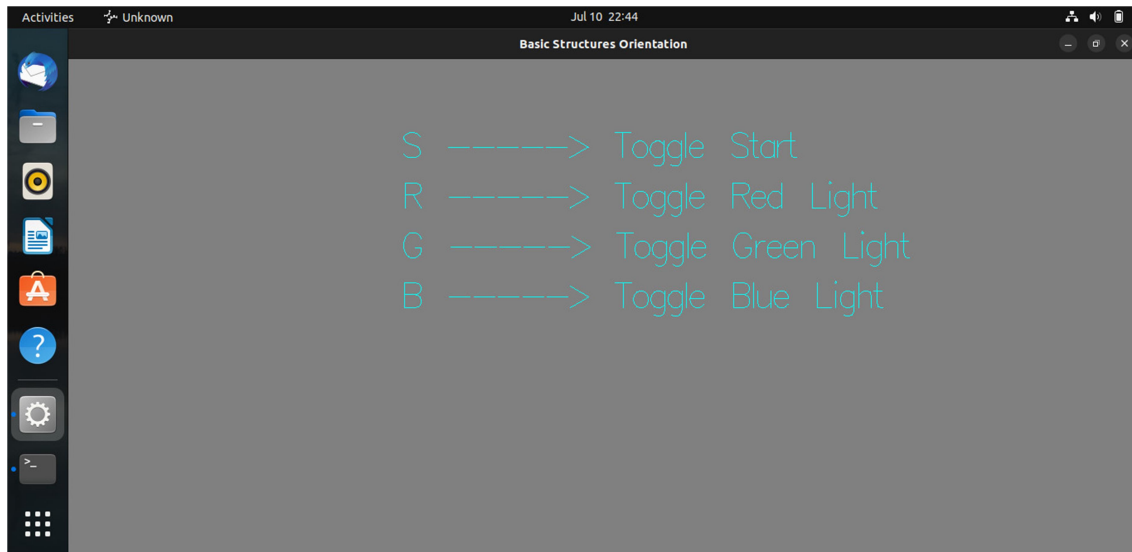
- `cc programname.c -lglut -lGLU -lGL -lm`
- `./a.out`

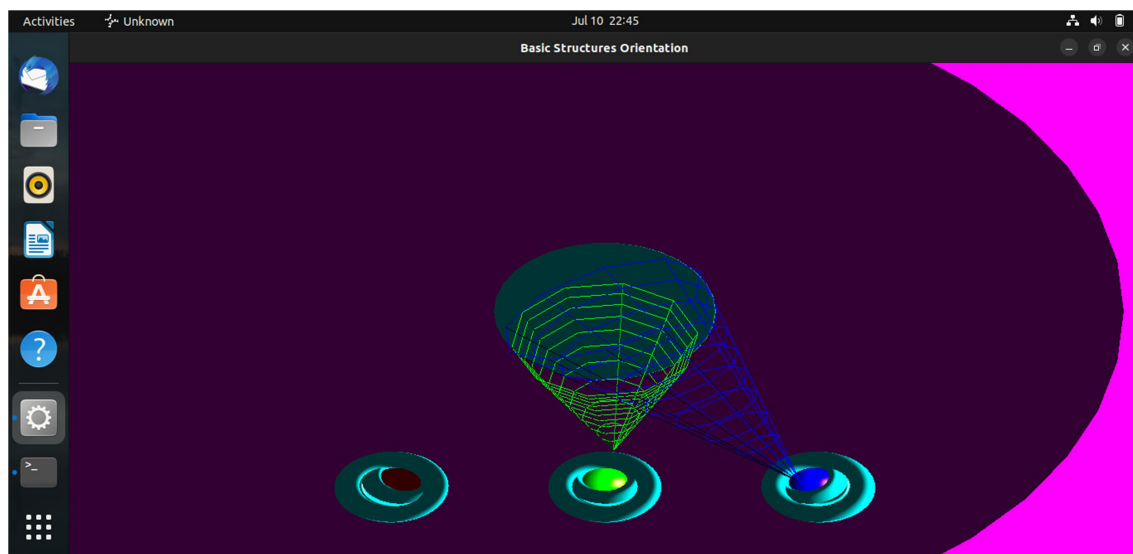
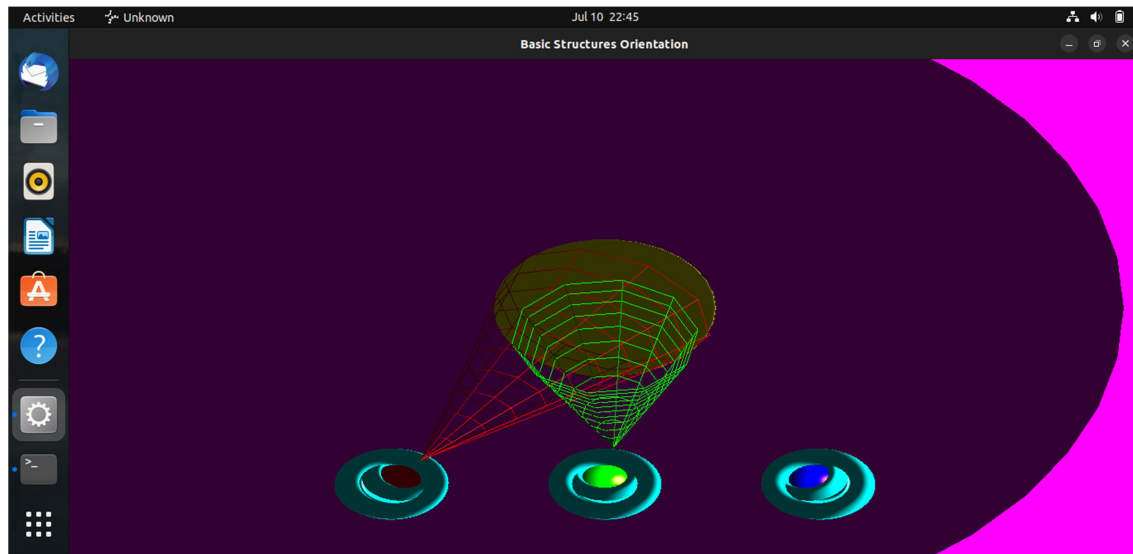
5.3EXIT:

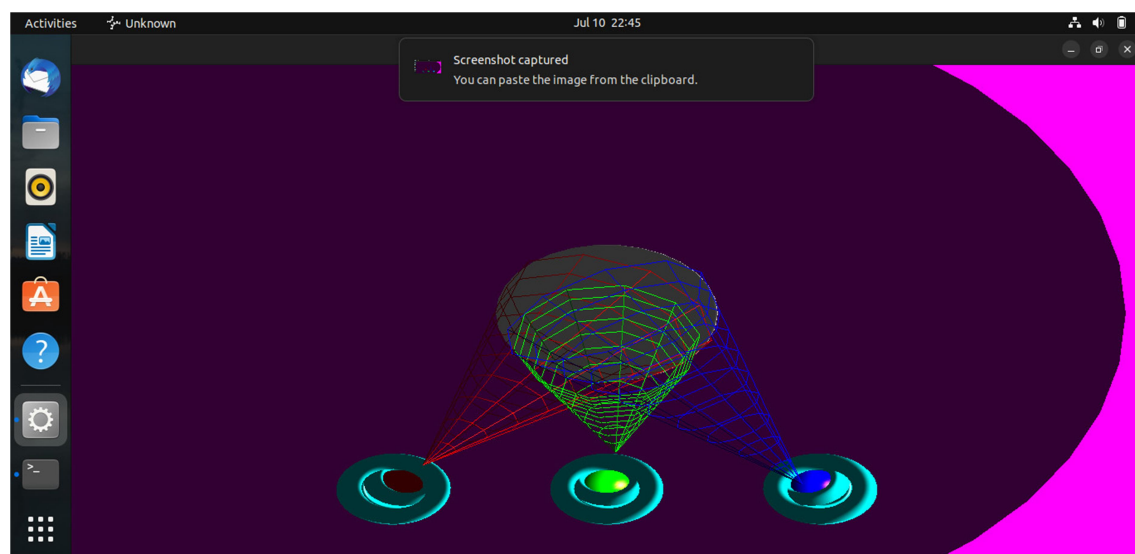
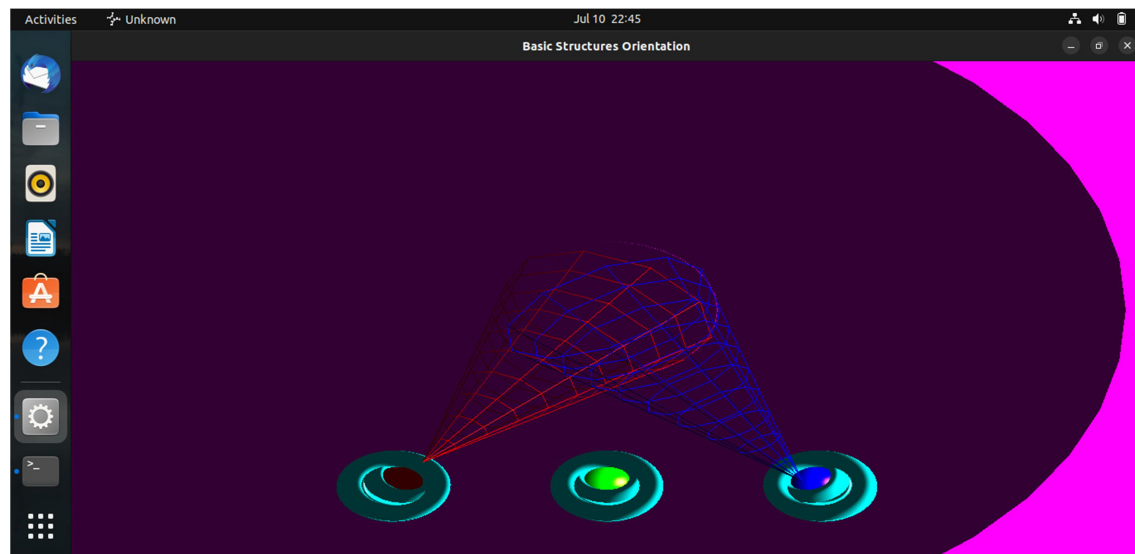
TO exit the window press Cntrl+C in the terminal.

CHAPTER 6

SNAPSHOTS







CONCLUSION

It gives us great pleasure in announcing the completion of the project. This project attempts to display functions of graphics using OpenGL. in a lucid and easy to understand manner. The design of this project has helped us to improve our knowledge about Computer Graphics. I started with a modest aim, with no prior experience in any programming projects such as this, but ended up in learning many things, fine tuning my programming skills and getting into the real world of software development with an exposure to corporate environment. During the development of any software of significant utility, we are faced with the trade-off between speed of execution and amount of memory consumed. This is a simple interactive application. It is extremely user friendly and has the features, which makes simple graphics project. It has an open source code and no security features has been included. The user is free to alter the code for future enhancement. Checking and verification of all of all possible types of the functions are taken care. Care was taken to avoid bugs. Bugs may be reported to creator as the need may be. So, I conclude on the note that I am looking forward to develop such projects with an appetite to learn more in the field of computer science.

REFERENCES

Books Referred:

- 1) **EDWARD ANGEL** – Interactive Computer Graphics using OpenGL, 5th edition.
- 2) **FOLEY** -Computer Graphics using OpenGL, 5th edition.
- 3) **DONALD HEARN & PAULINE BAKER** – Computer Graphics with OpenGL Version, 3rd /4 th Edition

Websites:

1. <http://www.opengl.org>
2. <http://www.glprogramming.com/red>
3. http://www.opengl.org/resources/libraries/glut/glut_downloads.php
4. <http://pyopengl.sourceforge.net/documentation/manual>
5. <http://stackoverflow.com/questions/tagged/opengl>