DECLARATION

I ABHISHEK M(4HG21CS400) student of 6th semester B.E, CSE. Government Engineering College, here by declare that the project entitled **"Flying Balloon Animation"** has been carried out by me, under the supervision of **Madhuri H D** faculty, Dept of CSE submitted in partial fulfilment of the requirements for the award of the degree of computer science and engineering by the Visvesvaraya technological university during the academic year 2022-23. This report has not been submitted to any other organization/university for any award of degree certificate.

BY:
ABHISHEK M

ABSTRACT

Create a balloon object that represents the visual appearance and behavior of a balloon. This object should have properties such as position, size, color, and velocity. Set up an animation loop that updates the position of the balloon object over time. This loop will be responsible for continuously redrawing the scene and moving the balloon across the screen. Simulate the physics of the balloon's flight. Apply forces such as gravity and wind to the balloon object to make it move realistically. Adjust the velocity and acceleration of the balloon based on these forces to create a convincing flying motion.Interaction Enable user interaction with the balloon animation. Allow users to click make it interact, such as causing it to change color or move in response to the input. Background and Environment Create a visually appealing background and environment for the balloon animation. This can include a sky, clouds Visual Effects Add visual effects to enhance the animation. This can include particle effects for clouds or trail effects for the balloon's movement. Use techniques such as blending, transparency, and shading to make the animation visually appealing and realistic. Optimize the animation for performance by minimizing unnecessary calculations and leveraging hardware acceleration when available. This will help ensure smooth and efficient execution of the animation, even on devices with limited resources.

ACKNOWLEDGEMENT

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BY:

ABHISHEK M

4HG21CS400

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Chapter 1

Introduction

Graphics are defined as any sketch or a drawing or a special network that pictorially represents some meaningful information. Computer Graphics is used where a set of images needs to be manipulated or the creation of the image in the form of pixels and is drawn on the computer. Computer Graphics can be used in digital photography, film, entertainment, electronic gadgets, and all other core technologies which are required. It is a vast subject and area in the field of computer science. Computer Graphics can be used in UI design, rendering, geometric objects, animation, and many more. In most areas, computer graphics is an abbreviation of CG. There are several tools used for the implementation of Computer Graphics. The basic is the ¡graphics.h¿ header file in Turbo-C, Unity for advanced and even OpenGL can be used for its Implementation.

The term 'Computer Graphics' was coined by Verne Hudson and William Fetter from Boeing who were pioneers in the field.

1.1 Glut

It is complete API written by mark kilogram, which lets us create windows and handle the messages. It exists for several platforms that a program, which uses GLUT, can be compiled on many platforms without any changes in the code. GLUT is needed to interact with the operating system such as creating a window,handling keyand mouse inputs.It provides high-level utilities to simplify openGL programming

1.2 How OpenGL works

To be hardware independent OpenGL provides its own data types, they all begin with "GL". Eg: GLfloat, Glint. There are also many symbolic constants that all begin with "GL". Eg: GLPOINTS, GLLINES. Finally commands have prefix "gl". Eg: glVertex3f (f, i, d).

Application of Computer Graphics: The development of computer graphics has been driven both by needs of the user community and by advancement in technology. The applications of computer graphics of computer graphics are many and varied, we can divide them into four categories :

1. Display of information

2. Design

3. Simulation and Animation

4. User interface

1. Display of Information:

Medical imaging possess interesting and important data analysis problem. Modern imaging technologies such as computed tomography (CT), magnetic resonance imaging(MRI), ultrasound, and position emission tomography(PET), generate 3D data that must be subjected to algorithmic manipulation to provide useful information. The field of scientific visualization provides graphical tools that help the researchers interpret the fast quantity of data that generate.

2.Design:

Professions such as engineering and architecture are concerned with design. Starting with a set of specifications, engineers and architects seek a cost effective and esthetical solution that satisfies the specifications. Design is an interactive process. Design problem are either over determined such that they possess no solution that satisfies all criteria, much less an optimal solution, or undetermined, such that they have multiple solutions that satisfies the design criteria.

3.Simulation And Animation:

Graphics system evolved to be capable of generating sophisticated images in real time, engineers and researchers began to use them as simulators. One of the most important use has been in training of pilots. The use of special PLSI chips has led to a generation of arcade, games as sophisticated as flight simulators. The simulators can be used for designing the robot, planning its path, and simulating its behaviour in complex environment. The success of flight simulators led to the use of computer graphics for animation in TV, motion pictures and advertising industries. Entire animated movies can now be made by computers at a cost less than that of movies made with traditional ways.

4.User Interface:

Our interaction with computers has become dominated by visual paradigm that includes icons, menus and pointing devices such as mouse. From users perspectives, winding system such as X and window system, Microsoft windows

1.3 OpenGL

• Graphics rendering API.

• High Quality colour images composed of geometric primitives

• Operating system independent

• OpenGL is an application programmer's interface (API) that allows programmers to write programs that access graphics hardware OpenGL provide a set of commands to render a two dimensional scene. That means you provide data in OpenGL usable form and OpenGL will show you this data in scene (render it).it is developed by many companies and it is free for use. You can develop OpenGL applications without licensing. OpenGL based on the state variables, there are many values for example, the colour, you can specify a colour once and draw several polygons, lines and whatever you want. Then there are no classes like in directX. However it is logically structured. Before we come to the commands themselves, here are another thing. It is very important thing to know, that there are two important matrices, which affect the transformation from 3D world to 2D screen. The projection matrix and the model view matrix. The projection matrix

contains information, how a vertex can be mapped tom the screen. This contains, whether the projection shall be isometric or a form of perspective, how wide the field of view is and so on. Into the other matrix you put information, how the objects are moved, where the viewer is and so on.

1.3.1 The OpenGL Pipeline:

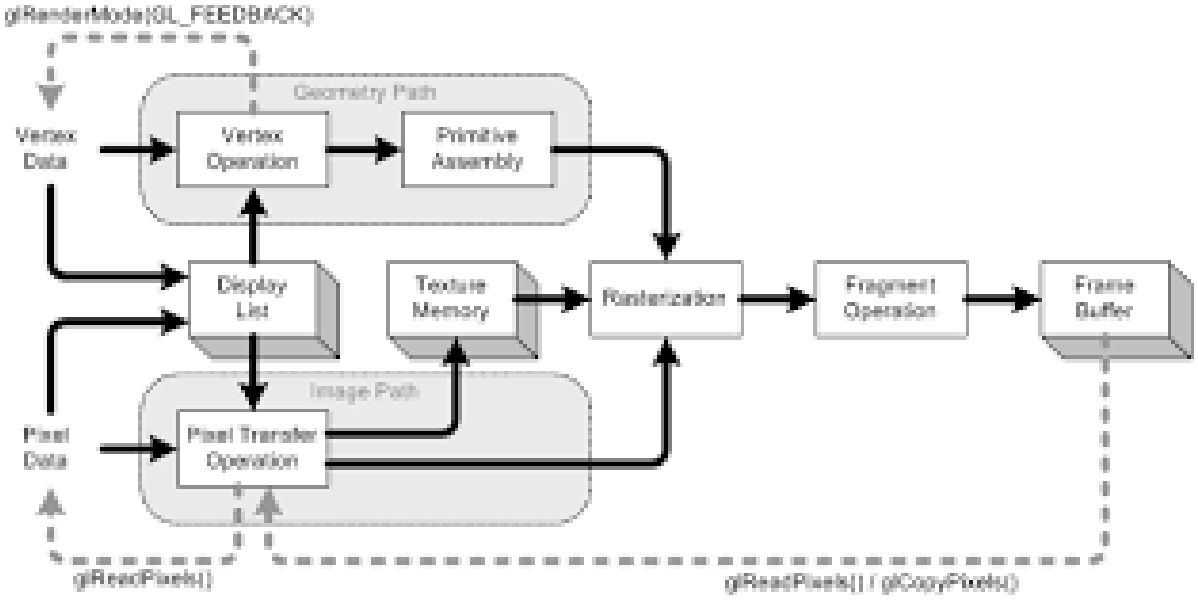

Figure 1.1: The OpenGL rendering Pipeline

Commands may be either be accumulated in display lists are processed immediately through pipeline architecture. Display lists allow for greater optimization and command reuse, but not all commands can be put in display lists. The first stage is evaluator. This stage effectively takes any polynomial evaluator commands and evaluates them into their corresponding vertex and attributes commands The second stage is per-vertex operations, including transformations, lighting, primitive assembly, clipping, projection, and viewport mapping. The third stage is rasterization. This stage produces fragments, which are series of frame buffer address and values from the viewport mapped primitives as well as bitmaps and pixel rectangles. The fourth stage is the per-fragment operations. Before fragments go to the frame buffer.

1.4 Project Introduction:

Creating a flying balloon animation,the animator will typically start by creating a model of the balloon using computer software.Once the balloon model is complete,the animator will add it to scene and setup the control its movements.

they may also add other elements to the secene,such as cloud.finally the animator will render the animation,which involves generating a series of still images that are played back in rapid succession to create the illusion of motion. Becouse the movement of balloon control by the user input using a keyboard Overall, the flying balloon animation introduction in computer graphics is a visually captivating and creative way to engage viewers, convey a desired mood or theme, and showcase the technical prowess of the animation team. The introduction of a flying balloon animation in computer graphics typically serves as an opening sequence or a visual element that captures the viewer's attention. It is a creative way to set the tone, establish the atmosphere, or evoke a sense of wonder in a digital production. The animation showcases the realistic movement and behavior of a balloon as it gracefully floats through a virtual environment.

The purpose of the flying balloon animation introduction can vary depending on the context. It may be used to convey a lighthearted or whimsical mood, symbolize freedom or adventure, or simply add visual interest to the scene.

1.5 Problem Statement

Implementation of Flying Balloon Animation Using GLUT function And OpenGL.

1.6 Objective

- Entertainment:To create a visually engaging and enertaining animation that capture the viewer's attention.
- Education: To create a animation that teaches the viewer about a specific topic or concept,such as the physics of filling or the history of hot air balloons.
- Marketing:To create an animation that promotes a product ,brand,or service,such

as an advertisement for a air balloon tour company.

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1.7 Application:

• Balloon Movement: Create an animation that simulates the movement of a balloon.

• Colorfull Balloon:The Chnging of Balloon Colors It will shows the Red,Blue and green colors.

• Interactive Elements:Add interactive elements to the animation,such as allow the user input the balloon will be changes the color and also movement of balloon.

• Background:To add the element like cloud.

•It Uses in a Entertinment Industry.

•Also use as a simple game

2D transmission can be used in medical imaging, such as X-rays and CT scans, to create images of the body's internal structures. It can also be used in security systems, like airport scanners, to detect hidden objects. Additionally, 2D transmission can be used in optical sensing, such as in the measurement of refractive index of materials.

1.8 Advantages

Visualization and Presentation: Computer graphics can be used to visually communicate the concept and design of a flying balloon project.

Design Iteration: With computer graphics, designers can quickly iterate and experiment with different balloon designs, shapes, and colors.

Marketing and Advertising: Computer graphics can create visually stunning images and animations that can be used for marketing and advertising purposes. Overall, 2D transformation is a powerful tool in computer graphics and image processing, and has many different applications.

Chapter 2

Requirement analysis

2.1 Hardware Requirements

Processor intel i5 onward

RAM 4Gb and more.

Hard Disk 16GB

2.2 Software Requirements

Operating System : Unix or Ubuntu

Language Tool : OpenGL

Editor : vi editor or gedit

• A visual C/C++ compiler is required for compiling the source code to make a executable file which can be directly executed.

• The built in graphics and dynamic link libraries like glut and glut32, and header file like glut.h to create 2D 3D layout.

Chapter 3

Proposed Methodology:

The whole program has been implemented in C++ language. Define the purpose and goals of your animation. Decide on the visual style and theme for the animation Create or gather the necessary assets, such as balloon images, backgrounds, and any additional elements required for the animation. Design the balloon with attention to color, shape, and details.

3.1 Proposed System:

creating or obtaining a high quality 2D balloon model. This model will serve as the main visual element in the animation Design. and create the surrounding environment,including the sky,clouds. Create keyframes to define the motion of the balloon throught the animation using a glutKeyboardFunc.

The movement of the balloon using the Keys '8' and '6' and '4' and'2' are Movements Like Up,down,left,right. And

Key's 'B' or 'R' or 'G'is used to changing the colors of the balloon.

'Q' key is used to exit. And reset the balloon Movements.

menusection In the menusection at the execution time,User gives the inputs based on that balloon will be move up down right and left and also changing the balloon colors. **Balloon Movement** The balloon will be move using a user inputs. The input keys like 8,4,2,6. the input key 'q' is used to exit. **Balloon color** The balloon Color will be changed based on the user input like Blue,Green,Red.

Chapter 4

Design

The Flying Balloon Animation implemented using OpenGL interface. In corporate this facility includes glut.h header files.

Void glColor3[b I f d ub us ui](TYPE r,TYPEg,TYPE b) Sets the present RGB colors.

1. Void glClearColor(GLclampfg,Glclampfg,Glclampfb, Glclampfa) Sets the present RGBA clear color used when clearing the color buffer. Variable of Glclampf are floating point numbers between 0.0 and1.0

2. Void glPointSize(Glfloat size) Sets the point size attribute in pixels.

4.0.1 Working with the window system

Void glutCreateWindow(char*title)

Creates a window on the display. The string title can be used by the window. The return value provides reference to the windows that can be used when there are multiple windows.

void draw balloon()

The draw functions is called repeatedly by the processing framework to update display

glutKeyboardFunc()

Enabling keyboard input for controlling the animation.

glTranslatef()

Translates the object(e.g,the balloon)to a specific position in the scene.

Void glFlush()

Forces any buffered openGL commands to execute. Void glutInit(int argc,char **argv) Initializes GLUT. The arguments from main are passed in and can be used by the application.

void glutInitDisplayMode(unsigned int mode)

Requests a display with the properties in mode. The value of mode is determined by the logical OR of options including the colormodel(GLUT RGB, GLUT INDEX) and buffering (GLUT SINGLE,GLUT DOUBLE). **void glutInitWindowSize(intwidth,int height)**

Specifies the initial height and width of the window in pixels. **void glutInitWindowPosition(intx,int y)**

Specifies the initial position of top-left corner of the window in pixels.

Void glutDisplayFunc(void(*func)(void))

Requests that the display callback be executed after the current callback returns.

4.1 Flow Chat

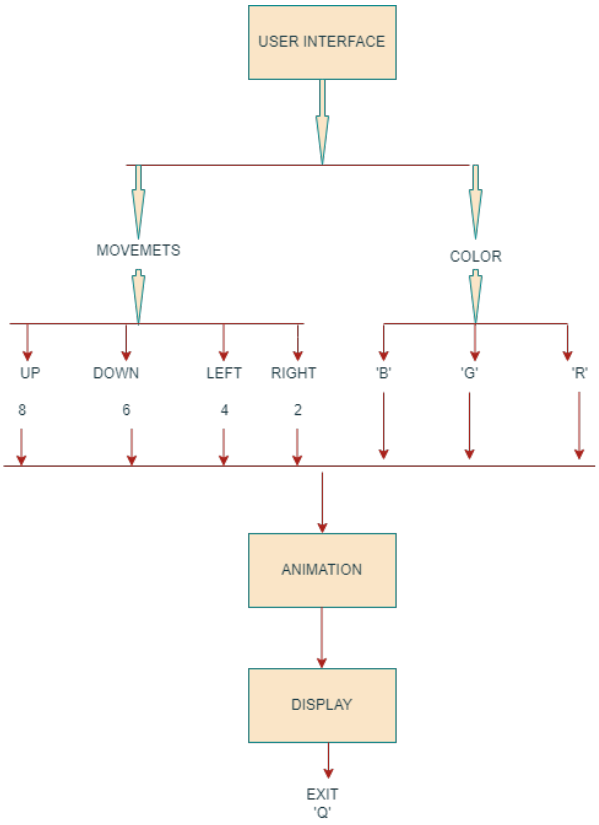

Figure 4.1: Flow chat for keyboard operation.

The above flow chat for keyboard operation consists of User interface ,Animation, Display. In the user Interface this component represents the user interface where the user interact with the animation.which Includes the input device like keyboard through which the user provides inputs for controlling the balloon animation(movements).

Animation this component receives user inputs from the user interface and calculating the motion and behaviour of the flying balloon based on those inputs.

Display this component is responsible for showing the rendering animation the screen or output device making it visible to the user.

Chapter 5

Implementation

Initializing the scene

set up the 2D environment with a balloon, defining a balloon initial position,orientation and properties.

Update Balloon Position:

update the balloon position Based on the user input. take the verlet integration update the position.update the orientation of the balloon based on ts movements.

Animation this component receives user inputs from the user interface and calculate the motion and behaviour of the flying balloon based on those inputs.responding to user action.

Display Display the rendered frrame on the screen or output device. repeated the animation loop to create continuous movement.this component is responsible for showing the renderd animation the screen or output device making visible to the user

Keyboard The movement of the balloon using the Keys '8' and '6' and '4' and'2' are Movements Like Up,down,left,right. And

Key's 'B' or 'R' or 'G'is used to changing the colors of the balloon.

'Q' key is used to exit.

termination end the animation loop when a specific condition met.the balloon will be terminate by pressing the key 'Q'.

Chapter 6

Result

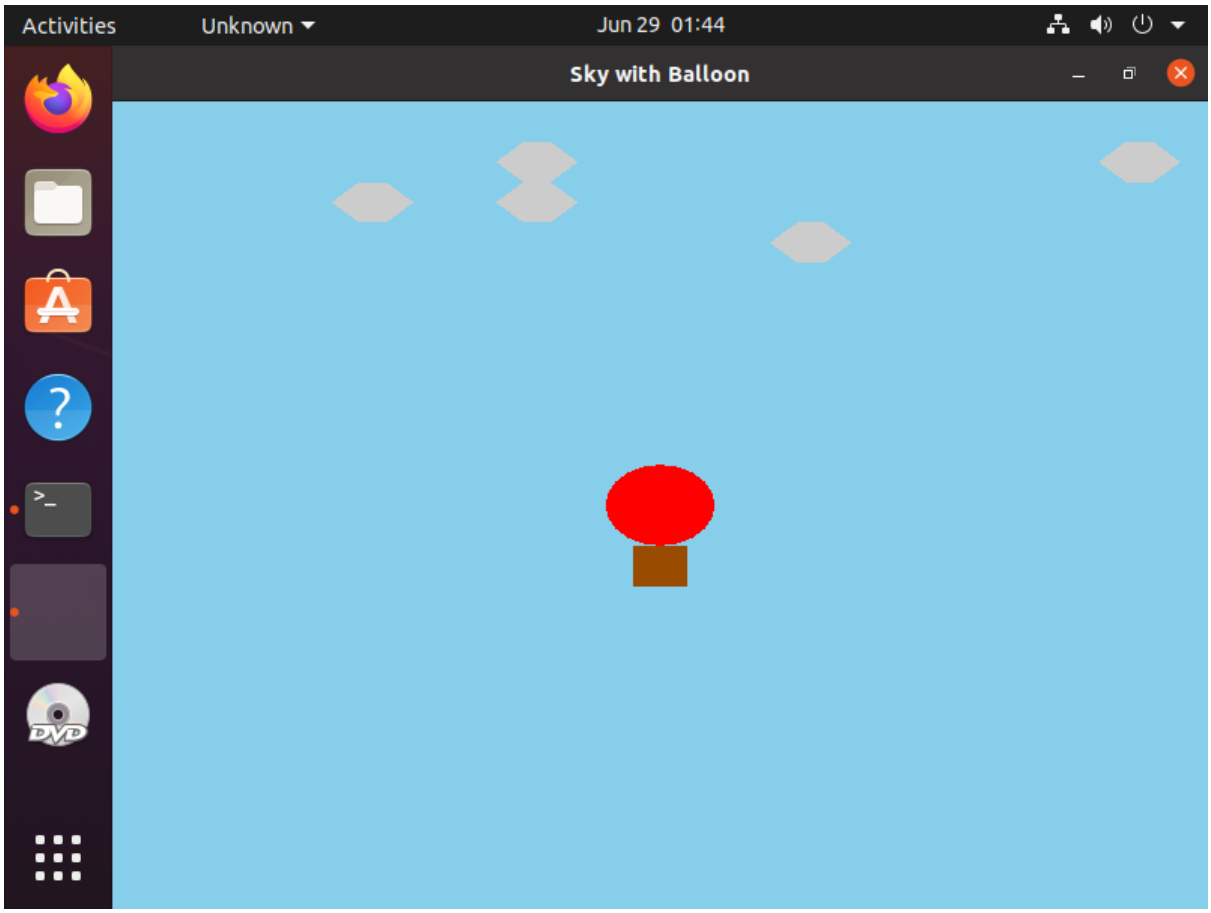

Figure 6.1: Initial position

The above figure 6.1 shows the Initial position of the Balloon.

Movements Of balloon

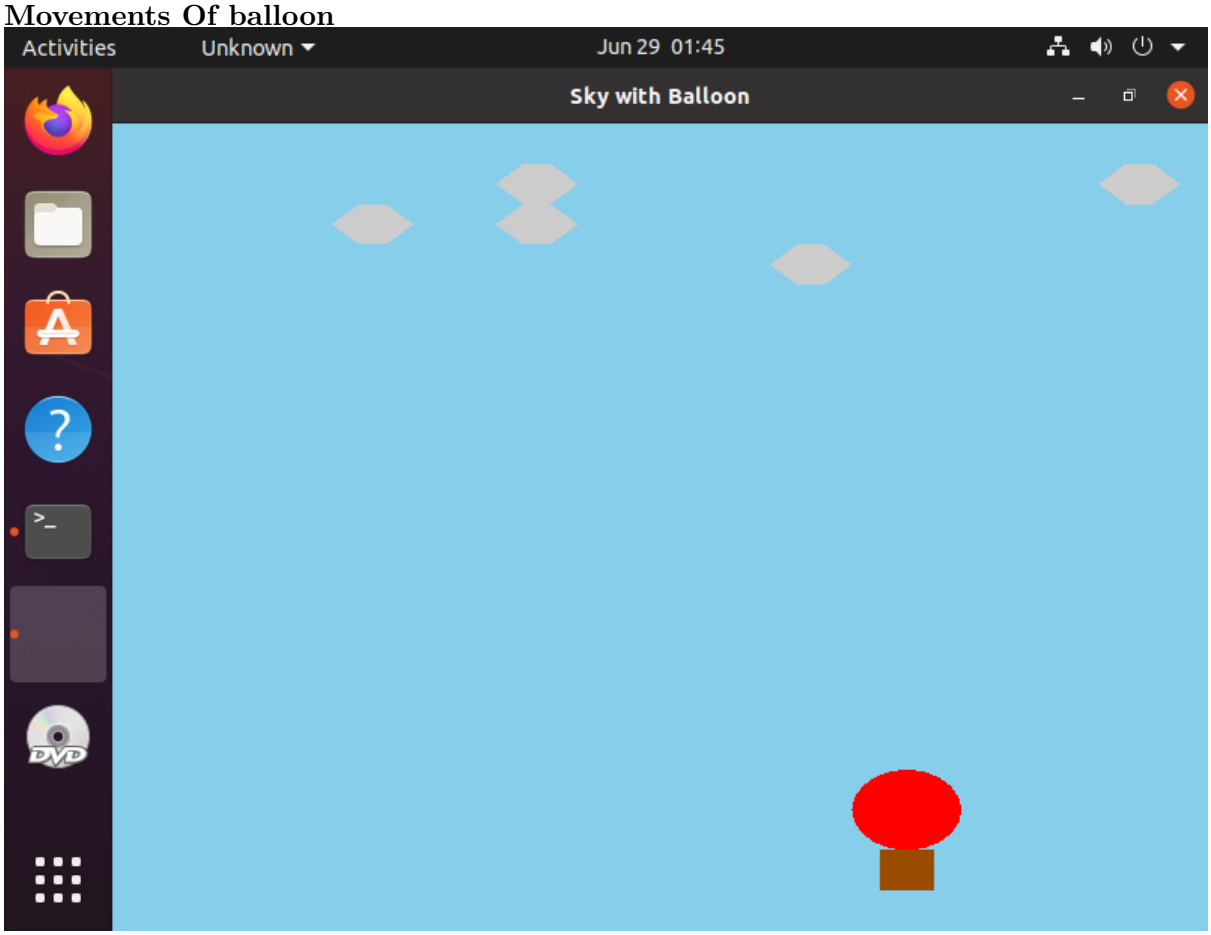

Figure 6.2: Balloon palced at down position

The above figure 6.2 shows balloon will placed at the down position.using a kye '2' when we pressing key '2' the balloon moves down

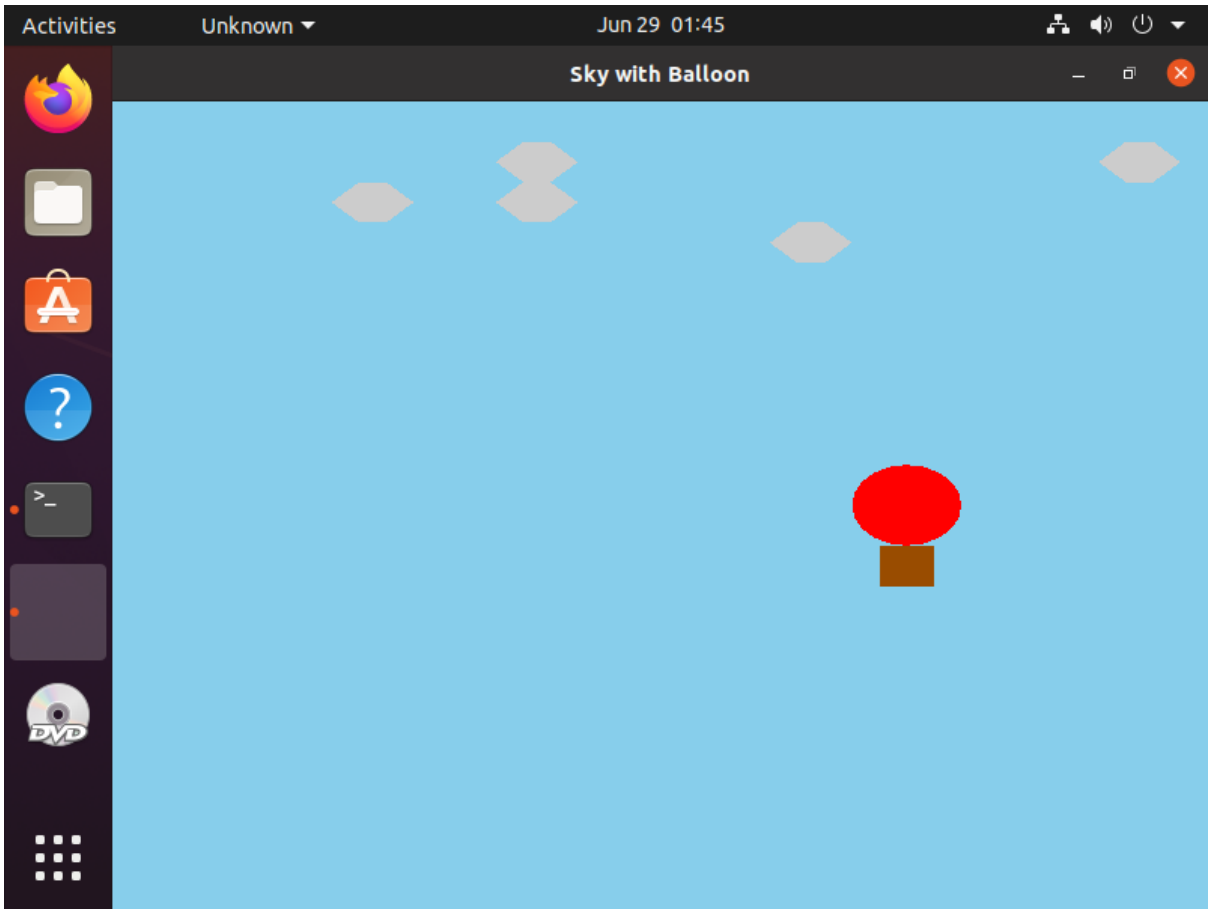

Figure 6.3: Balloon at the right position

The above figure 6.3 shows balloon will placed at the right position.using a kye ’6’ when we pressing key ’6’ the balloon moves right

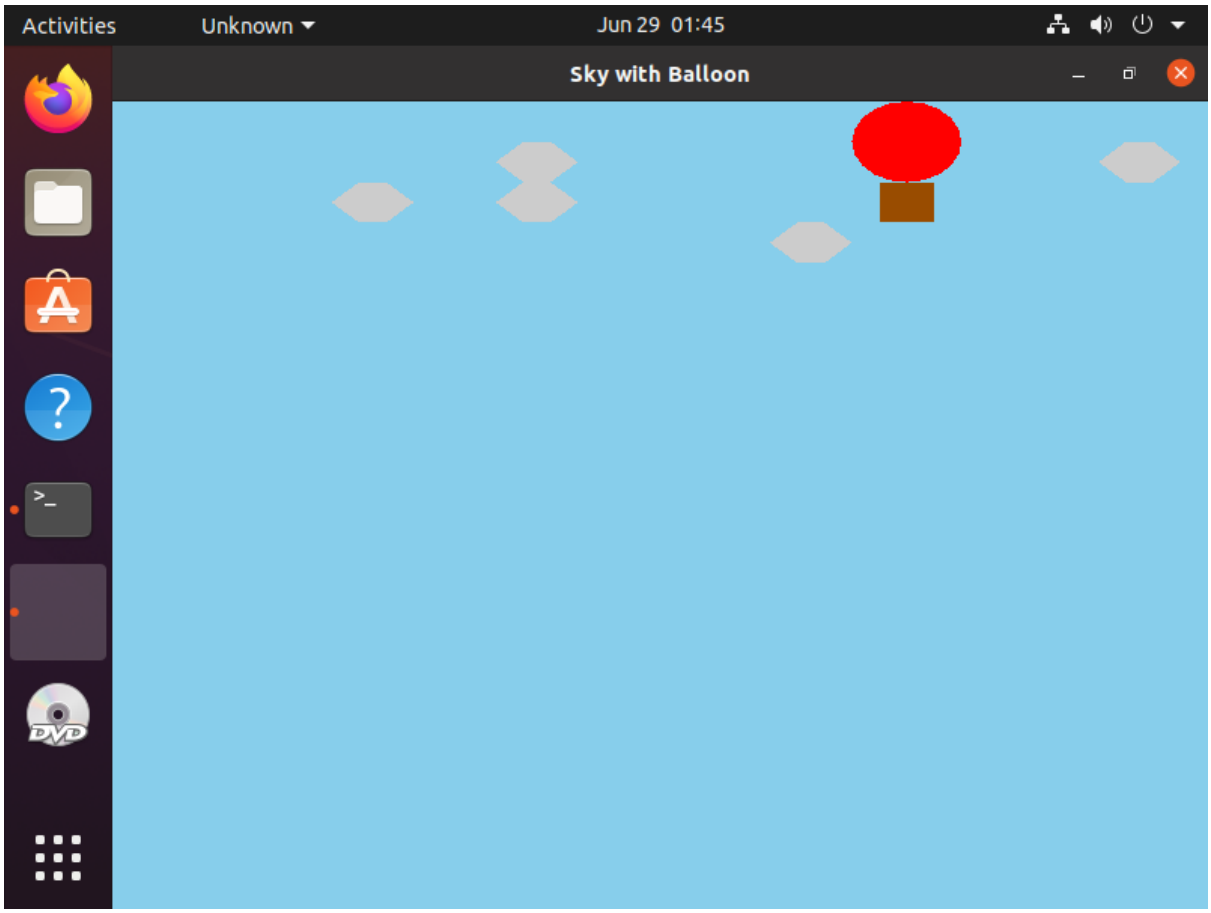

Figure 6.4: Balloon placed at up position

The above figure 6.4 shows balloon will placed at the up position.using a kye ’8’ when we pressing key ’8’ the balloon moves up.

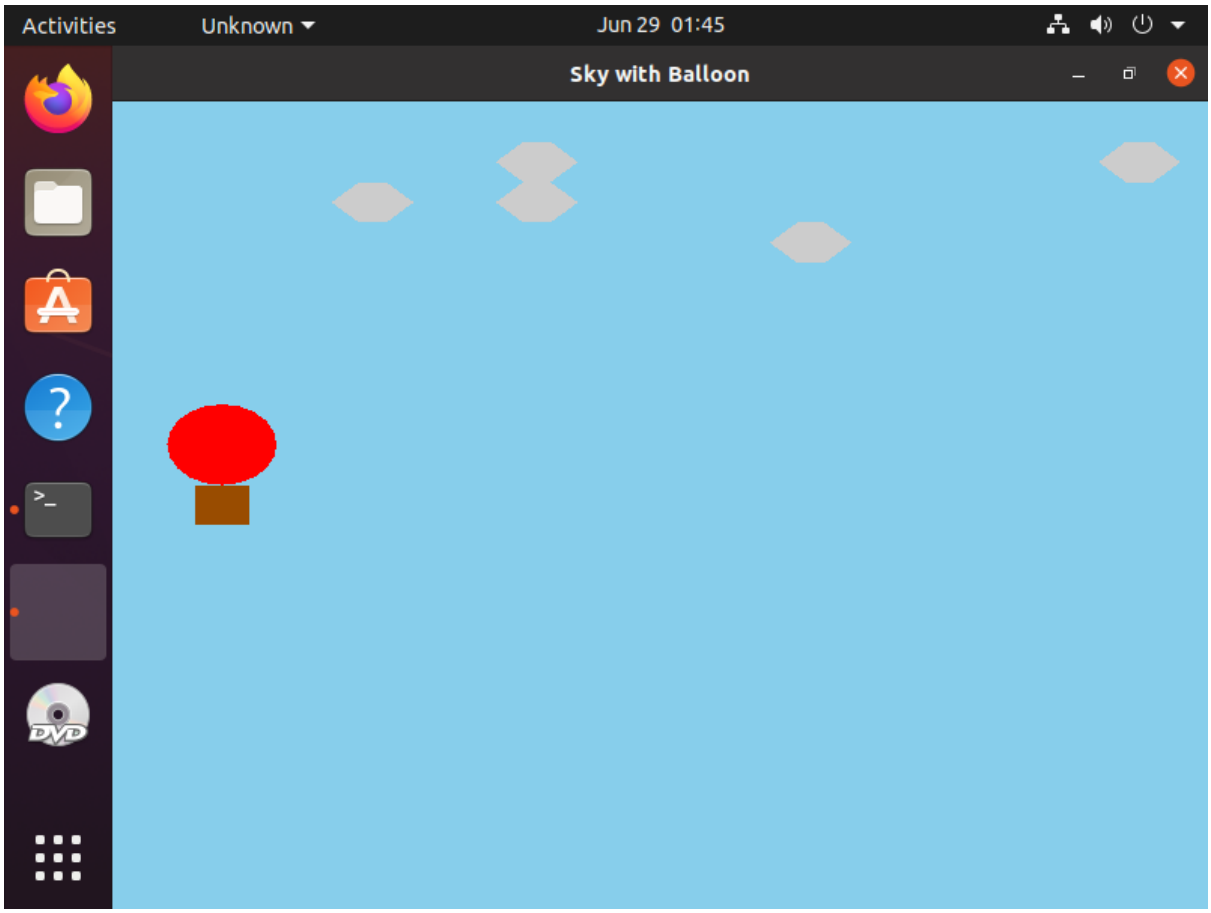

Figure 6.5: Balloon placed at left position

The above figure 6.5 shows balloon will placed at the left position.using a kye '4' when we pressing key '4' the balloon moves left.

Color Change

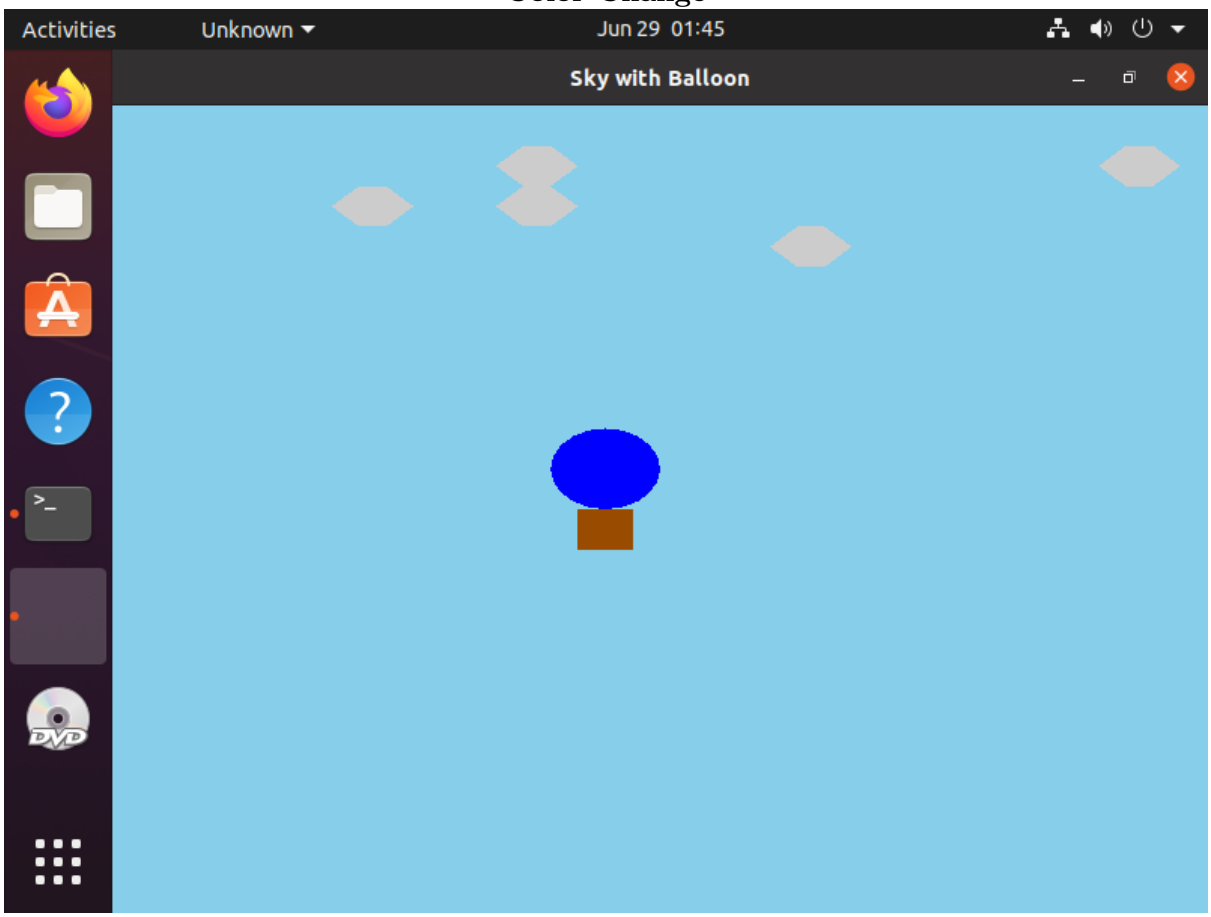

Figure 6.6

The above figure 6.6 Shows When we pressing a key B the balloon will be changed to blue colour.

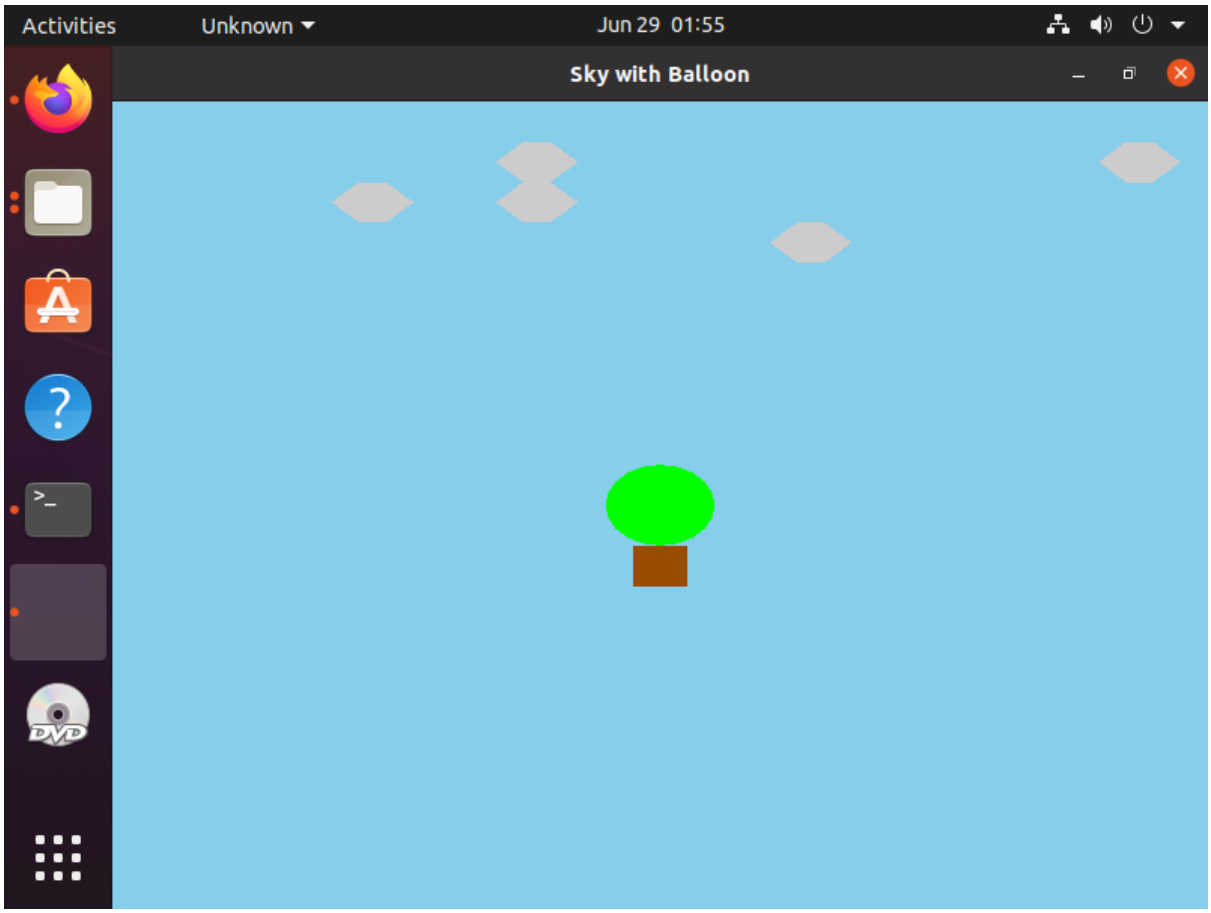

Figure 6.7: fig 1.7

The above figure 6.7 Shows When we pressing a key G the balloon will be changed to green colour.

Chapter 7

Conclusion

The flying balloon animation is a captivating and whimsical creation that brings joy and wonder to viewers. Through its vibrant colors, smooth movements, and graceful flight, the animation succeeds in evoking a sense of enchantment and freedom. The floating balloon symbolizes the human spirit's desire for exploration and adventure, reminding us of the limitless possibilities that await us when we embrace our dreams. The animation's seamless execution and attention to detail make it an engaging and immersive experience, drawing the audience into a world where anything is possible. Overall, the flying balloon animation is a delightful work of art that leaves a lasting impression and serves as a reminder to always reach for the sky.

Chapter 8

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