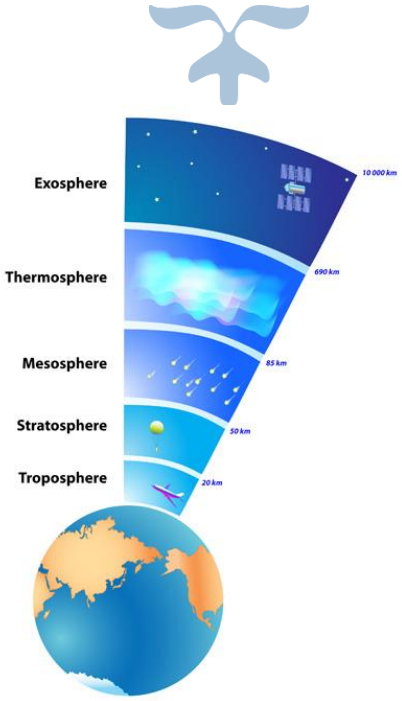
ATMOSPHERIC LAYER STRUCTURE

2D Graphics Project



COURSE: GRAPHICS SESSIONAL
COURSE CODE: CSE - 414

NAME: SHARMISTHA BARDHAN
STUDENT ID: 201114062
BATCH: CSE – 11
LEVEL = 4, TERM = 2

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1. Introduction

Atmospheric Layer Structure is a 2D graphics project idea that shows the atmospheric layers surrounding the world. The activity and characteristics of each real life vehicle or element in a particular layer is shown through animation. According to the atmospheric layers around the world, the five layers are shown with different colors to show the difference. Then the different attributes of each layer is shown with air vehicle or cloud or satellite etc.

This project tries to be a helping tool for young learners to help them learn about the Atmospheric Layers through interactive session since they can interact with the program with mouse and keyboard and see the transitions. The characteristics of each layer is described in different windows with brief description. Special effects about different and significant events like Ultraviolet Ray or Thunder Effect are also shown.

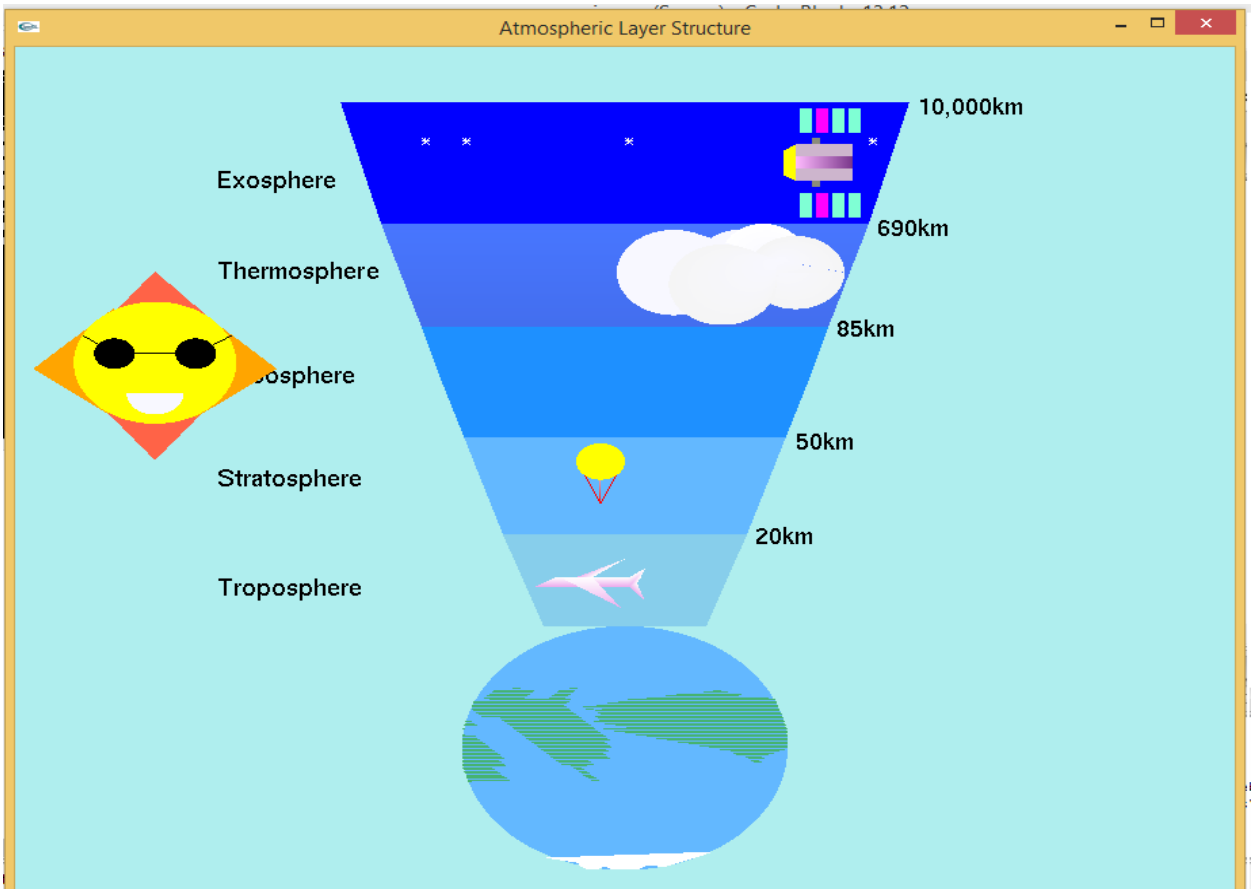


Fig: Initial View of the Project Atmospheric Layer Structure

2. Tools

In order to implement the main idea of the project the following tools have been used,

Tools Category	Tool Name
Language	C++
Graphics Tools	OpenGL
Library	Glut

3. Main Idea

The main idea of this project is to implement such a system that shows,

i) The attributes of the Atmospheric Layers around the world through animation.

ii) The effect of Sun on Earth

iii) How these layers are helping the Earth from harmful things from Sun

iv) Let the user know about the characteristics, temperature, pressure and some other attributes of these layers.

4. Features

The main idea of the project is tough to implement since it has many features. Some of the major features are implemented in this project. They are,

- The main feature of this project is to show the atmospheric layers in a different manner, shades and colors to make it more interesting.
- The user comes to know about different layers from different option.
- Ultra violet Ray effect
- Thunder effect with background music effect.
- Continuous Background music will make it more enjoyable.
- Different mouse and key events are added.

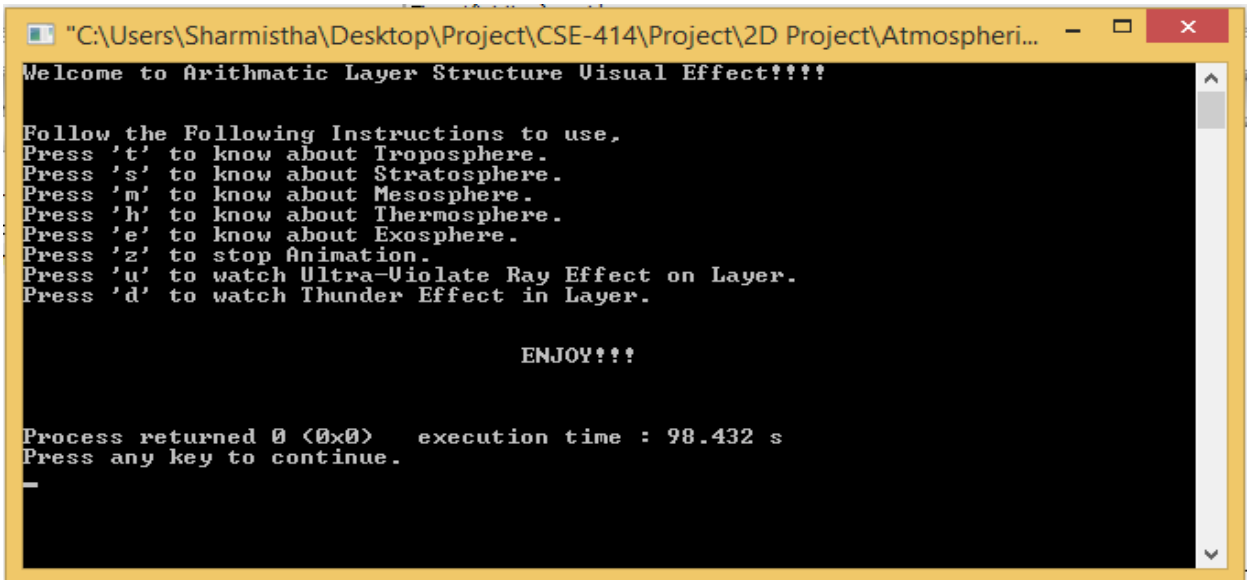


Fig: Menu showing the Key events

5. Animation

In order to implement the project, it was important to add animation to it. Basically, the animation is added using the Timer. There were different timers to implement the different scenario of the project with animation.

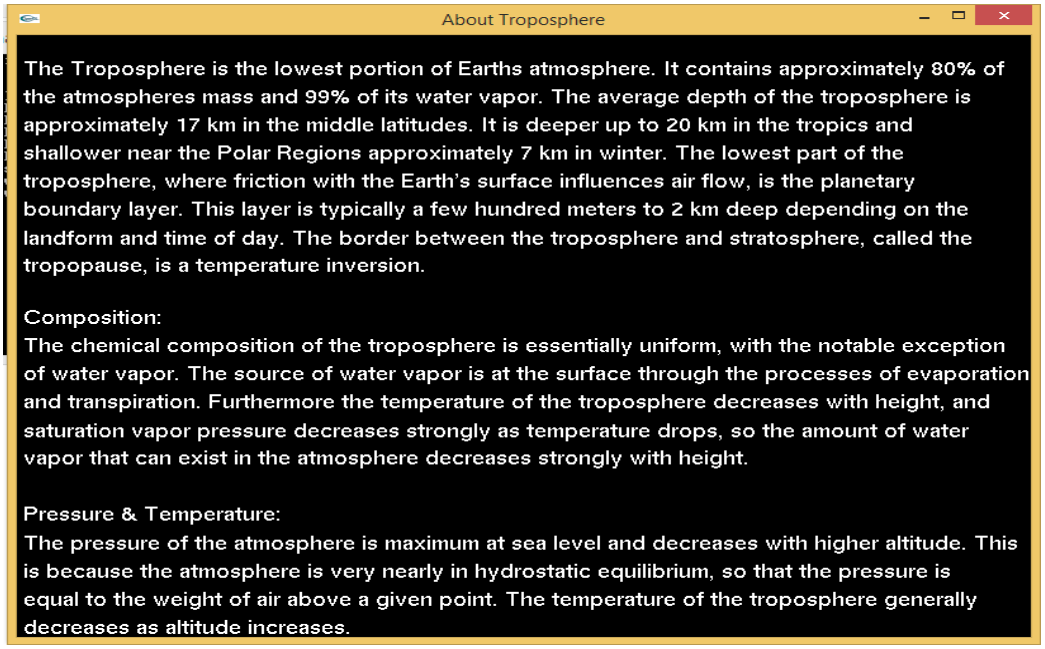
- Animation is used in,
    a) Earth movement
    b) Sun movement
    c) Aero plane, parachute, comets, cloud and satellite movement on layers are also shown through Animation.

- Moreover, the special effects on the layers such as Ultra Violet Ray Effect, Thunder Effect are shown with Animation.

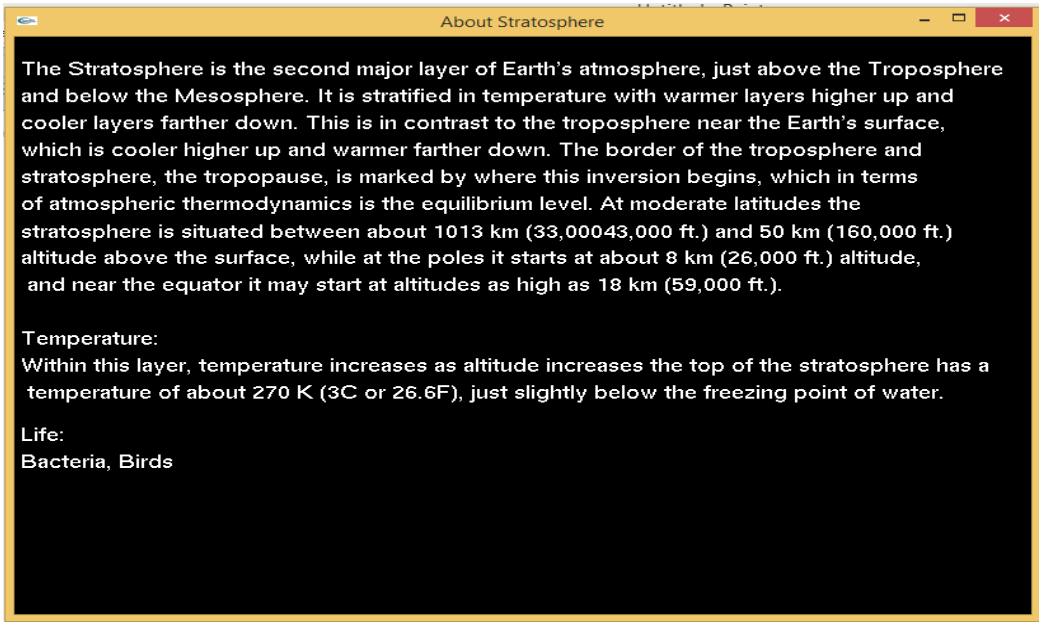
6. Keyboard event

Several Keyboard events were added to the project to implement all the features of the project. The Keyboard events are,

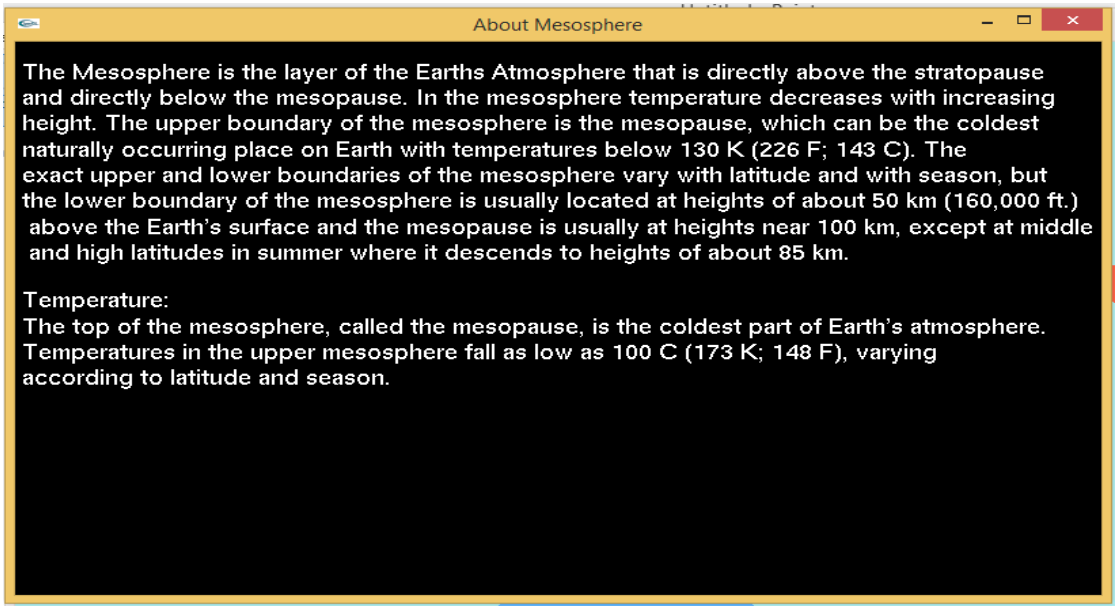
- Press on ‘t’ - shows the information about the **Troposphere** in separate window.



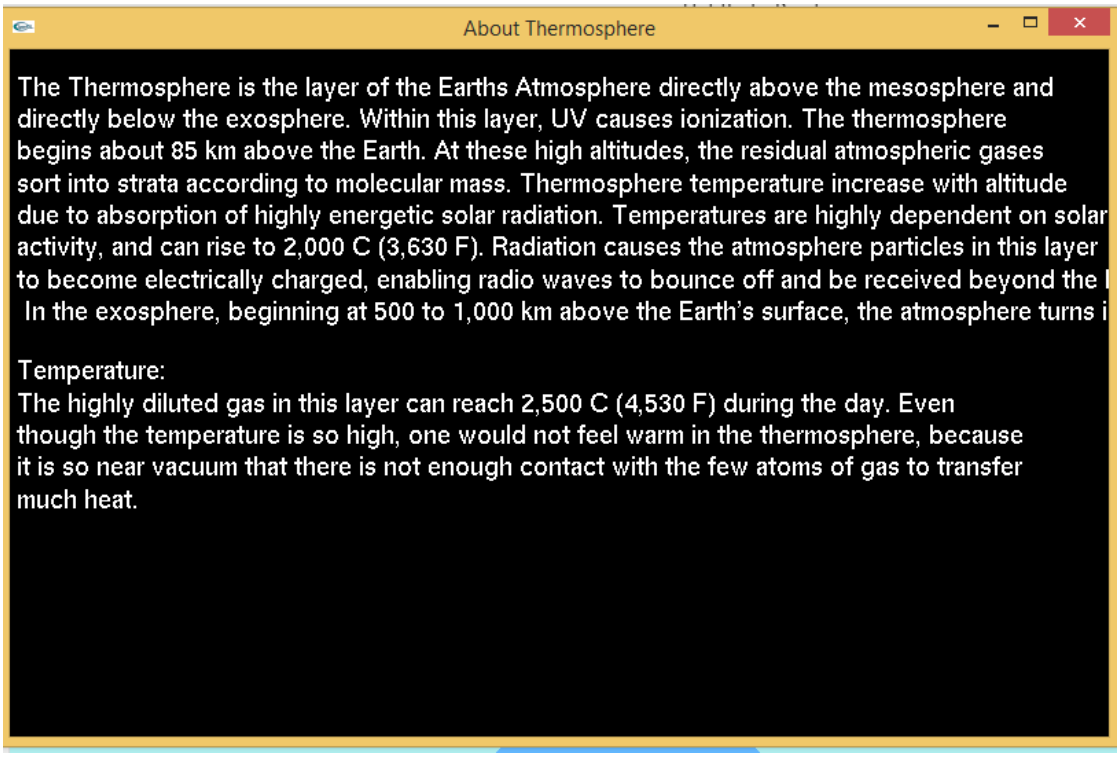
- Press on ‘**s**’ - shows the information about the **Stratosphere** in separate window.



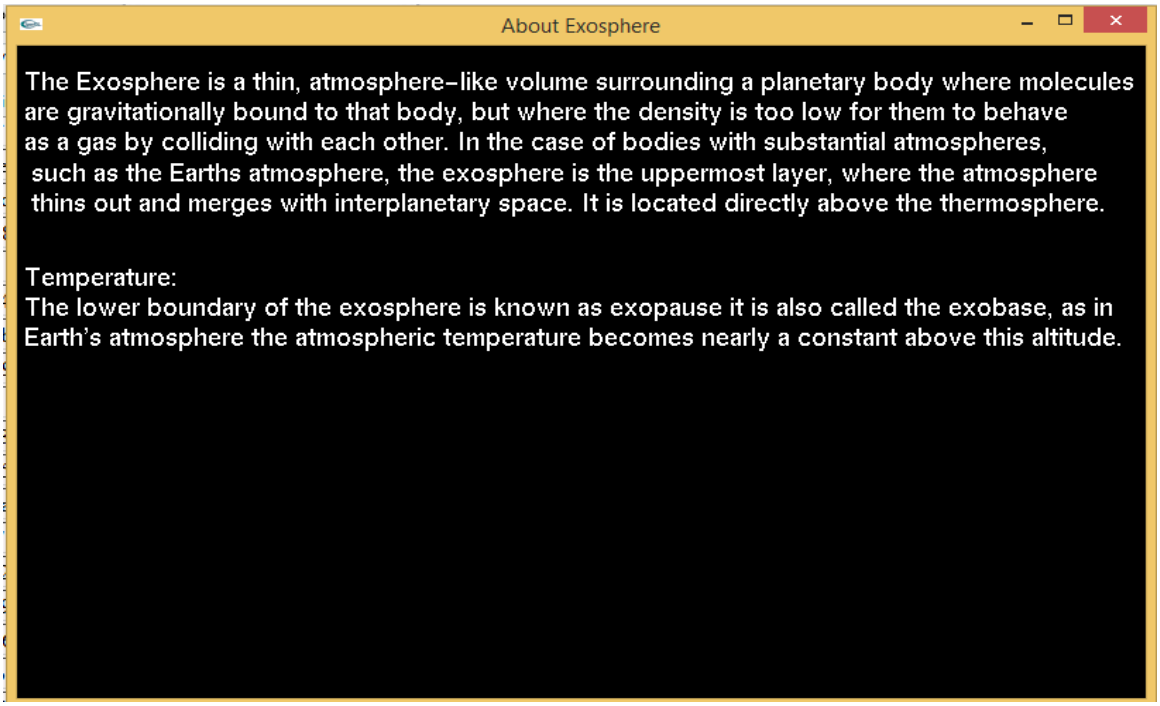
- Press on '**m**' - shows the information about the **Mesosphere** in separate window.



- Press on '**h**' - shows the information about the **Thermosphere** in separate window.



- Press on '**e**' - shows the information about the **Exosphere** in separate window.



- Press on '**z**' - to stop all the animation going on in the screen. In order to again start animation press '**z**' again.
- When a window is open it initially freezes all activities in the main window i.e. all kind of animation is stopped. Therefore, in order to start animation in the main window one need to press the 'z' button.
- Moreover, during the project run one cannot close the Information windows. It will completely shut the program.

- Press on '**u**' - shows the **Ultraviolet Ray Effect** on earth as well as layers. Again press 'u' to stop the effect.

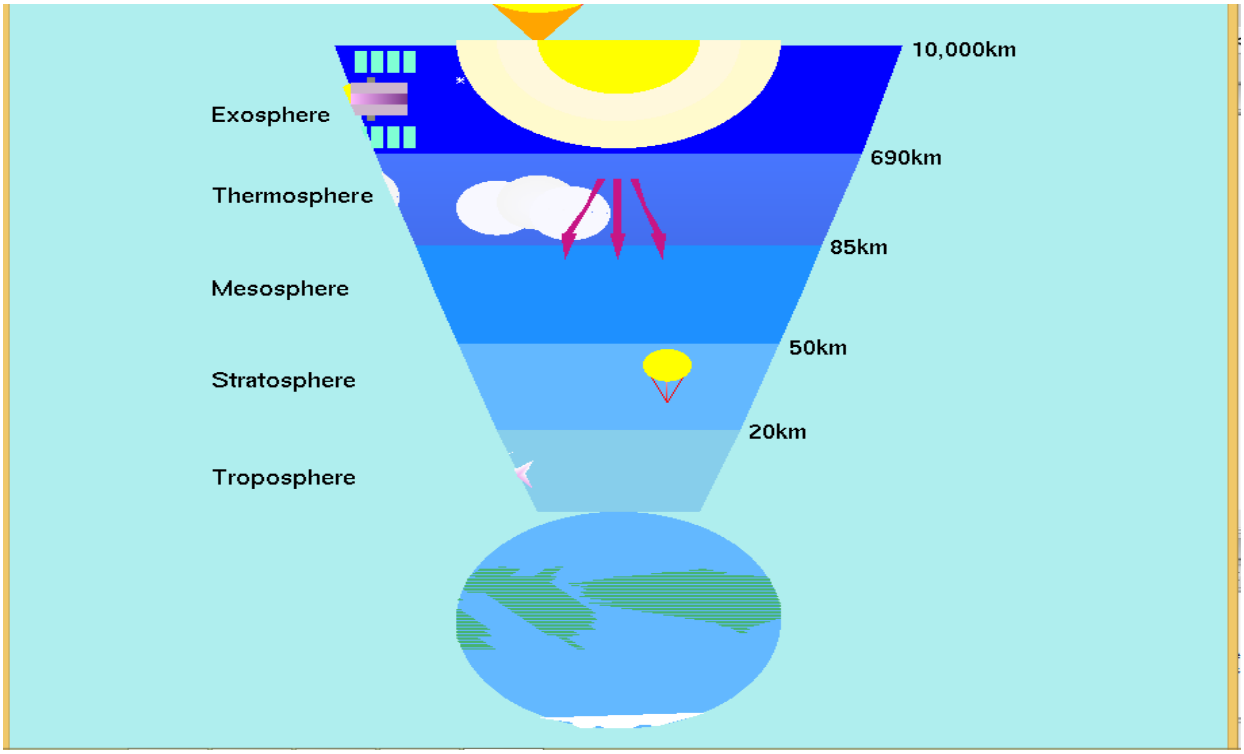


Fig: The Ultra Violet Ray Effect

When the sun is in the nearest possible position to Earth, the Ultra Violet Ray Effect will be shown. Sun shines at its highest and 3 Ultraviolet ray are coming out of it. These rays will go towards the Earth. Because of the presence of Ozone sphere in the Stratosphere Layer, the Ultra Violet Rays will be absorbed here.

The ultra violet rays come out of the Sun and gradually move towards Earth. In the Stratosphere Layer, the rays are absorbed, hence the change is shown with the different colors in the rays. After the absorbance process the rays disappeared from the screen.

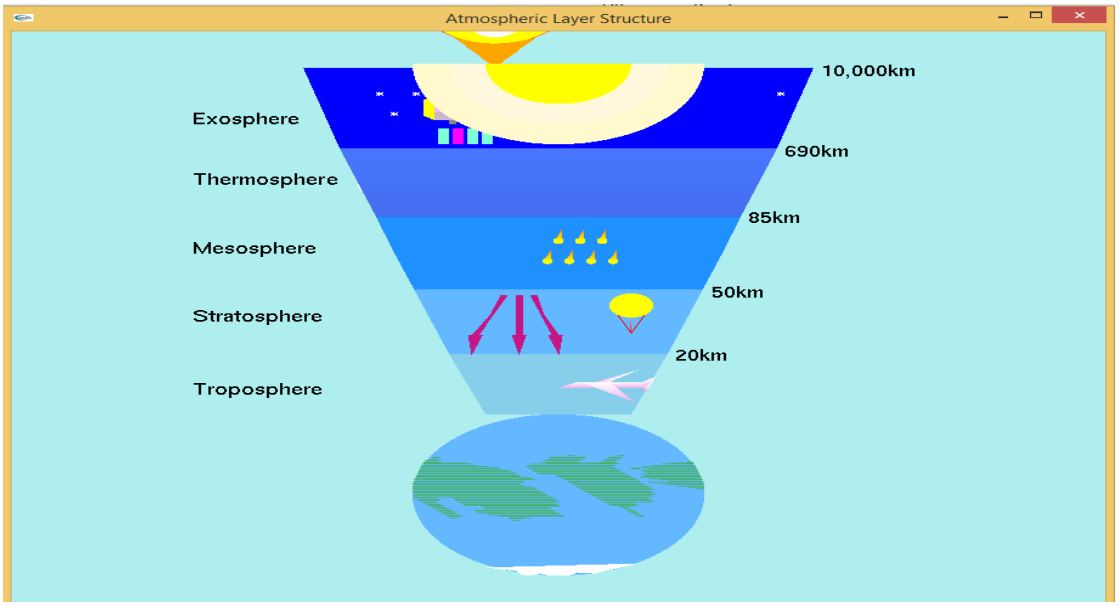


Fig: The Ultra Violet Ray absorbed in Stratosphere

- Press on '**d**' - shows the Thunder Effect.

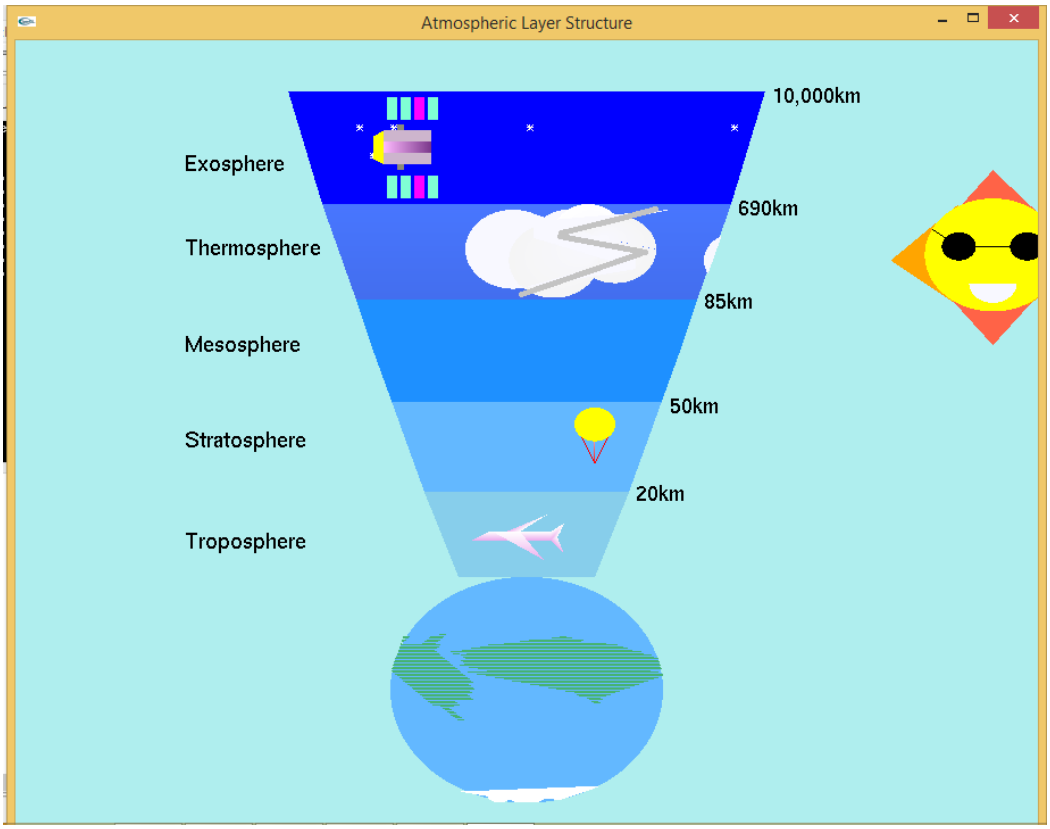


Fig: Thunder Effect

A thunder effect will be shown in the Thermosphere Layer. A **background music** will also be played of thunder with this effect to make it real.

7. Mouse Event

In the mouse event, there are three events. The events are shown in the following figure,

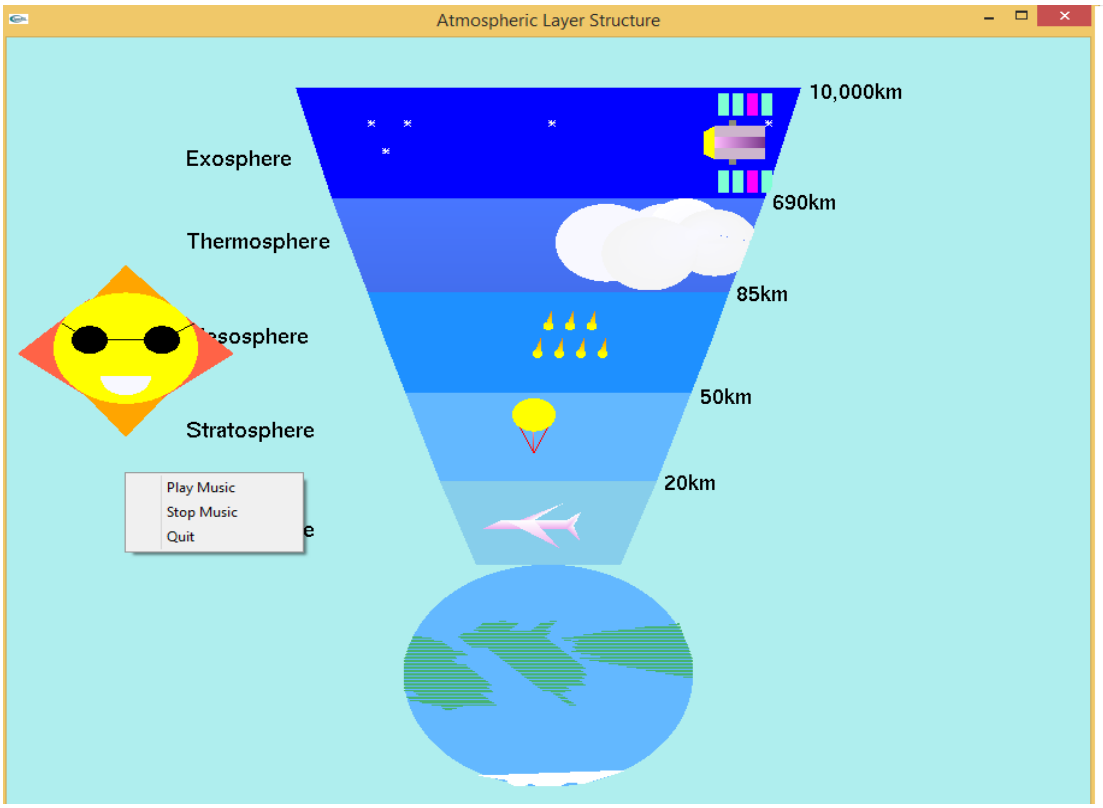


Fig: Mouse Event

The mouse events are shown when a right button click of the mouse is happened on the main screen. On Right Button Click on Monitor, a menu will appear. Further clicks on the menu options will act as following,

a) A click on "**Play Music**" option - a continuous **Background music** will be played.
b) A click on "**Stop Music**" option – the continuous Background music will be stopped.
c) A click on "**Exit**" option - the project will be shut down.

Since a continuous background music is played. The user can change it according to his/her choice.

8. User Instruction

The using techniques of this project is described through previous several points. Although the most important topics have been covered there, here some other instruction is covered up,

i) Using Keyboard event one can open the "Information Window". This will freeze all the animation on the Main Window. Therefore, in order to start the animation or activity one need to press '**z**' button. Moreover, "Information Window" cannot be closed or it will immediately shut all the open windows.

ii) Due to the animation every object in the screen is moving. Therefore, one can see the "Thunder Effect" only when the clouds are in the screen.

iii) Once the '**u**' button is pressed the "Ultra Violet Ray Effect" is shown continuously only when the Sun is in the nearest position to Earth not always. It is considered to be in the nearest position to Earth when it is in the middle position above Exosphere Layer.

9. Future Development

This project is now at an initial stage and so need to be upgrade to make user experience better. Some fields that can be considered for future development are,

- In the future development plan the project may be implemented in 3D representation.
- Some other environmental effects may be added.
- Some other colors and more shading may be added to make it more lucrative.

10. Conclusion

The main purpose of these project is to create a 2D Graphics representation of the Atmospheric Layer Structure. But using different techniques and GLUT Library a more user interactive project has been implemented.