

3D RENDERING ENGINE

NIRANJAN RATHOD

PROJECT DETAILS

3D rendering is the [3D computer graphics](#) process of automatically converting 3D [wire frame models](#) into 2D images with 3D [photorealistic effects](#) or [non-photorealistic rendering](#) on a computer. **Rendering** is the final process of creating the actual 2D image or animation from the prepared scene. This can be compared to taking a photo or filming the scene after the setup is finished in real life. Several different, and often specialized, rendering methods have been developed. In general, different methods are better suited for either photo-realistic rendering, or [real-time rendering](#).

Real-time rendering

Rendering for interactive media, such as games and simulations, is calculated and displayed in real time, at rates of approximately 20 to 120 frames per second. In real-time rendering, the goal is to show as much information as possible as the eye can process in a fraction of a second. The primary goal is to achieve an as high as possible degree of photorealism at an acceptable minimum rendering speed .

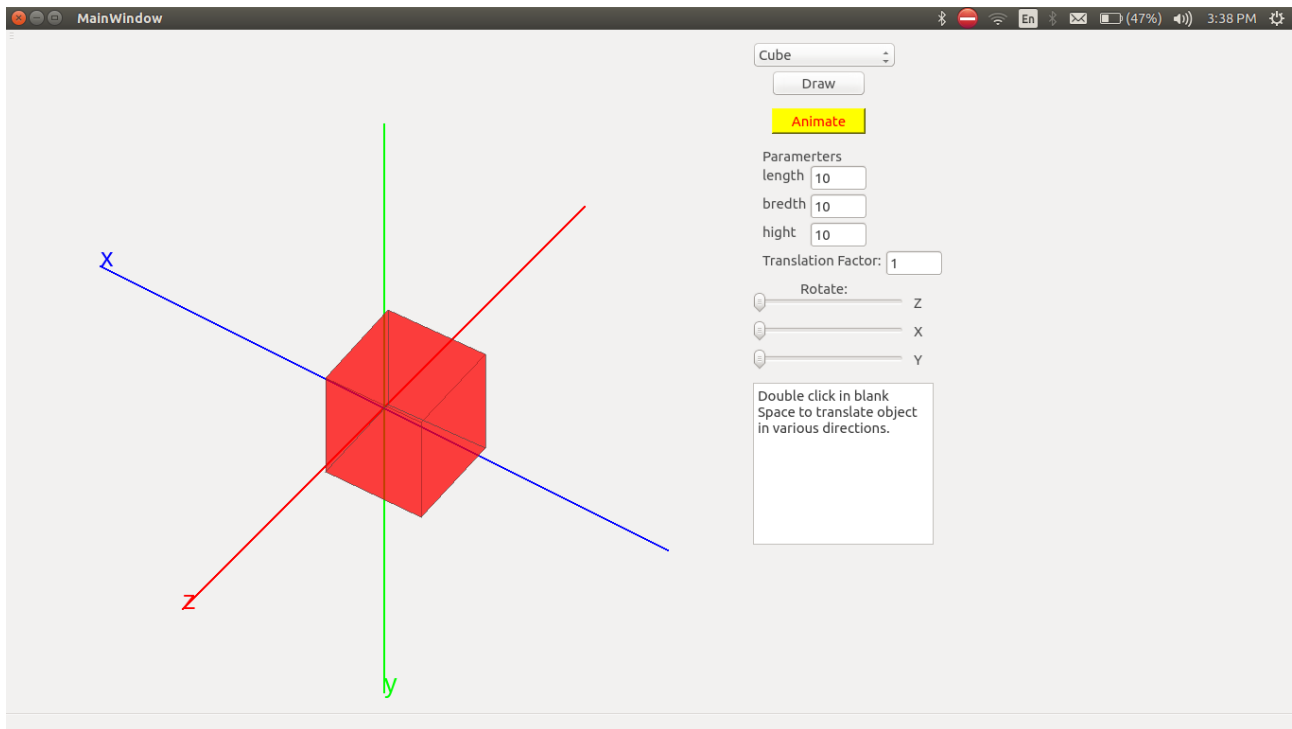
Non-real time rendering

Animations for non-interactive media, such as feature films and video, are rendered much more slowly. Non-real time rendering enables the leveraging of limited processing power in order to obtain higher image quality. Rendering times for individual frames may vary from a few seconds to several days for complex scenes. Rendered frames are stored on a hard disk then can be transferred to other media such as motion picture film or optical disk.

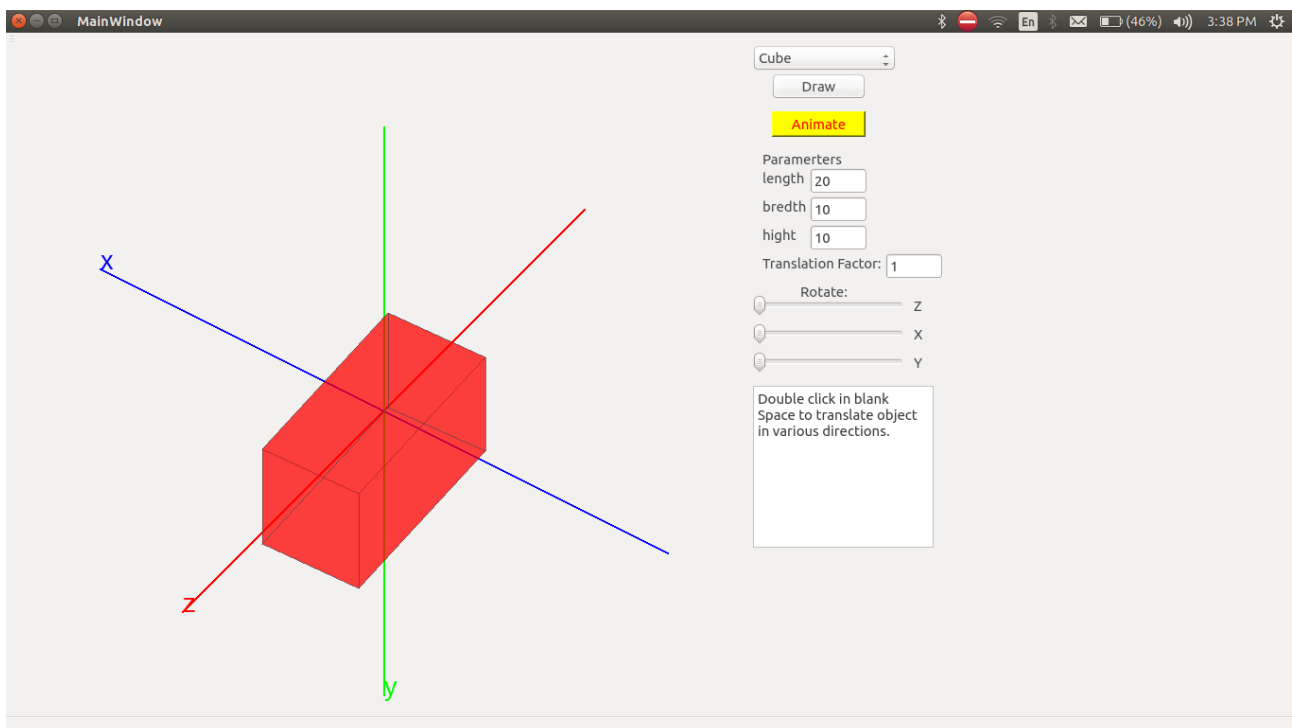
SALIENT FEATURES OF THIS PROJECT

1. No external graphics library used.

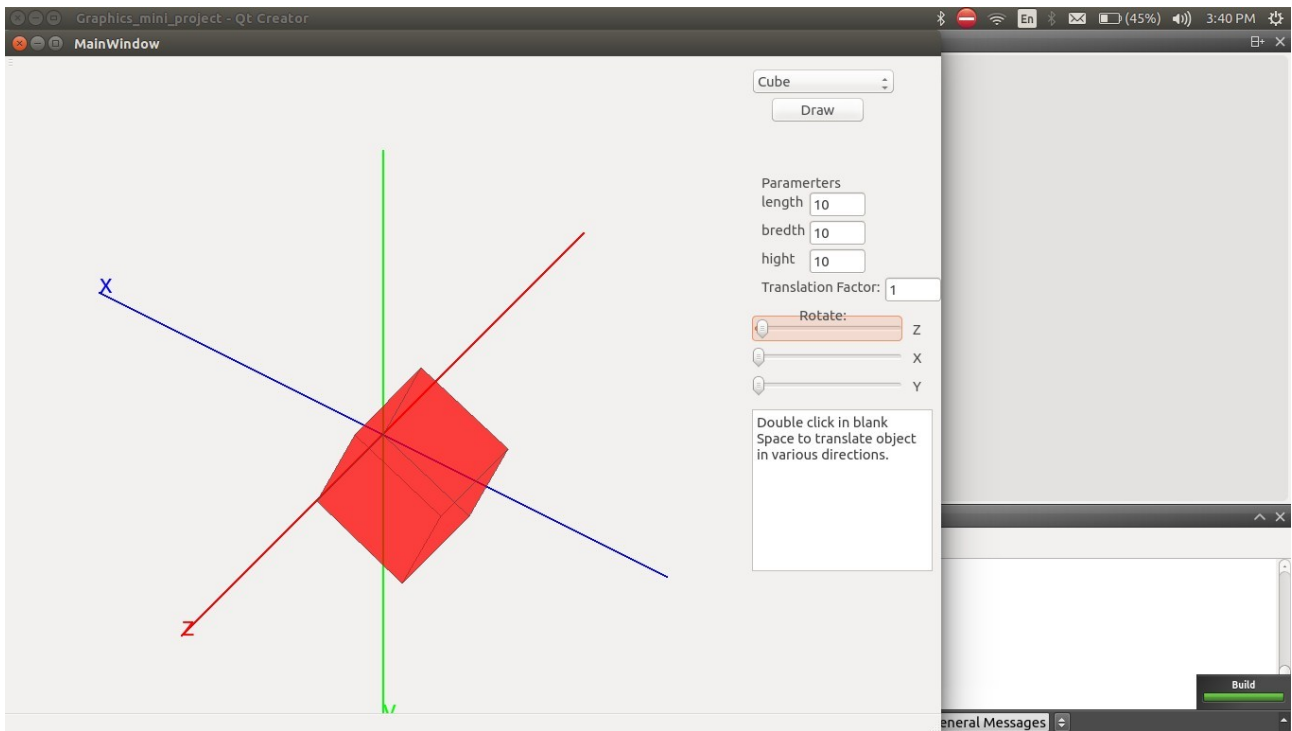
2. Programmable 3d modeling can be done with the help of this 3D rendering engine.



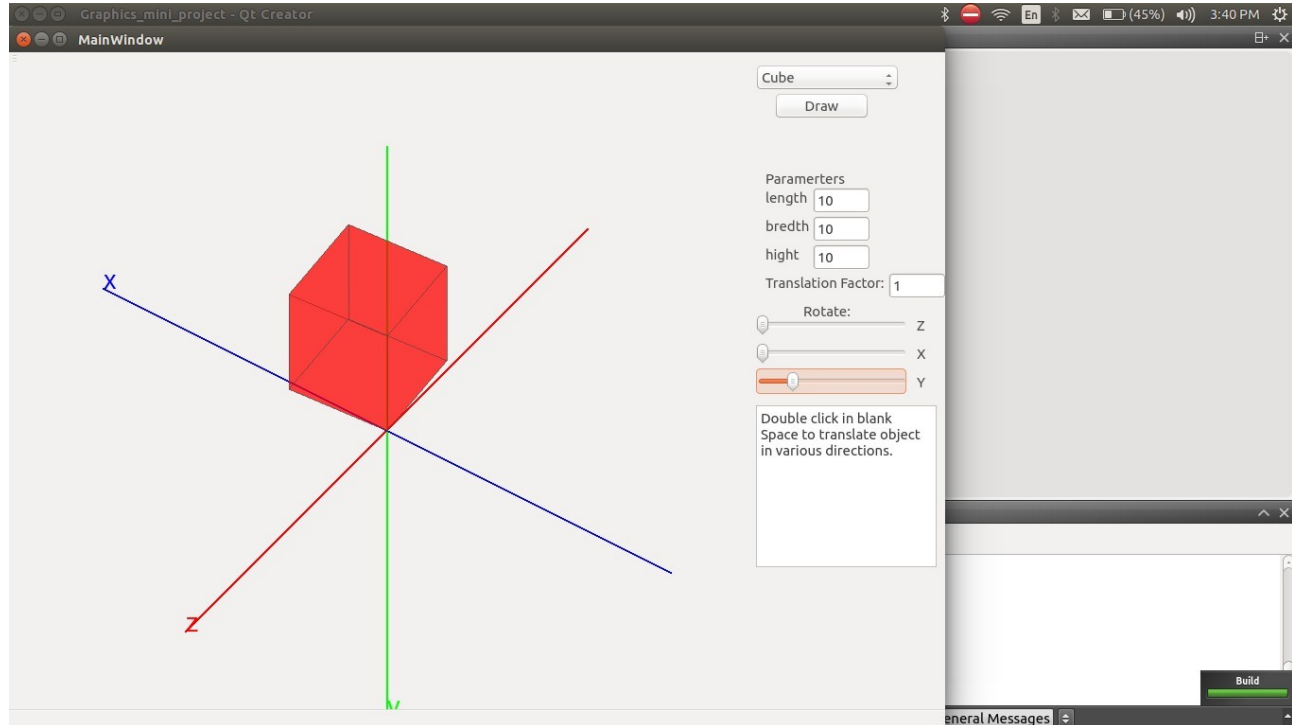
Programmable 3D modeling.



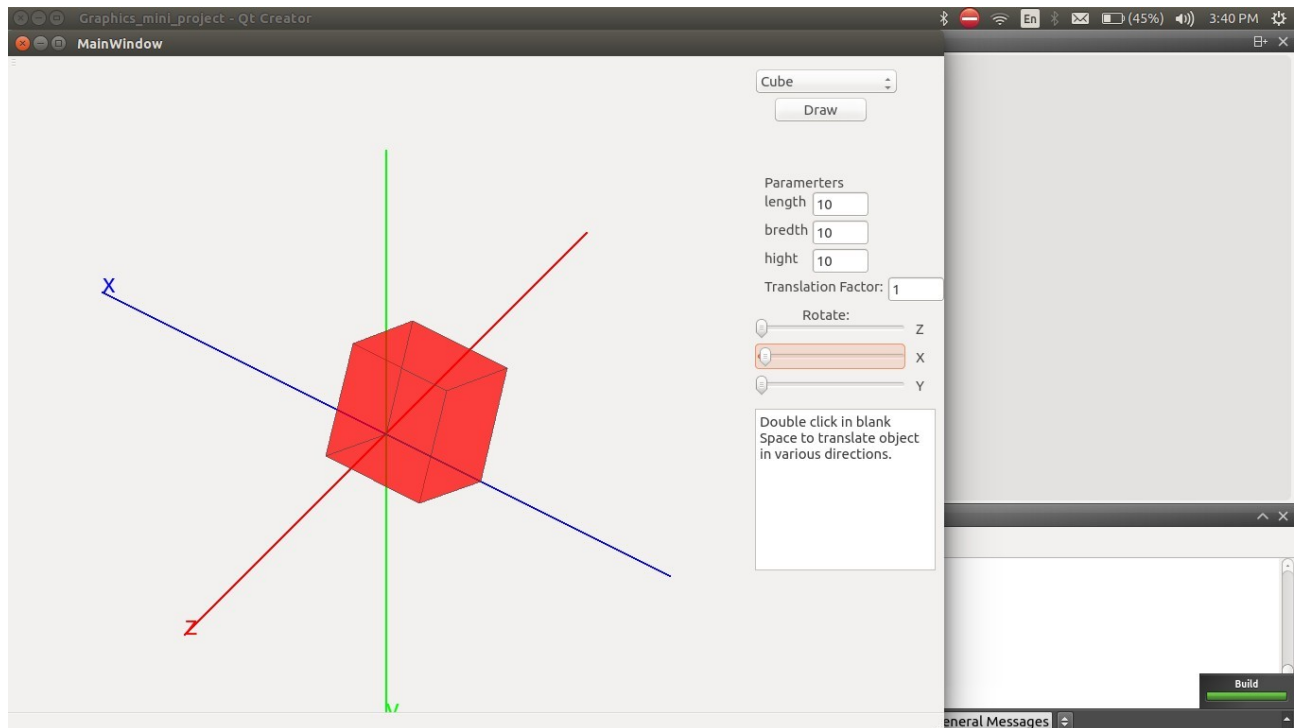
Rotation matrix implementation about Z-axis



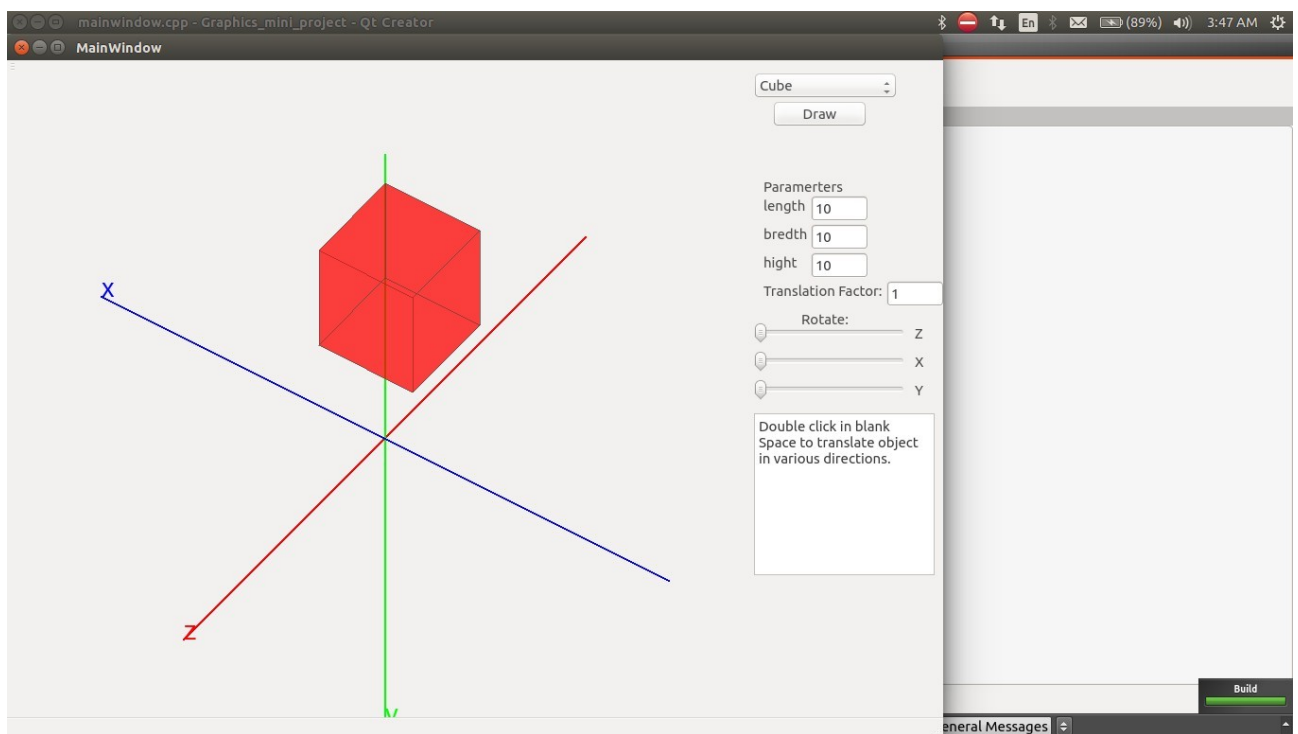
Rotation matrix implementation about Y-axis



Rotation matrix implementation about X-axis

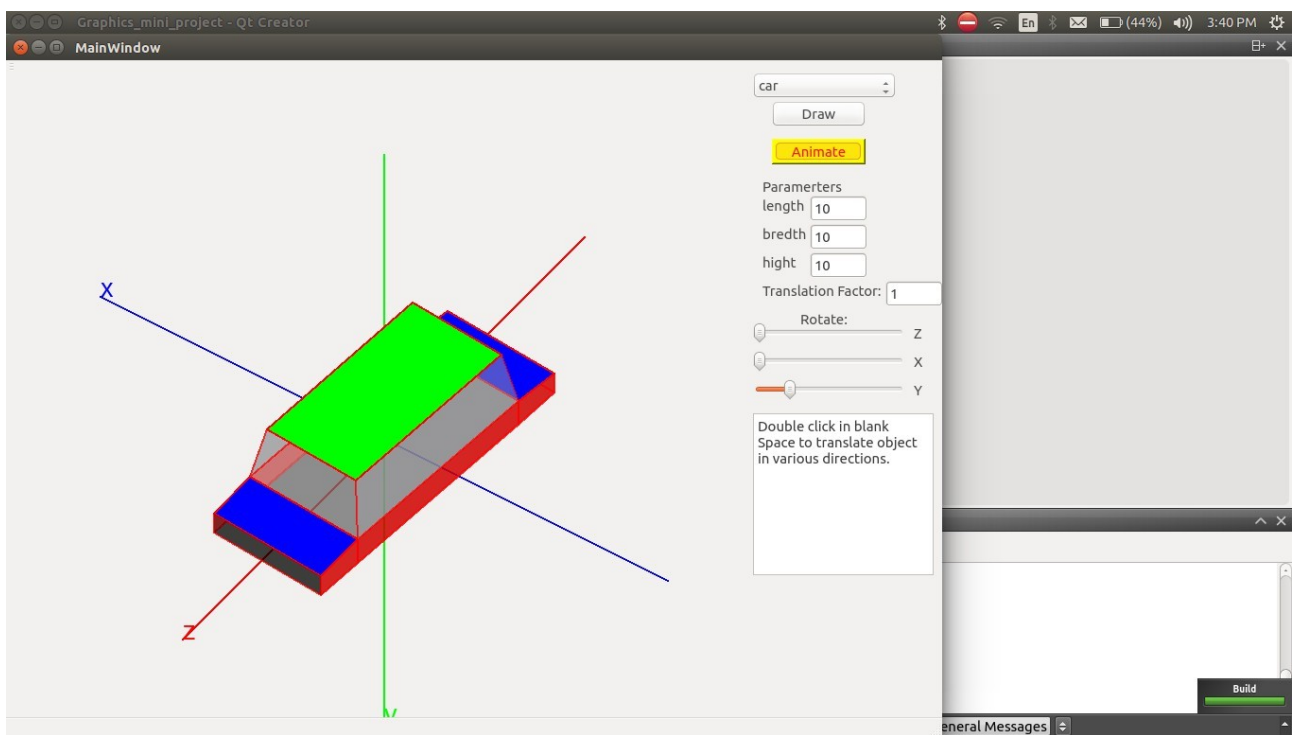
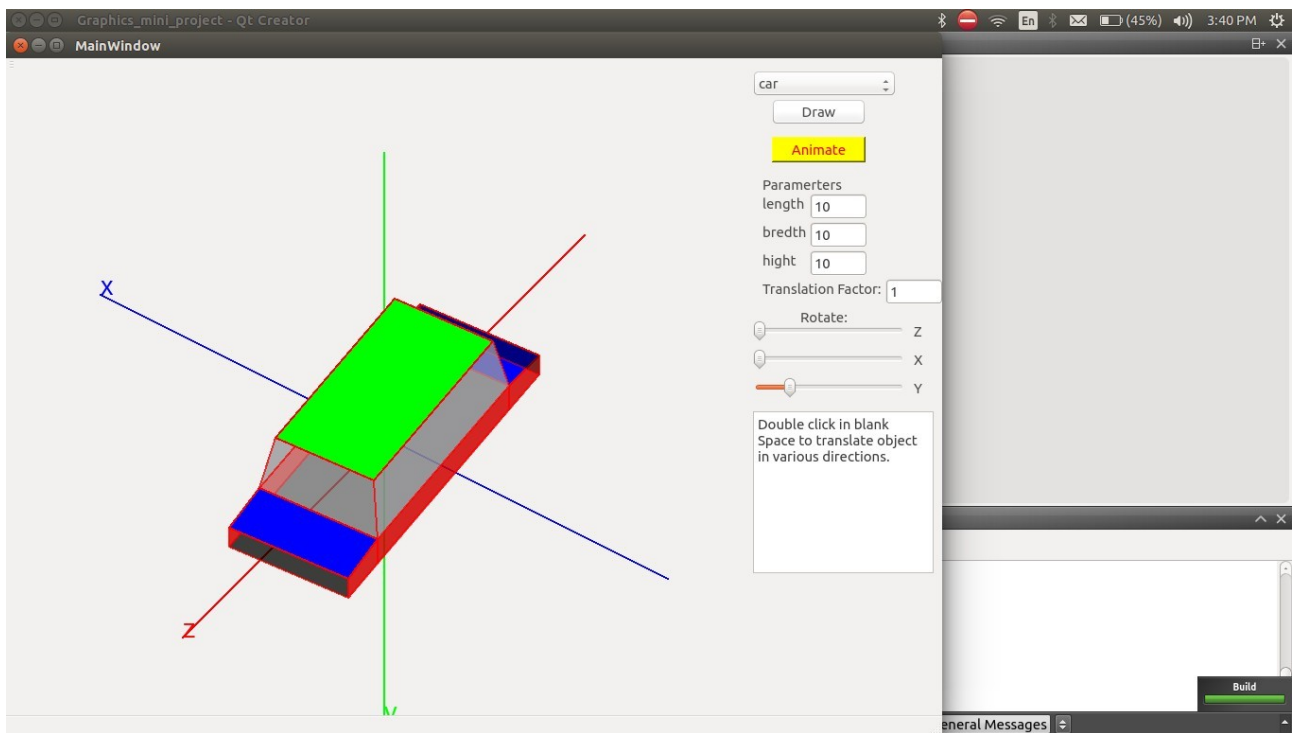


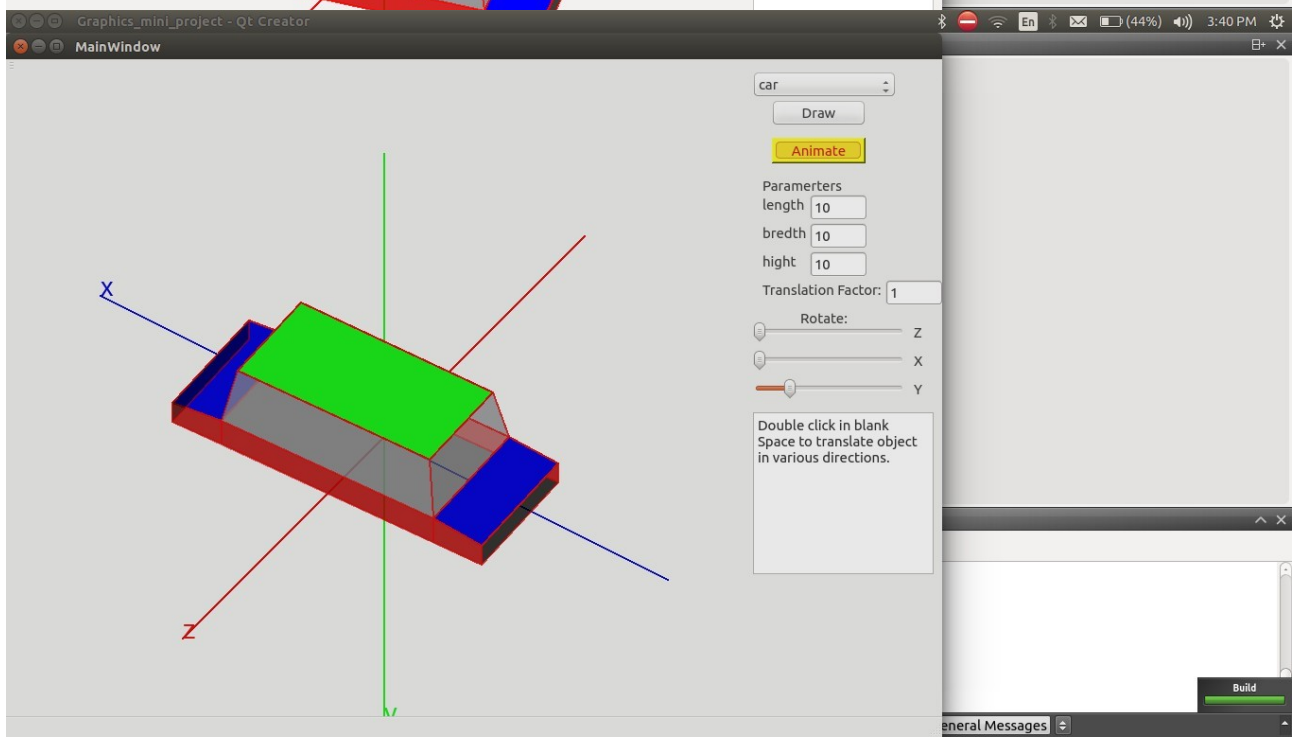
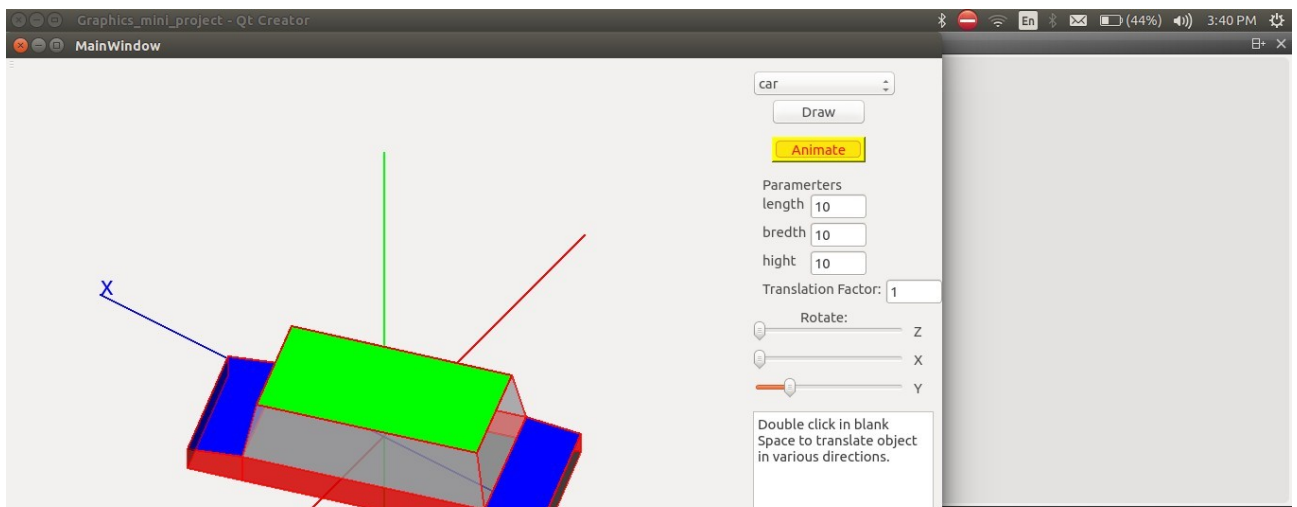
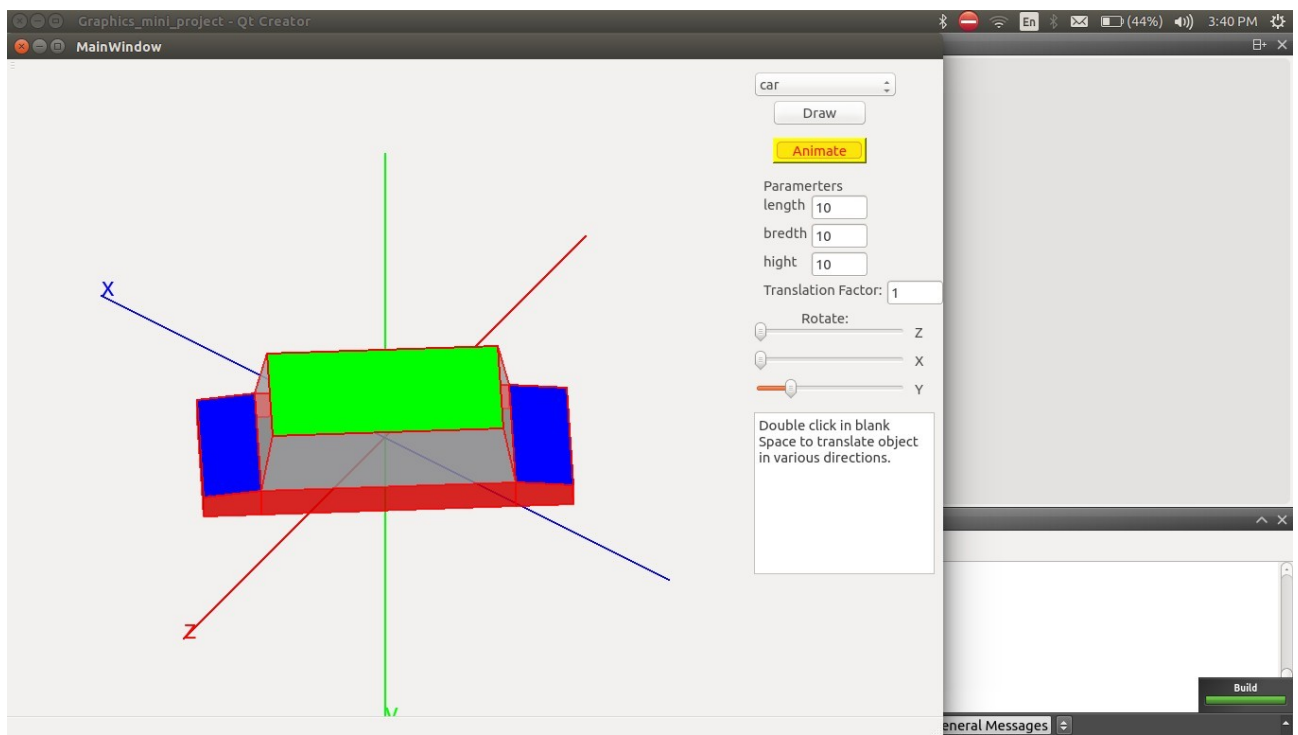
Translation On mouse Click:

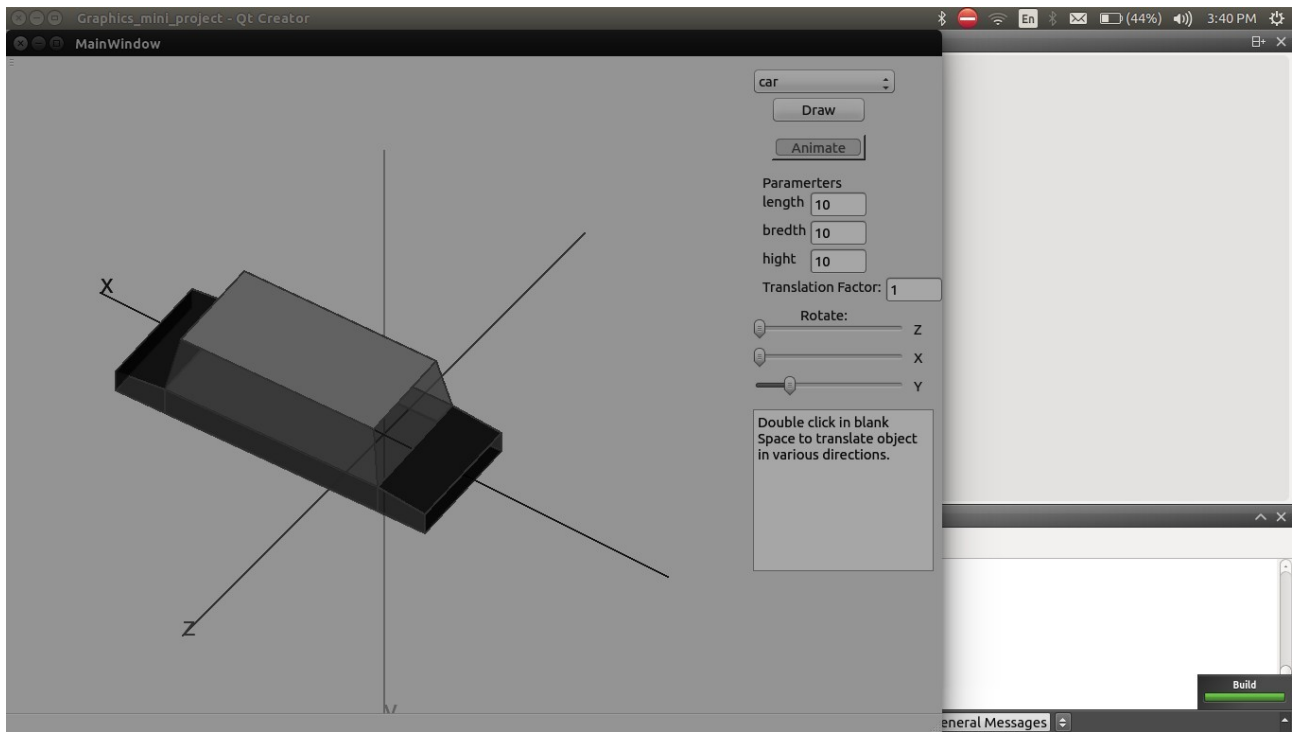
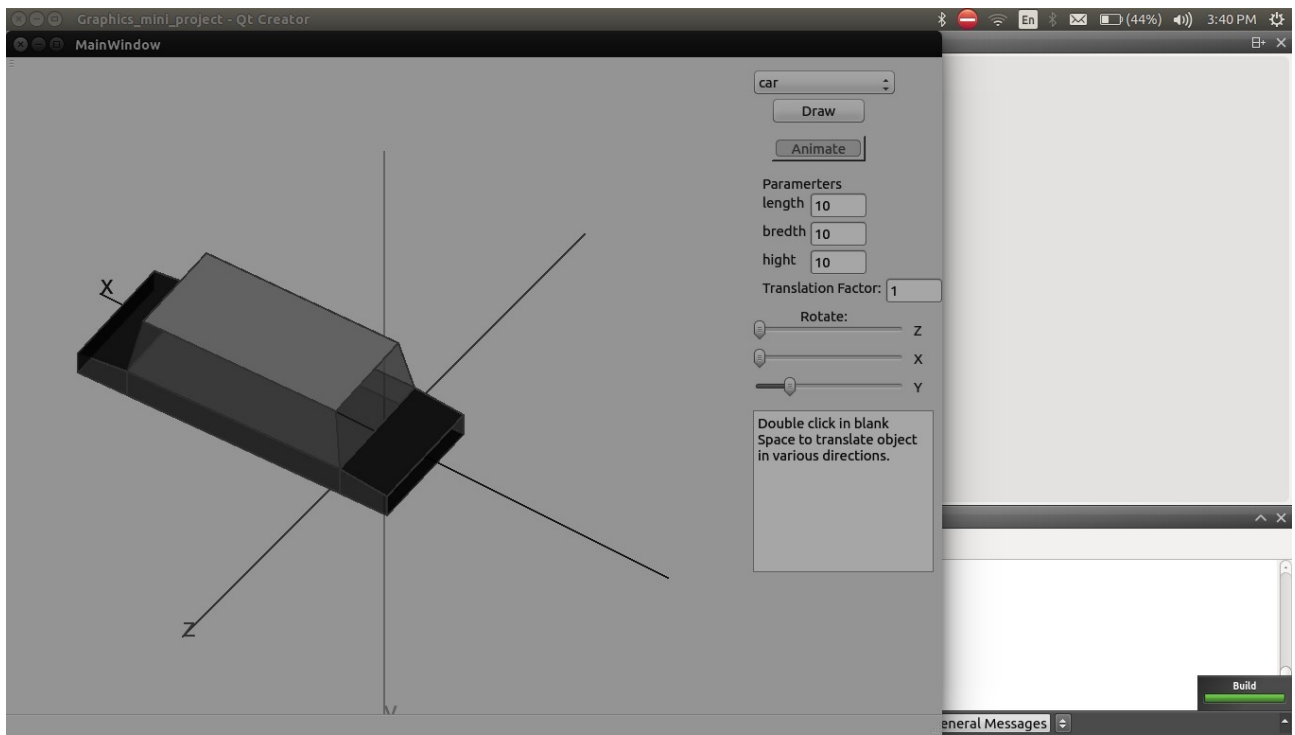


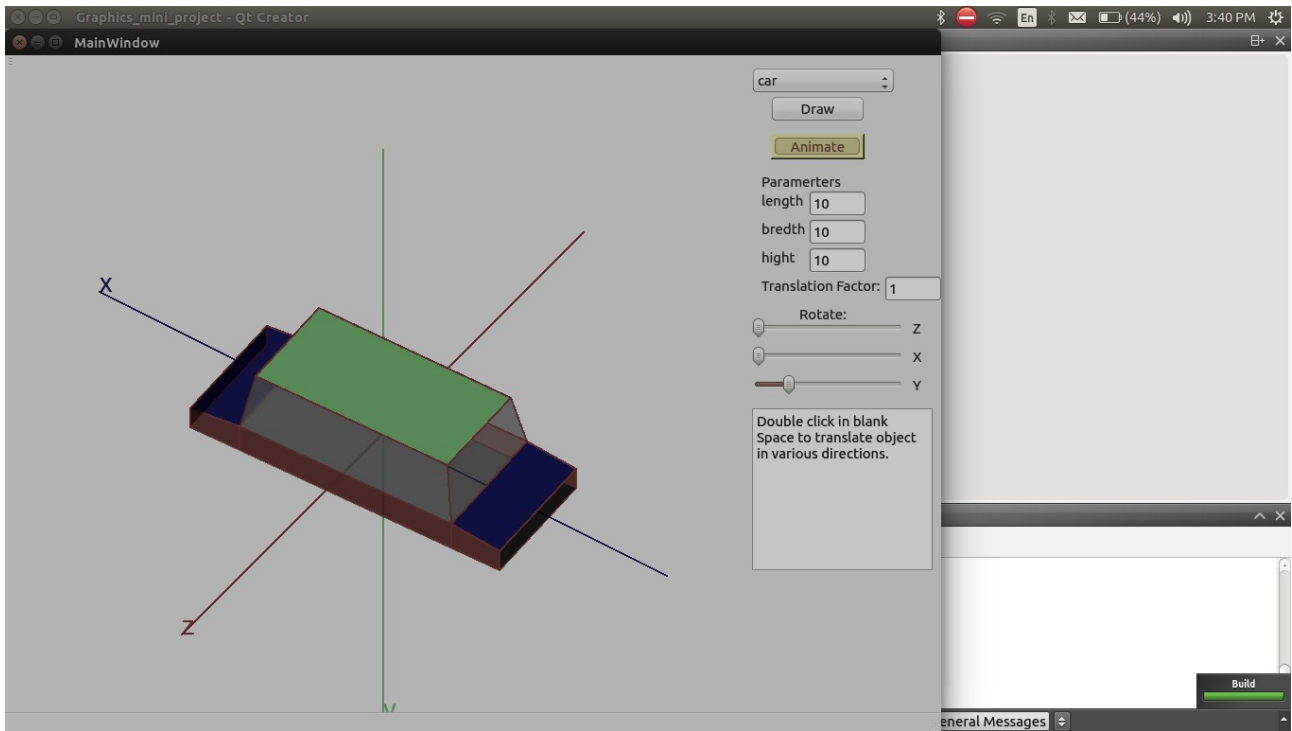
3. Animations can be done with the help of this 3D rendering engine.

ANIMATION SCREENSHOTS



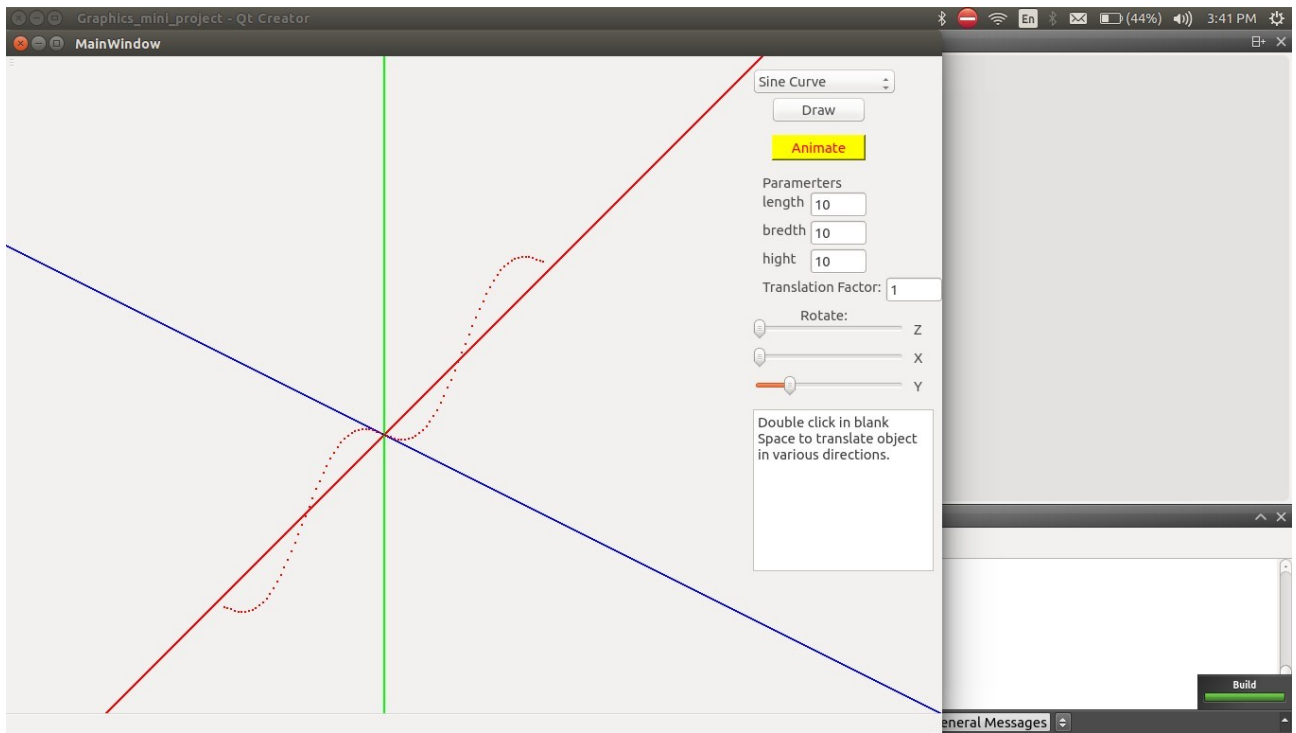




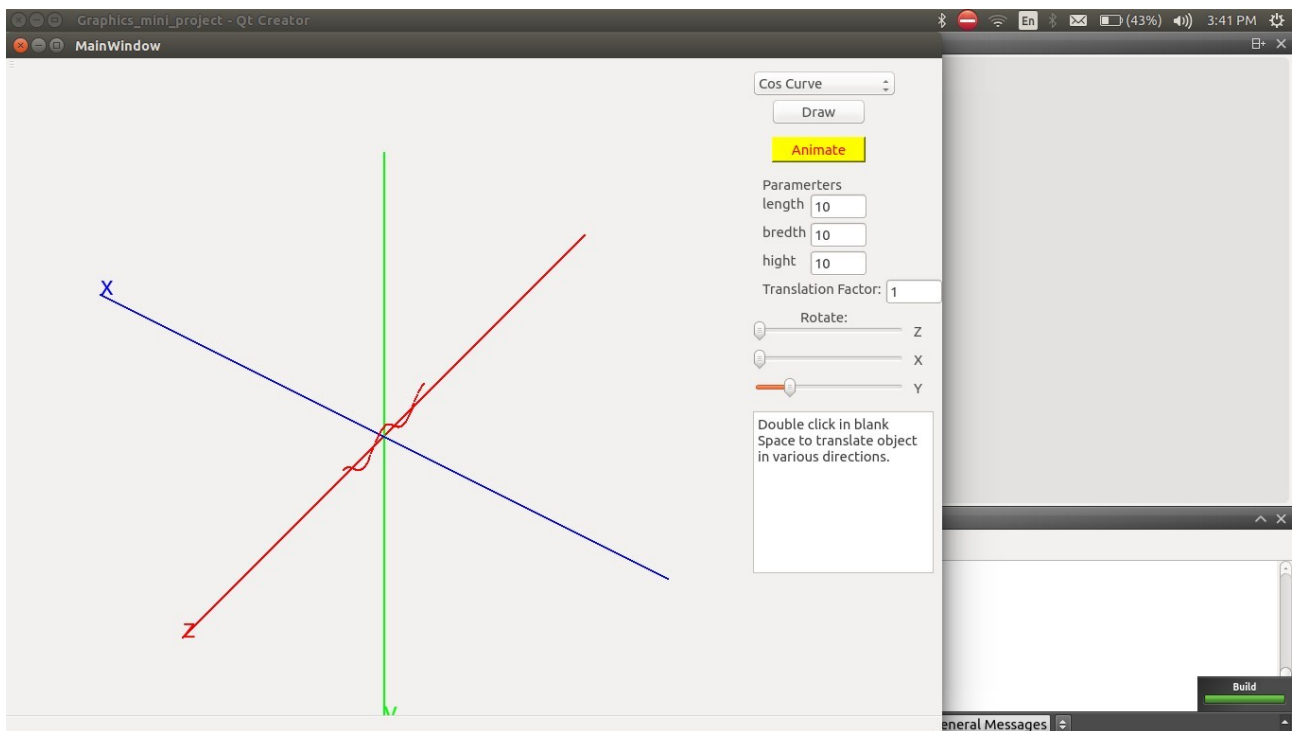


4. Any equation involving 3D co-ordinates can be plotted with the help of this 3D rendering engine.

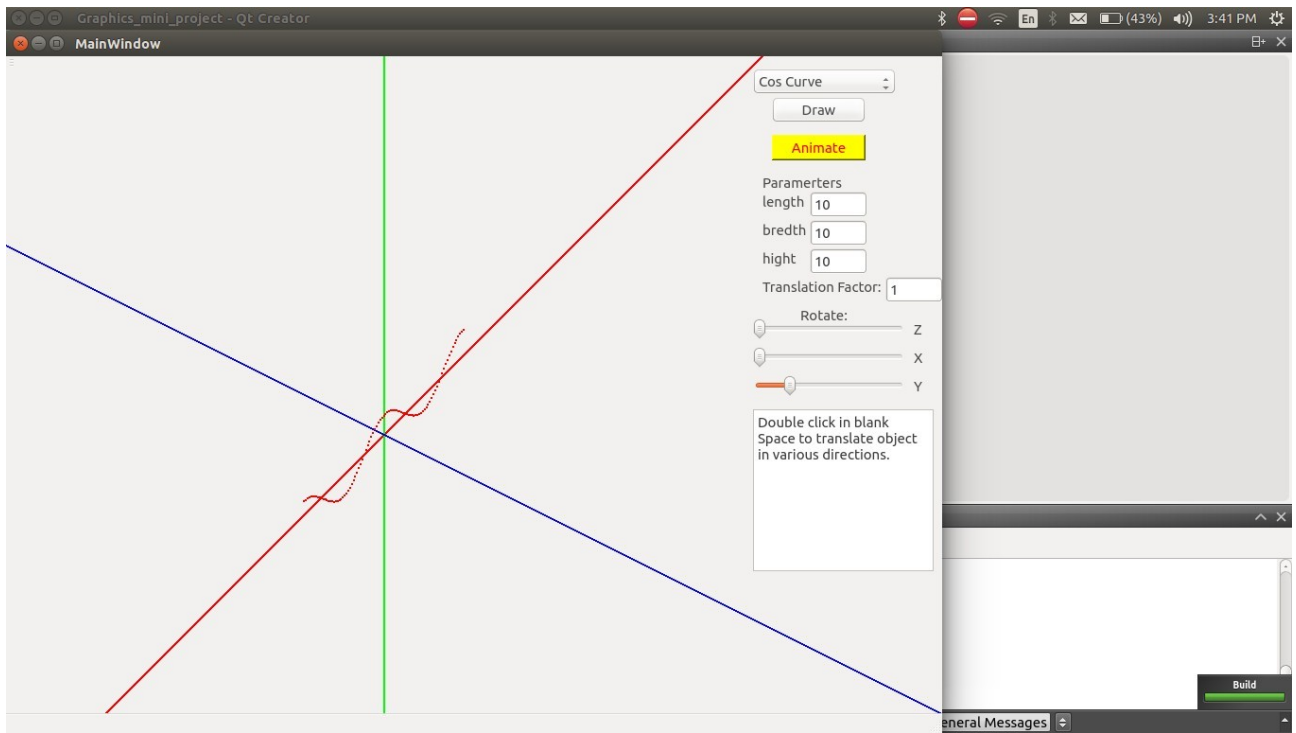
Equation Of Sine Curve 3X Scaled by rolling Mouse wheel.



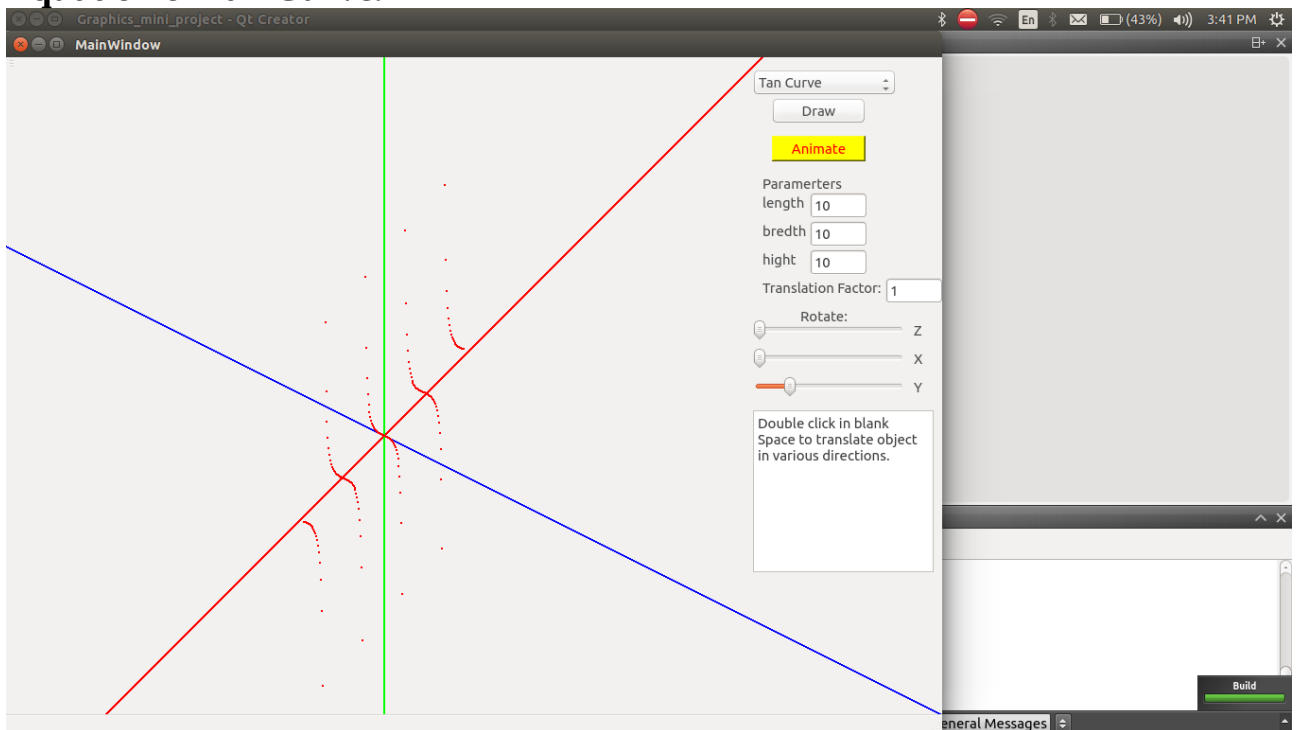
Equation Of Cos Curve .



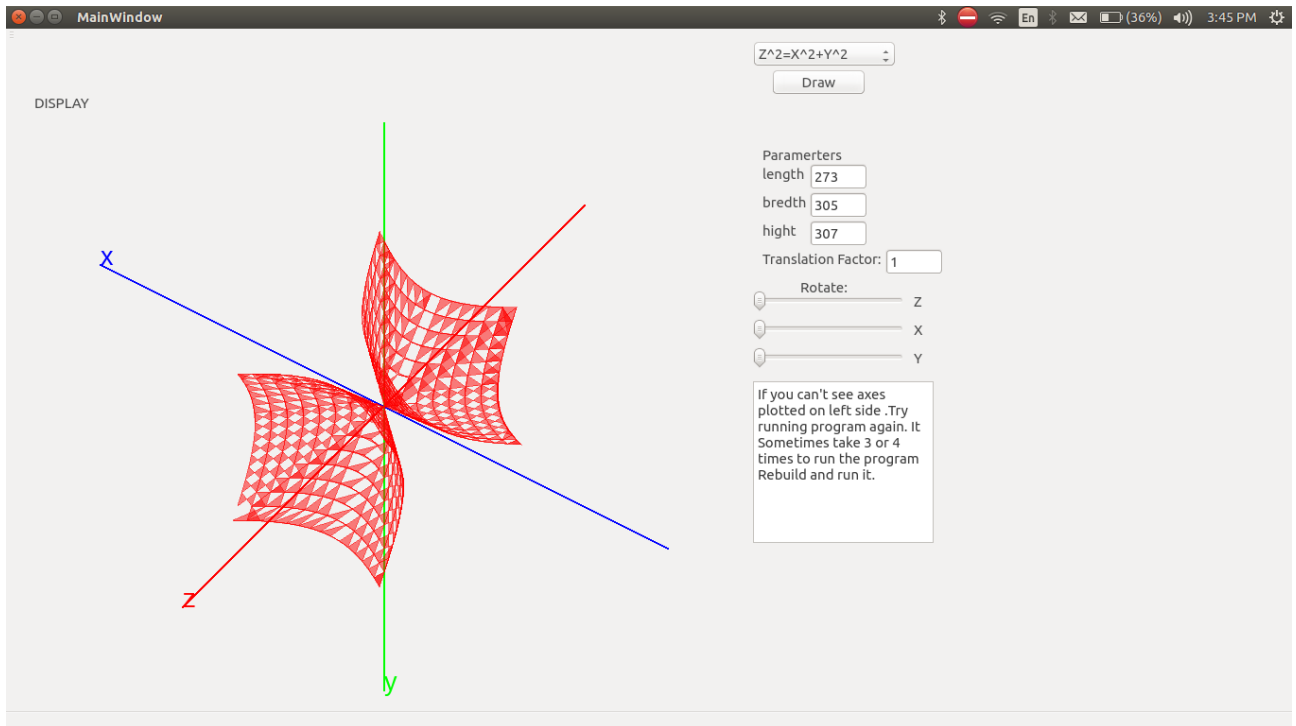
Equation Of Cos Curve 2X Scaled by rolling Mouse wheel.



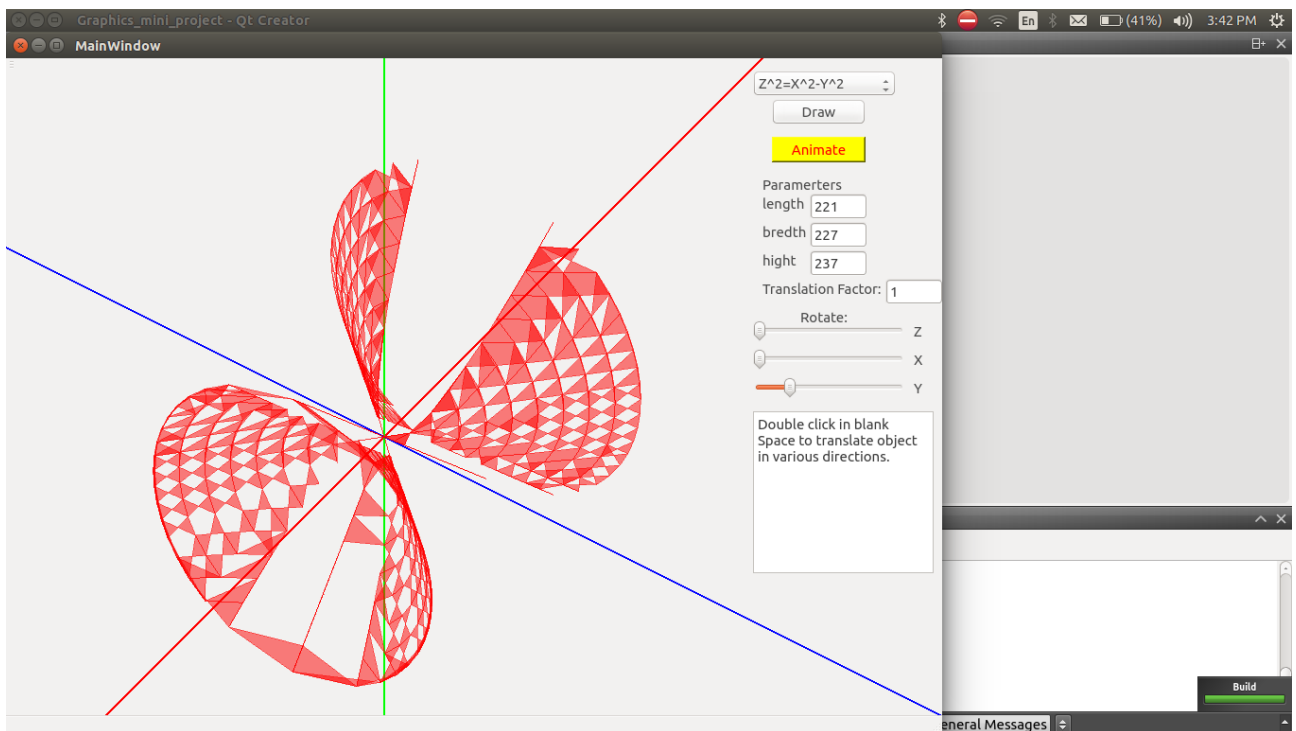
Equation of Tan Curve.



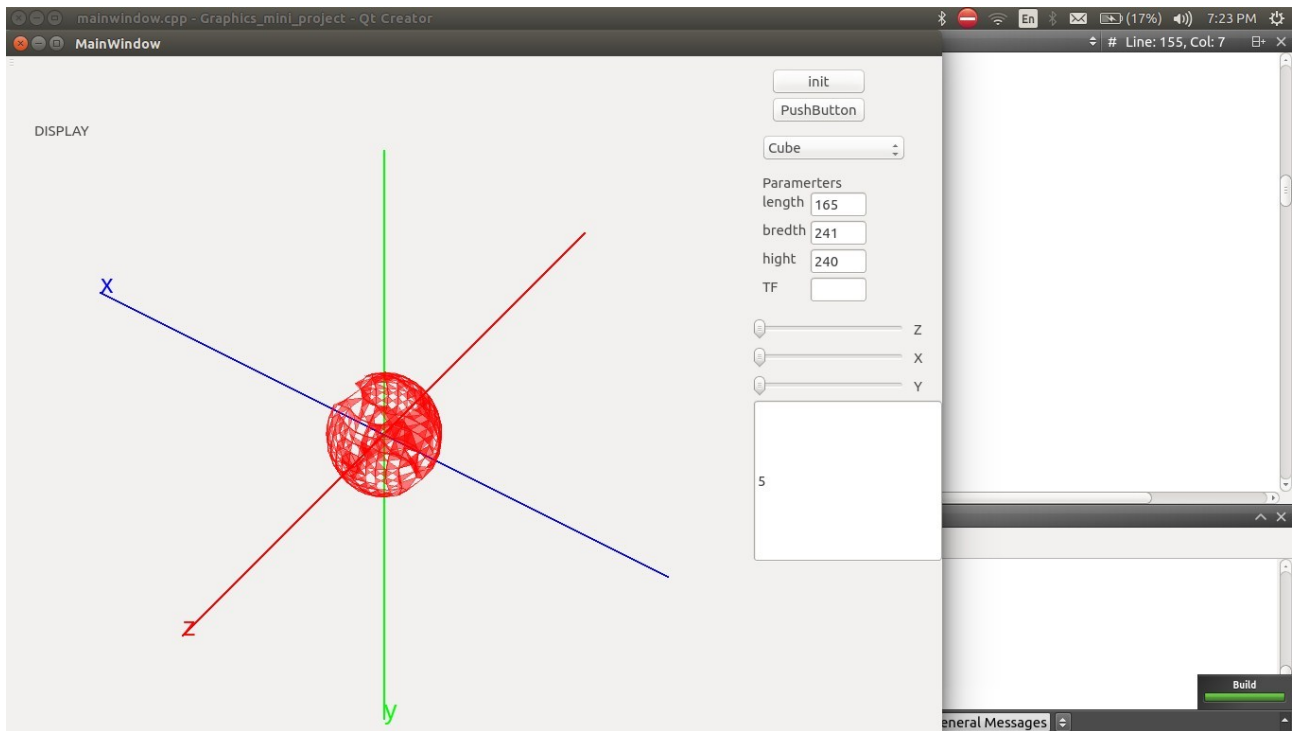
3D Plot of Equation $Z^2 = X^2 - Y^2$



3D Plot of Equation of Cone $Z^2 = X^2 + Y^2$ **For Rough Visualization.**



3D Plot of Equation of Sphere. *For Rough Visualization.*



CONCLUSION

Thus, we have successfully designed a 3D rendering engine which can perform the above listed tasks.