

Exercise 4: Interaction

Duplicate the solution of the previous *Exercise 3-b* in your *Visual Studio Code* workspace and start from that point. Initially, your application should be similar to *Figure 1*. Extend the code to allow interactive modification of the camera point of view. We will allow the following type of camera interactions:

- Panning (on center button mouse drag)
- Zooming in/out (on mouse wheel)
- Rotation (on left button mouse drag)
- Reset the camera (key 'r')

Through these kinds of interactions, you should be able to interactively obtain a result similar to those shown in *Figure 2*.

You will have to include the following additions:

- As we will use the same geometry as in the previous exercise, shaders and vertex buffers will remain unchanged.
- Add the needed global variables to store the camera parameters.
- Add the needed function callbacks to capture mouse and keyboard events.
 - Modify panning, zooming and rotation global variables on the appropriate event.
- Modify *drawScene()* to:
 - Apply panning and zooming in the *translate()* camera transformation.
 - Multiply the current camera matrix by the rotation matrix.
 - Push, modify, and pop the current modelview matrix for each object we render.

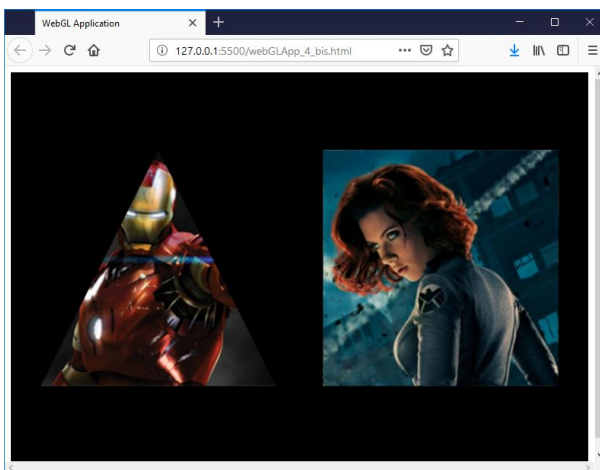


Figure 1. Solution of Exercise 3-b.

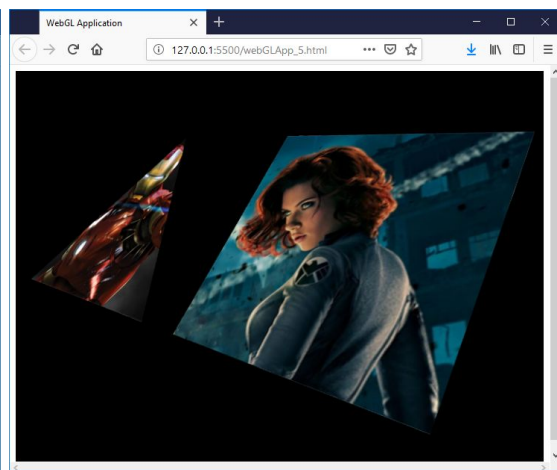


Figure 2. Different camera point of view.