

Introduction

In this assignment you will draw a rectangle of specified dimensions in the window. The program will maintain either top and bottom margins or left and right margins of 10% of the window's height or width, respectively, depending on the window's size.

User Interface

The default rectangle will be 1×1 . If the user changes the window size, the window boundaries will be recomputed as necessary.

If the user presses the **S** key, then, in the text window, the program will prompt the user to enter the width and height of the rectangle. The program will then draw that rectangle with the window margins adjusted as necessary. In all cases, the rectangle will remain centered in the window.

If the user presses the escape key, the program will quit.

Program Description

Name the program `Margins.cpp`. This program will use a projection matrix, created by a call to `ortho2D()`. The values of `xmin`, `xmax`, `ymin`, and `ymax` will be calculated each time the window is resized or when the dimensions of the rectangle are changed.

If the aspect ratio of the window (width/height) is greater than the aspect ratio of the rectangle, then the top and bottom margins should be set at 10% of the window's height. If the aspect ratio of the window is less than the aspect ratio of the rectangle, then the left and right margins will be set to 10% of the window's width. In either case, the rectangle will be shrunk or expanded to fit the space within the margins.

You will need to pass the projection matrix to the vertex shader as a uniform variable and then multiply it by the vertex (`vec4`) before assigning it to `gl_Position`.

Due Date

Drop the program `Margins.cpp` and the associated shader programs in the dropbox by midnight Monday, September 16.