Documentation

GaeGebra is a coordinate geometry application inspired by GeoGebra. It was written in C99 using SDL2 and uses the AddressSanitizer. Here is a short documentation, but if you want to dive deeper into the source code, you can find a pdf in the docs folder that contains a short description about the functions and structures.

Coordinate geometry

Coordinate system

The first step is to create a coordinate system with `coordinate_system_create`. Then you can add shapes to it that will be stored and freed in the end. You need to call `coordinate_system_draw` to draw it, and call `coordinate_system_destroy` in the end to clean up. There are some other 'methods' that you can use:

- `coordinate_system_is_hovered`
- `coordinate_system_get_hovered_shape`
- `coordinate_system_translate`
- `coordinate_system_zoom`
- `coordinate_system_update_dimensions`

Sometimes, converting points from screen space into coordinate system space can be useful and vica versa. This can be achieved with the following functions:

- `screen_to_coordinates`
- `coordinates_to_screen`

Shapes

The are a number of shapes that can be created:

- Point
- Line
- Circle
- Parallel
- Perpendicular
- Angle Bisector
- Tangent

To create a one, call `[SHAPE]_create` with the name of the shape. The shape will be automatically freed in the end by the parent coordinate system.

API

Project structure

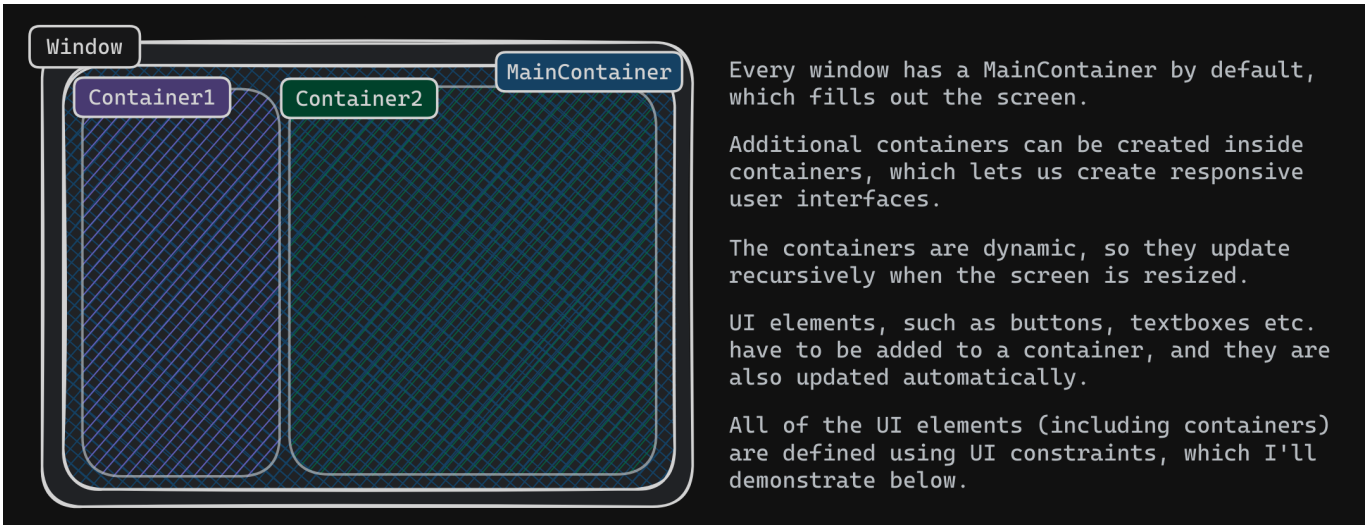
The project is broken down into modules, and the SDL code is *completely* abstracted away:

- App
- Window
- Input
- UI
- Renderer
- Texture
- Font
- Color

The most important ones are presented here:

GUI

Obviously, a coordinate geometry app would be nothing without a GUI! So I wrote a library that allows you to create basic UI elements easily. The UI is responsive, everything is updated automatically. To make use of responsiveness, you need to use `Containers`:



UI Elements

There are a number of UI elements supported by the library:

- Button
- ImageButton
- Textbox
- Label
- Panel
- Checkbox
- Slider
- SplitButton
- DropdownList

The API is designed in such a way, that it is as easy as possible to create a simple, but fully functional GUI.

To define an element, I chose to use a constraints system:

```
The constraint system allows you to define UI elements in a way
that their positions and sizes are automatically updated when the
parent container is resized or moved.

So I designed a flexible, yet easy-to-use API for creating nice,
responsive GUIs, which works as follows:

Each UI element has 4 constraints (2 for position, 2 for size)

There are 5 different constraint types:

    Pixel Constraint:     it is given in pixels, relative to the parent
                          can be both positional and size constraint
                          can be negative (measured from the opposite side)

    Center Constraint:    it places the element in the center of the parent
                          can only positional constraint
                          the value does nothing

    Relative Constraint:  it is a ratio, relative to the parent
                          can be both positional and size constraint
                          can only be positive (usually 0-1 decimal)

    Offset Constraint:    the offset from the previously added element in pixels
                          can only be positional
                          should only be positive (negative works but not recommended)

    Aspect Constraint:    it is a ratio of the other size constraint
                          can only be set for size (and only for one of the two)
                          should only be positive (negative works but not recommended)
```

How to use

To download the app, execute the following commands:

```
git clone https://github.com/mandliors/GaeGebra
mkdir build;cd build
cmake ..
```

If you want to build and run, you can use the start.sh script in the root directory by calling `./start.sh`