Chart Class

This project involves creating a new Chart class definition and using the new Chart to display a graph. The Chart class is defined by the following UML diagram (see “Using UML In Class Design.pdf” if unsure, or program “testChart.cpp” for an example of how your Chart Class might be used to draw a chart).

Fragment source code is an example of how one might use your new Chart class.

Please send in your source file and take a screenshot of your program demonstrating use of your Chart class.

Chart UML

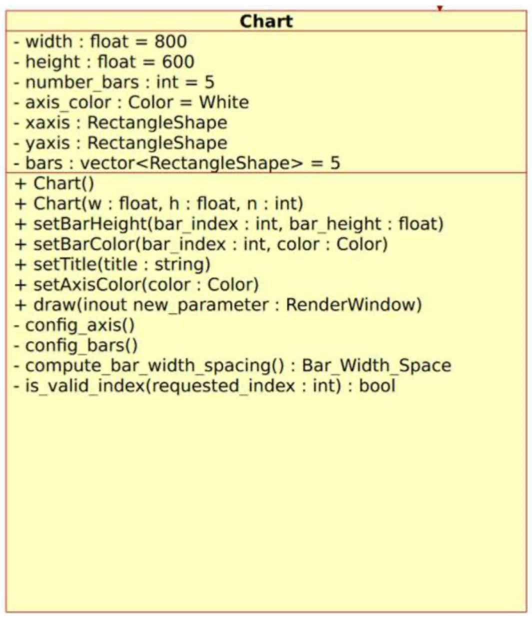


Chart
- width : float = 800
- height : float = 600
- number_bars : int = 5
- axis_color : Color = White
- xaxis : RectangleShape
- yaxis : RectangleShape
- bars : vector<RectangleShape> = 5
+ Chart()
+ Chart(w : float, h : float, n : int)
+ setBarHeight(bar_index : int, bar_height : float)
+ setBarColor(bar_index : int, color : Color)
+ setTitle(title : string)
+ setAxisColor(color : Color)
+ draw(inout new_parameter : RenderWindow)
- config_axis()
- config_bars()
- compute_bar_width_spacing() : Bar_Width_Space
- is_valid_index(requested_index : int) : bool

Brief description for each member function

Chart()

- **default constructor for class, initialize member variables and call member functions to create a chart with default values. Some reasonable default values are**
- **width=800, height=600, number_bars=5, color = WHITE, bars = 5 bars**

Chart(int width, int height, int num_bars)

- **use width=width, height = height and size of bar vector is num_bars**

void setBarHeight(bar_index :int color : Color)

- **sets the bar at bar_index to color** void setBarColor(int idx , Color c)

- sets the color of the specified bar at idx

void setTitle(string title)

- sets the title for the chart. This requires SFML font and Text .

void setAxisColor(Color c)

- slight fudge (both axis (x-axis and y-axis) are the

same color). void config_axis()

- internal utility function that configures the y and x axis based on member values. It should set the width, height, initial color and position of the x and y axis. Maybe this function is called from the constructors
- function only accessible from member functions.

void config_bars()

- internal utility function that configures the each bar. It should compute
  and set the width
  initial height
  initial color
  and position
- for each bar in the chart. Maybe this function is called from the constructors
- function only accessible from member functions.

compute_bar_width_spacing()

- returns a structure containing two floats (width and inter-bar-spacing)
- the function uses the values of chart width and height to compute how wide each bar should be and space between the bars on the graph.
- Maybe called by config_bars()

bool is valid_index(int idx)

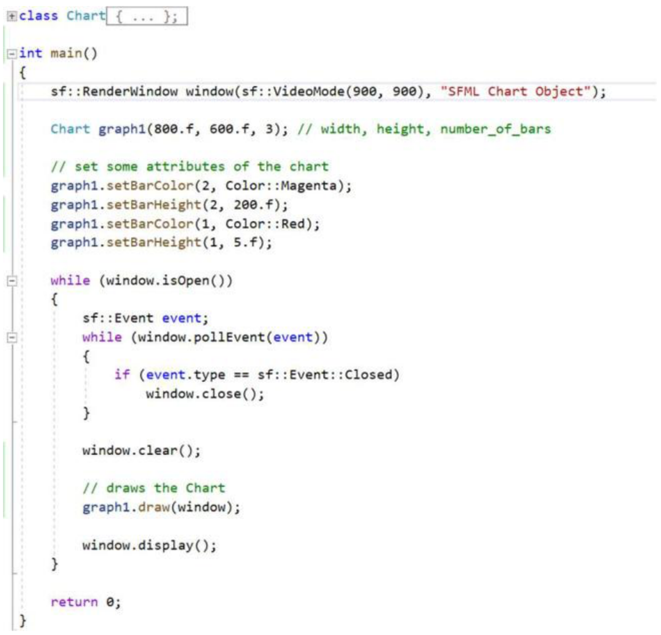
- utility function that enforce invariant on indexes use to specify bar in the vector
- prevents user from supplying an invalid index
  when using setBarColor()
  setBarHegith()

void draw(RenderWindow &window)

- used to make the window.draw() to draw the chart objects to the graphic screen

You are free to add additional member variables and/or functions, however the above must be implemented.

Example usage:



```
class Chart { ... };

int main()
{
    sf::RenderWindow window(sf::VideoMode(900, 900), "SFML Chart Object");

    Chart graph1(800.f, 600.f, 3); // width, height, number_of_bars

    // set some attributes of the chart
    graph1.setBarColor(2, Color::Magenta);
    graph1.setBarHeight(2, 200.f);
    graph1.setBarColor(1, Color::Red);
    graph1.setBarHeight(1, 5.f);

    while (window.isOpen())
    {
        sf::Event event;
        while (window.pollEvent(event))
        {
            if (event.type == sf::Event::Closed)
                window.close();
        }

        window.clear();

        // draws the Chart
        graph1.draw(window);

        window.display();
    }

    return 0;
}
```

output: