H T W G
Hochschule Konstanz
Technik, Wirtschaft und Gestaltung

Fakultät für Informatik
Labor für Computergrafik
Prof. Dr. G. Umlauf

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Assignment 1

„Computer graphics“

Deadline 10.11.2021, F033.

Programing frame-work:
Download the programing frame-work from the web-page of the lecture. Open the project file with Visual Studio and compile/start the program. A window as in Figure 1 occurs.

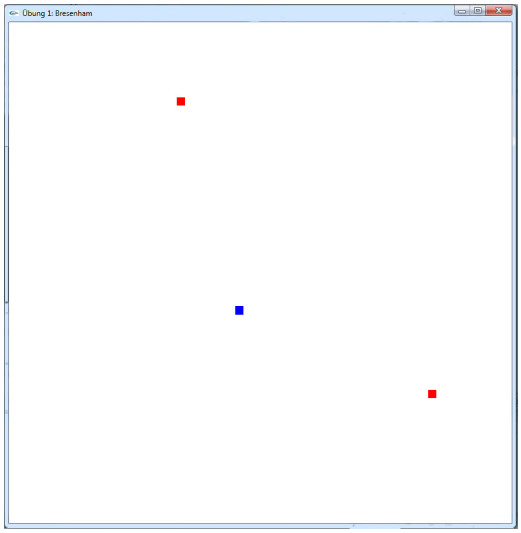

Figure 1: Programing frame-work

The provided files contain already some program code necessary for the display of your results. In particular there is some code to enlarge the displayed results. This is necessary since modern screens have such large resolution such that programming at pixel resolution would yields hardly recognizable results.

Important for the exercises are the functions `clearImage(Color c)`, `setPoint(Point p,Color c)`, and `display()` as well as `bhamLine(Point p1, Point p2, Color c)` and `bhamCircle (Point p, int r, Color c)`. Use the function `setPoint`, to set a "pixel". The displayed area is bounded to the coordinates $[-50; 49]^2$. If you draw a pixel outside this area, an error message is printed on the console window.

Exercise 1 (Bresenham algorithm for lines) — 5 points

Part 1:
Implement the Bresenham algorithm for lines in the first octant by completing the function

```
bhamLine(Point p1, Point p2, Color c).
```

This function is invoked by the function `display()`.

Part 2:
Generalize the above function to arbitrary octants by reflections of the start- and end-point of the line at the x- and y-axis.

Exercise 2 (Bresenham algorithm for circles) — 5 points

Part 1:
Implement the Bresenham algorithm for circles in the second octant around the origin only by completing the function

```
bhamCircle(Point p, int r, Color c)
```

This function is invoked by the function `display()`.

Part 2:
Generalize the above function to draw a complete circle by reflection of the output points and around arbitrary center points.

Deadline 10.11.2021, F033.