



JUNE 29, 2018

## REAL-TIME COMPUTER GRAPHICS, SUMMER 2018 ASSIGNMENT 10

Present your solution to this exercise on Thursday, July 12, 2018.

The exercises are going to take place in the CIP pool, room G40 in Mühlenpfordstraße 23. Please make sure your solutions compile and run on the CIP pool computers. Note that you need a y-number, which can be obtained at the Gauß-IT-Zentrum, to use the computers. If for some reason you are not able to attend the exercise, you may send your solution to [ecg@cg.cs.tu-bs.de](mailto:ecg@cg.cs.tu-bs.de) instead.

This exercise and the corresponding version of the framework can be found on the lectures website (<http://www.cg.cs.tu-bs.de/teaching/lectures/ss18/ecg/>).

### Theoretical Tasks

#### 10.1 Cohen Sutherland (15 Points)

Perform line clipping using the 2D Cohen-Sutherland Algorithm on the following lines (clipping frustum is the axis aligned 2x2 square around the origin):

- a)  $(-1, 2), (2, 0)$
- b)  $(-2, 2), (-2, 0)$
- c)  $(-3, 0), (3, 0)$

Give the computed outcodes and the clipping result.

#### 10.2 Polygon Clipping (10 Points)

Perform polygon clipping for the triangle  $(-1, 2), (2, 0), (-\frac{1}{2}, \frac{1}{2})$ . Again, the clipping frustum is the axis aligned 2x2 square around the origin. Use a suitable clipping algorithm from the lecture and document each step.

#### 10.3 Bezier Curves (20 Points)

A bezier curve is defined by its control points  $P_0 = (0, 0)$ ,  $P_1 = (2, 1)$  and  $P_2 = (4, 0)$ . Approximate the bezier curve with 3 segments and give the resulting 4 segment endpoints. Compute your results as rational numbers.

#### 10.4 Short Presentation (Extra credit 10 Points)

Prepare a 5min talk about an interesting topic related to the current lecture. Send your topic proposal via email to [ecg@cg.cs.tu-bs.de](mailto:ecg@cg.cs.tu-bs.de) at least 24 hours before the presentation.