Lecture 2

Computer Graphics 2D

SCC-1010: Graphics, 2020

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2.1. Geometric transformation

Geometric transformations can be used to position objects, i.e. to shift them to another **position** or to **rotate** them, to change the **shape** of objects.

2.1. Geometric transformation

The most important geometric transformations are:

- scaling,
- rotation,
- shearing,
- and translation.

2.1. Geometric transformation

2.1.1. Scaling

Scaling leads to stretching or shrinking of objects in the direction of the *x*- and the *y-axis*. A scaling $S(s_x, s_y)$ maps the point (x, y) to the point (x', y') given by

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} s_x \cdot x \\ s_y \cdot y \end{pmatrix} = \begin{pmatrix} s_x & 0 \\ 0 & s_y \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix}$$

2.1. Geometric transformation

2.1.1. Scaling

$s_x = 2, s_y = 0.5$

Rectangle (80, 120) (180, 180)

2.2. Geometric transformation 2D

2.3. Drawing curves

2.4. Fractals

2.5. Fonts