

Computergrafik SS 2010

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Ziel

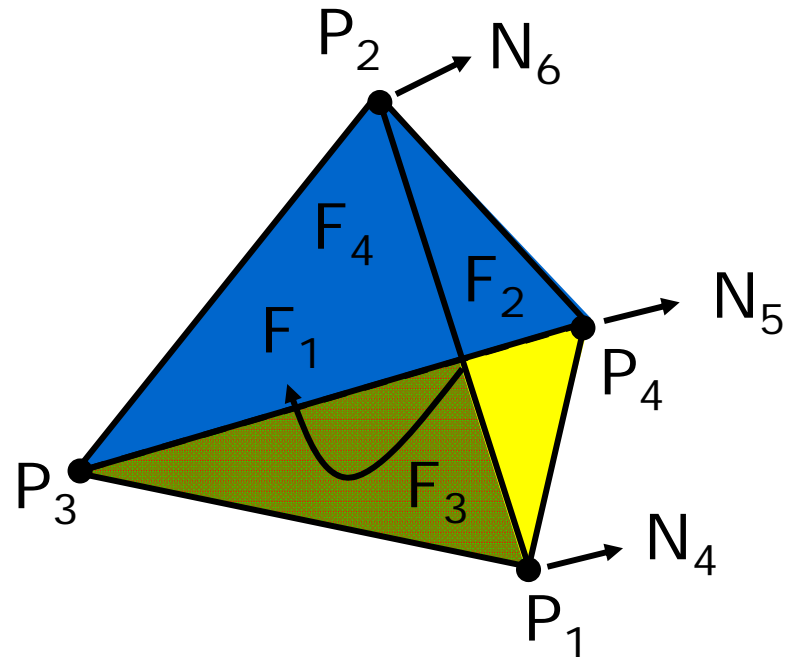


Was bisher geschah

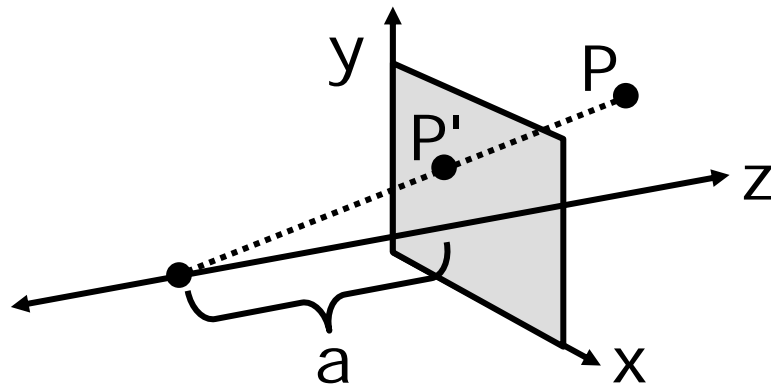
- Modellieren
- Projizieren
- Rendern

Modellieren

Punkte, Kanten, Flächen, Material, Normalen



Projizieren

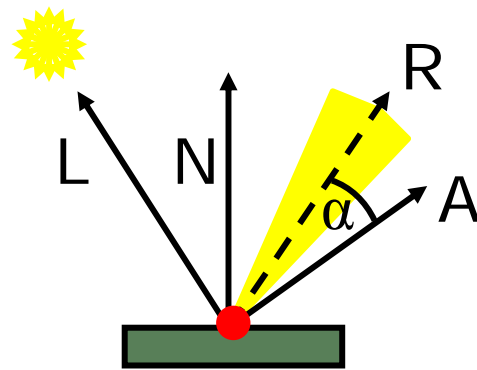
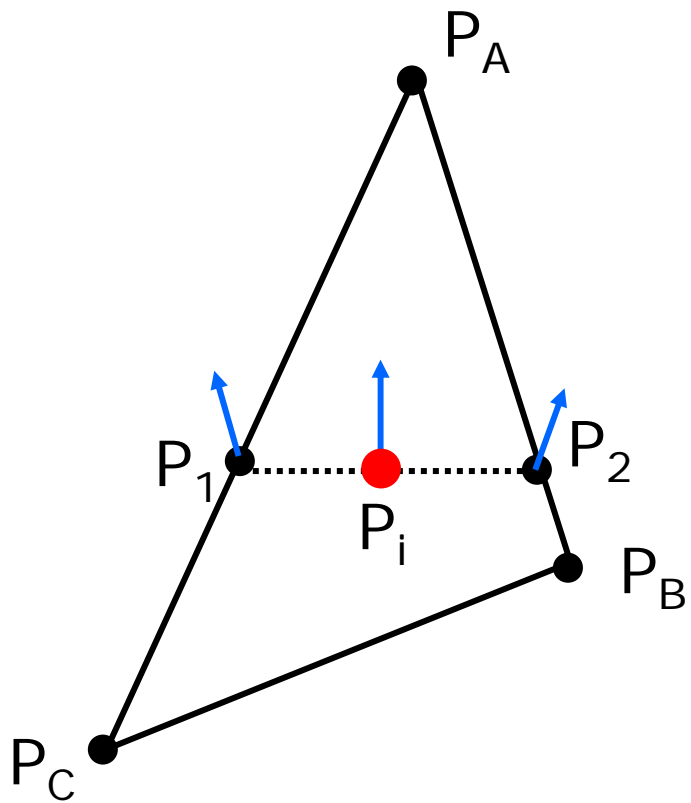


$$x' = \frac{x}{1+z/a}$$

$$y' = \frac{y}{1+z/a}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1/a & 1 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \\ z \\ 1 \end{pmatrix} = \begin{pmatrix} x \\ y \\ 0 \\ 1+z/a \end{pmatrix}$$

Rendern



Kapitel 20: VRML

SVG

<http://www-lehre.inf.uos.de/~cg/2010/SVG/basics.html>

VRML

- 3D-Vektorgrafik für Webseiten
- offizieller Standard des W3C
- in ASCII geschrieben
- exportierbar von CAD-Tools
- verlustfrei skalierbar
- Grafik, Text, Audio, Video
- erlaubt Interaktion
- unterstützt Javascript
- verlangt Plugin im Browser
- verlangt Rechenleistung im Browser

Geschichte

April 1994 1st Internat. WWW Conference
Tim Berners-Lee, Mailing List

Okt. 1994 2nd Internat. WWW Conference
VRML 1.0 (statische Szenen)

Dez. 1995 1st VRML Conference
VRML 97
(+ Animation + Sound + Video)

ab 2000: Stillstand

Syntax

- Knoten
- Felder

Geometrische Primitive

Knoten für

- Box
- Sphere
- Cylinder
- Cone

```
Shape {  
  geometry Sphere {  
    radius 1.5  
  }  
}
```

parametrisierbar über Felder

- size
- radius
- height
- bottomRadius

Transformationen

Knoten für Transformationen mit Feldern

```
Transform {  
  scale 1 1 2  
  rotation 1 0 0 0.5235  
  translation 0 0 -4  
  children [  
    ...  
  ]  
}
```

Reihenfolge immer scale – rotation - translation

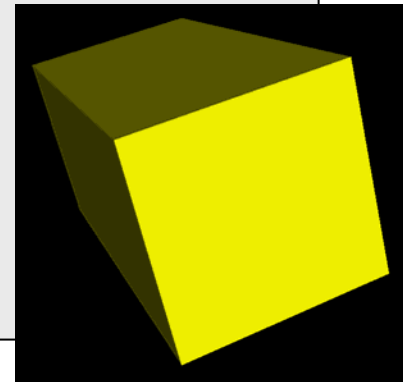
Aussehen

- Gestaltknoten mit Feldern
- Materialknoten mit Feldern

```
Shape{  
    appearance Appearance {  
        material Material {  
            diffuseColor 1 1 0  
            shininess 0.9  
        }  
    }  
}
```

gedrehter verschobener Quader

```
# VRML V2.0 utf8
Transform {
  scale      1  1  2
  rotation   1  1  1  0.5235
  translation 0  0 -5
  children [
    Shape {
      geometry Box {}
      appearance Appearance {
        material Material {
          diffuseColor 1 1 0
        }
      }
    }
  ]
}
```



Webseite mit VRML

```
<HTML>
<HEAD><TITLE>VRML</TITLE></HEAD>
  <BODY
    <H1>VRML-Beispiel</H1>
    <EMBED SRC      ="szene.wrl"
              WIDTH  =300
              HEIGHT =300>
  </BODY>
</HTML>
```

~cg/2010/VRML/frames3.html


```

#VRML V2.0 utf8
Transform {
  rotation      0.82  -0.56  -0.039  2.10
  translation   -0.03   0.00  -0.052
  children [
    Shape {
      appearance Appearance {
        material Material {
          ambientIntensity 0.2
          shininess        0.2
          diffuseColor     1 0 0
        }
      }
    }
    geometry Box {
      size 1 1 1
    }
  ]
}

```

VRML

versus

X3D

```

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.0//EN"
  "http://www.web3d.org/specifications/x3d-3.0.dtd">
<X3D>
  <Scene>
    <Transform rotation=      " 0.82 -0.56 -0.039 2.10"
      translation= "-0.03  0.00 -0.052" >
      <Shape>
        <Appearance>
          <Material ambientIntensity  ="0.2"
            shininess        ="0.2"
            diffuseColor     ="1 0 0" />
        </Appearance>
        <Box size="1 1 1"/>
      </Shape>
    </Transform>
  </Scene>
</X3D>

```



Viewpoint



<http://www.viewpoint.com>



3Dimerce



<http://www.3dimerce.com>