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VRML



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VRML⁹⁷
ISO/IEC 14772-1:1997



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VRML⁹⁷
ISO/IEC 14772-1:1997



VRML



Virtual Reality Modelling Language



VRML⁹⁷
ISO/IEC 14772-1:1997



Entwicklung

- ✓ VRML 1.0 – May 1996
 - ✓ OpenInventor basierend
- ✓ VRML 2.0 – August 1996
 - ✓ Neue Knoten (Sound, Animation)
- ✓ VRML97 – September 1997
 - ✓ Optimierung



SceneGraph-Konzept

- ✓ Kern aller aktuellen high-level API's und Szenenebeschreibungen
- ✓ S.G. gerichteter azyklischer Graph von Knoten
 - ✓ Geometrie
 - ✓ Licht
 - ✓ ...
- ✓ Attribute



Knoten

- ✓ Objekte
- ✓ Materialeigenschaften
- ✓ Lichtquellen



Attribute

- ✓ Transformationen
- ✓ Helligkeitsangaben
- ✓ usw.

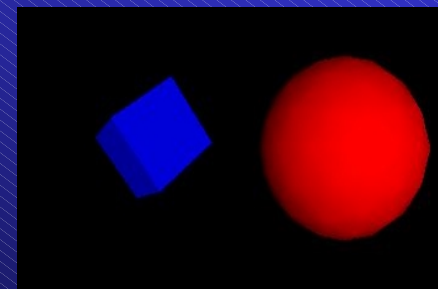


Beispiel

```
#VRML V2.0 utf8
DirectionalLight {
  direction 0 0 -1 # Light illuminating the scene
}

Transform { # First child - a red sphere
  translation 3 0 1
  children [
    Shape {
      appearance Appearance {
        material Material { diffuseColor 1 0 0 } # Red
      }
      geometry Sphere { radius 2.3 }
    }
  ]
}

Transform { # Second child - a blue box
  translation -2.4 .2 1
  rotation 0 1 1 .9
  children [
    Shape {
      appearance Appearance {
        material Material { diffuseColor 0 0 1 } # Blue
      }
      geometry Box { }
    }
  ]
}
```





- ✓ VRML-Knoten (Kugel, Box, Zylinder)
- ✓ Attribute
 - ✓ Punktliste („coord“)
 - ✓ Flächenliste („coordIndex“)
- ✓ Jede Fläche durch mindestens 3 Indizes in der Punktliste – Triangles (Trenner „-1“)



```

Transform {
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 1 0 0 } }
      geometry IndexedFaceSet {
        ccw TRUE
        solid TRUE
        coord Coordinate [ point [
          0 0 0, # Punkt 0
          0 0 5, # 1
          0 5 0, # 2
          0 5 5, # 3
          5 0 0, # 4
          5 0 5, # 5
          5 5 0, # 6
          5 5 5 ] ]
        coordIndex [
          0, 1, 2, -1, # Dreieck 0
          1, 3, 2, -1, # 1
          4, 6, 5, -1, # 2
          5, 6, 7, -1, # 3
          0, 4, 1, -1, # 4
          1, 4, 5, -1, # 5
          2, 3, 6, -1, ...
          3, 7, 6, -1,
          0, 2, 4, -1,
          2, 6, 4, -1,
          1, 5, 3, -1,
          3, 5, 7, -1 ] ] } }
    ]
  }
}

```



- ✓ **Zusätzlich Attribute**
 - ✓ **Texturbild** („texture ImageTexture“)
 - ✓ **Texturkoordinaten** („texCoord TextureCoordinate“)
 - ✓ **Texturkoordinatenindex** („texCoordIndex“)



```
SpotLight {
  intensity 1
  color 1.0 1.0 1.0
  location 50.0 50.0 25.9
  direction -50.0 -50.0 -25.0
  beamWidth 0.6024 # Cut off Angle
  on TRUE
  radius 1 }

Transform {
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 1 0 0 }
        texture ImageTexture
          { url "icologo.tif" }
      }
      geometry IndexedFaceSet {
        ccw TRUE
        solid TRUE
        coord Coordinate { point [
          0 0, # Punkt 0
          0 5, # 1
          0 5, # 2
          0 5, # 3
          5 0, # 4
          5 0, # 5
          5 0, # 6
          5 5 ] }
        texCoord TextureCoordinate
          0 0, # Punkt 0
          0, # 1
          1, # 2
          0 1, } ]
    }
  ]
}
```

```
coordIndex [
    0, 1, 2, -1, # Dreieck 0
    1, 3, 2, -1, # 1
    4, 6, 5, -1, # 2
    5, 6, 7, -1, # 3
    0, 4, 1, -1, # 5
    1, 4, 5, -1, # 6
    2, 3, 6, -1, ...
    3, 7, 6, -1,
    0, 2, 4, -1,
    2, 6, 4, -1,
    1, 5, 3, -1,
    3, 5, 7, -1,
    texCoordIndex [
        0, 1, 3, -1,
        1, 2, 3, -1,
        1, 2, 0, -1,
        0, 2, 3, -1,
        0, 1, 3, -1,
        3, 1, 2, -1,
        3, 0, 2, -1,
        0, 1, 2, -1,
        1, 2, 0, -1,
        2, 3, 0, -1,
        0, 1, 3, -1,
        3, 1, 2, -1    ]}]}
```



VRML-Viewer

- ✓ Cortona
 - ✓ www.parallelgraphics.com/products/cortona
- ✓ Cosmo Player
 - ✓ www.cai.com/cosmo/



Links

- ✓ www.vrml.org
 - ✓ Komplette Spezifikation
- ✓ Weitere Hilfe auf unserer Homepage