



# Tutorial DirectX Mobile 2

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Chair for Computer Aided Medical Procedures & Augmented Reality

Department of Computer Science | Technische Universität München



# Scheduling: Beispiel

```
void moveGame()
{
    Position.X += 1;
}
```

```
mainLoop()
{
    moveGame();
    renderSzene();
}
```

```
timePassed = 0;
```

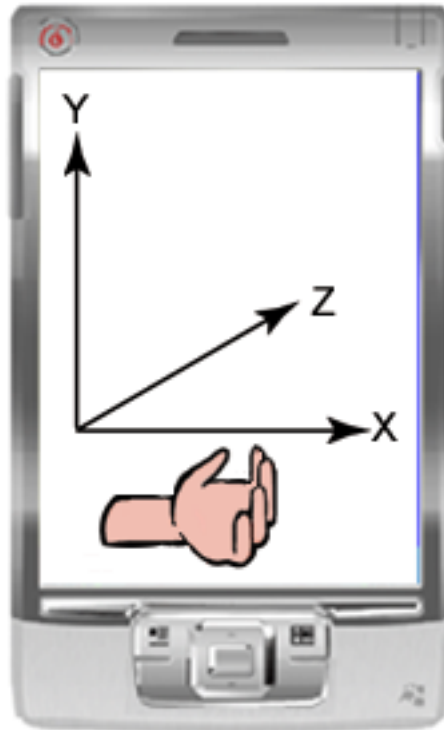
```
void moveGame()
{
    Position.X += 1*timePassed;
}
```

```
mainLoop()
{
    startTime = getTime();
    moveGame(timePassed);
    renderSzene(timePassed);
    endTime = getTime();
    time Passed = endTime – startTime;
}
```

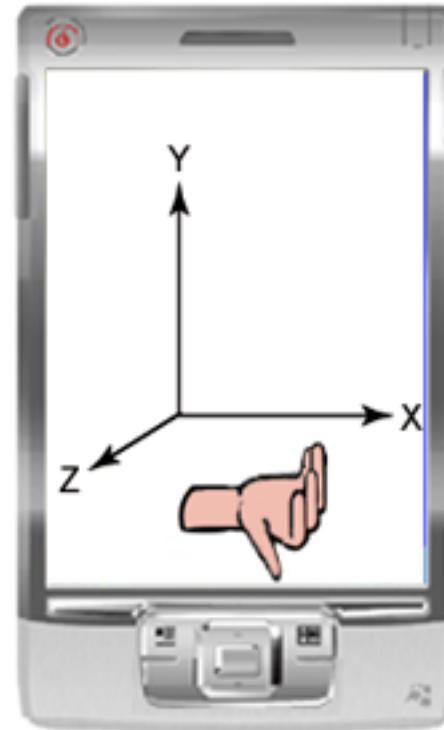
# Koordinatensysteme

- weit verbreitet: rechtshändig
- DirectX: linkshändig

Left-handed  
Cartesian Coordinates



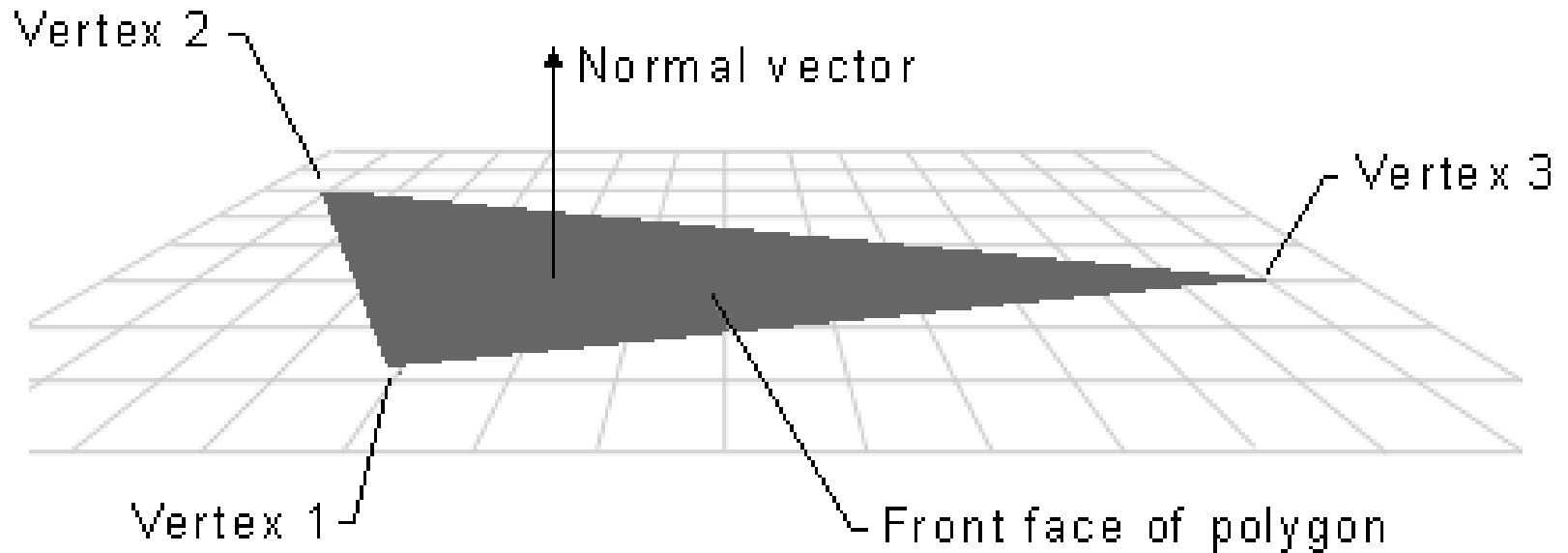
Right-handed  
Cartesian Coordinates



# Geometrien

linkshändiges Koordinatensystem

Polygone im Uhrzeigersinn definieren:



Achtung: Normalenvektor muss Einheitsvektor sein

# Geometrien – Shading

Flat shading

D3DMSHADE\_FLAT



Gouraud shading

D3DMSHADE\_GOURAUD



```
pDev->SetRenderState(D3DMRS_SHADEMODE, ....);
```

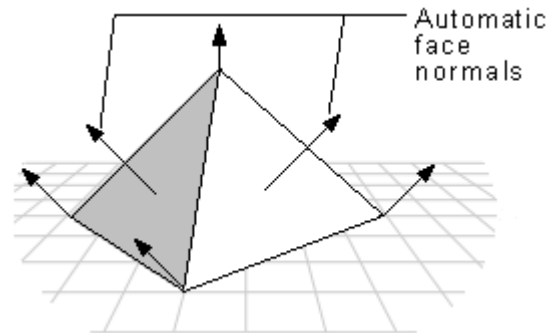
# Geometrien – Shading

Flat shading

Homogene Flächen

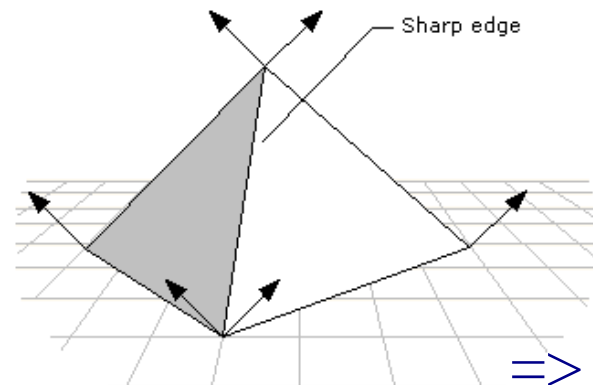
Gouraud shading

Interpolation der einzelnen Normalenvektoren  
-verschiedene Interpolationen (!!DeviceCaps!!)



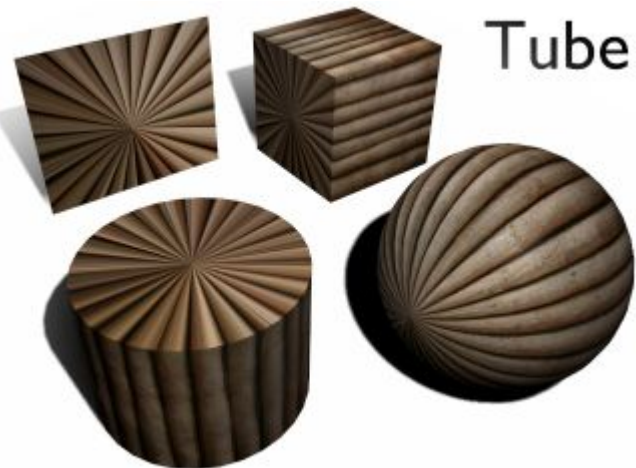
=> eckige Pyramide

=> runde Pyramide

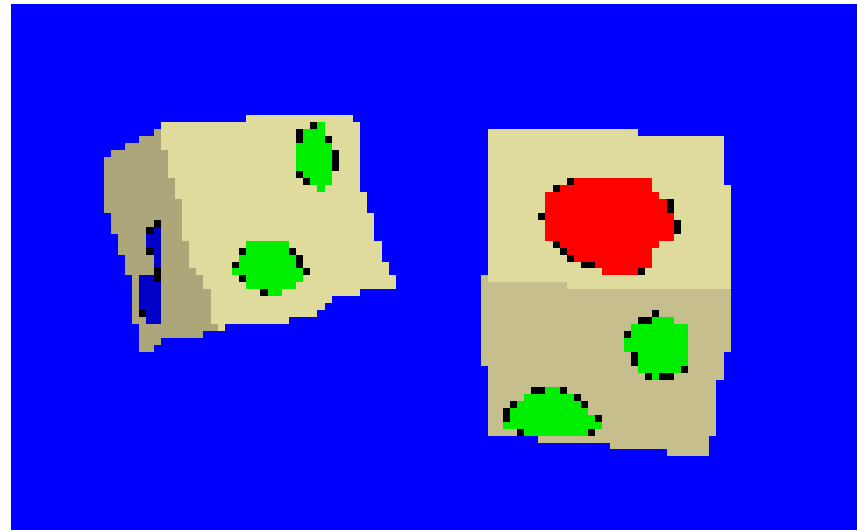
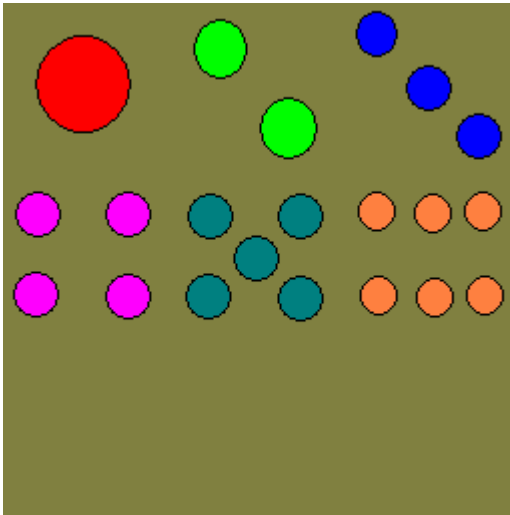


=> eckige Pyramide

# Texturen Projektion



# Texturen UV Mapping





# Texturen erzeugen/ laden

D3DMXCreateTextureFromFileEx(

Quellen, Pfade, Devices, ..

Bildformat

Bildgröße (quadratisch, 2er Potenz)

Abbildungsfiler : Textur -> Polygon (einfach bis Interpolation)

Speicher (Arbeitsspeicher/Videospeicher)

Mip Mapping (Levels, Filter)



# Texturen: Datenstruktur

```
struct SCustomVertex
```

```
{
```

```
    D3DMVECTOR m_sPosition;
```

```
    D3DMVECTOR m_sNormal;
```

```
    D3DMVALUE m_fU, m_fV;
```

```
};
```

```
#define D3DMFVF_CUSTOMVERTEX_FIXED(
```

```
    D3DMFVF_XYZ_FIXED | \
```

```
    D3DMFVF_NORMAL_FIXED | \
```

```
    D3DMFVF_TEX1 | \
```

```
    D3DMFVF_TEXCOORDSIZE2(0) | \
```

```
    D3DMFVF_TEXCOORDFIXED(0))
```



# Texturen: Blending definieren

```
g_pD3DMDDevice->SetTextureStageState(0, D3DMTSS_COLOROP,  
                                       D3DMTOP_MODULATE);  
// S = Arg1 x Arg2
```

```
g_pD3DMDDevice->SetTextureStageState(0, D3DMTSS_COLORARG1,  
                                       D3DMTA_TEXTURE);
```

```
g_pD3DMDDevice->SetTextureStageState(0, D3DMTSS_COLORARG2,  
                                       D3DMTA_DIFFUSE);
```

```
g_pD3DMDDevice->SetTextureStageState(0, D3DMTSS_ALPHAOP,  
                                       D3DMTOP_DISABLE);
```



# Was ist los mit den PDAs ?



# Direct3D Game Tutorials

- WM5.0 Mobile SDK: C:\Programme\Windows CE Tools\wce500\Windows Mobile 5.0 Pocket PC SDK\Samples\CPP\Win32\Directx\d3dm\tutorials\
  - [http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnppcgen/html/med308\\_msdn\\_migrating\\_wm\\_gapi\\_app\\_directx.asp](http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnppcgen/html/med308_msdn_migrating_wm_gapi_app_directx.asp)
  - [http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnppcgen/html/Graphics\\_DirectX\\_WM5\\_Games.asp](http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnppcgen/html/Graphics_DirectX_WM5_Games.asp)
  - <http://www.mperfect.net/cfMDX/>
- Msdn DirectX 9 Documentation