Computergrafik 1

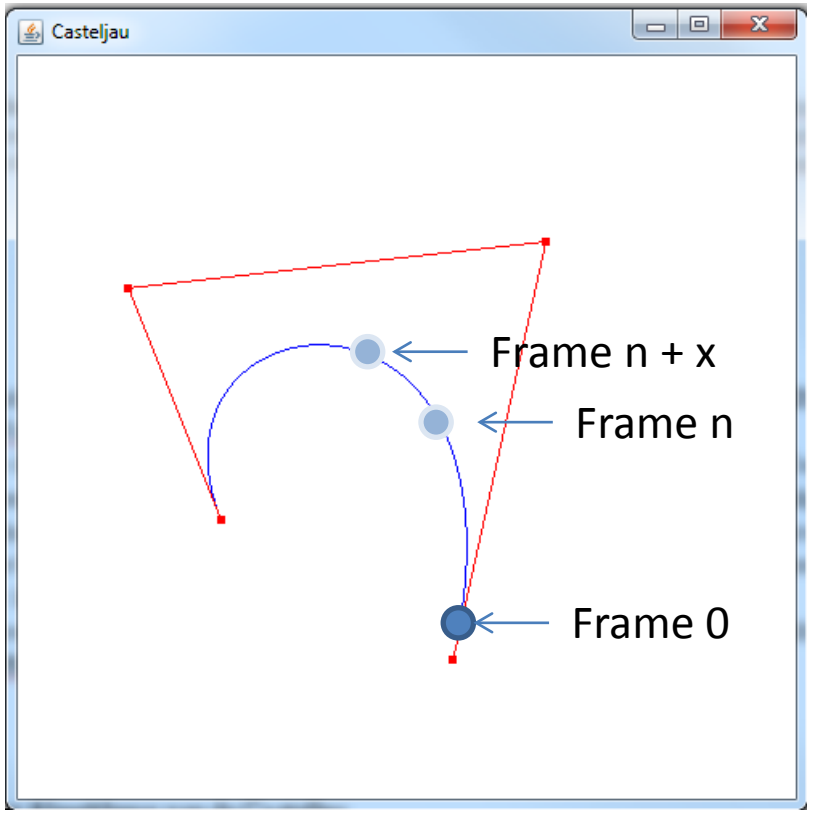
Blatt 10

Animation in JOGL

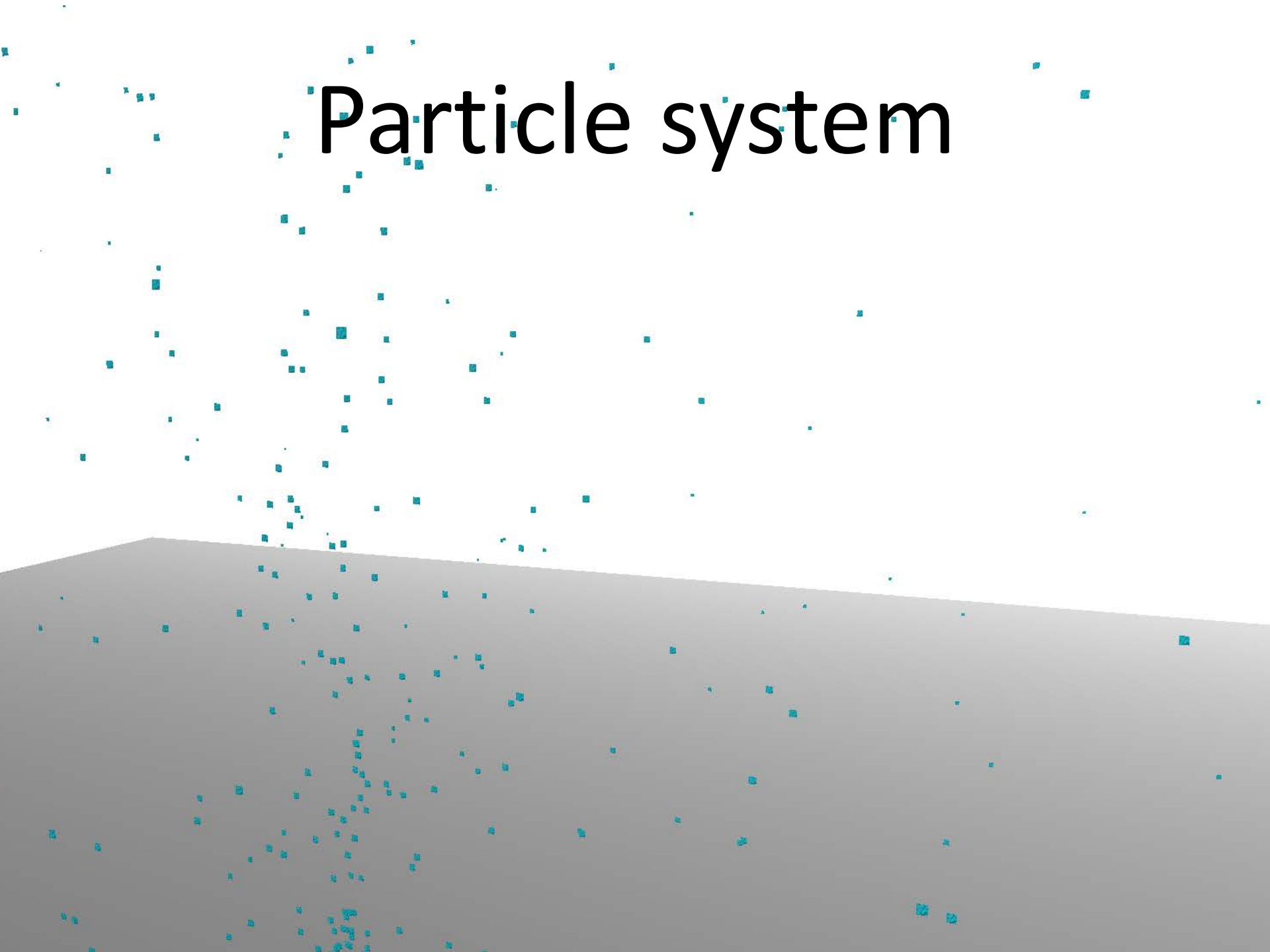
```
final Animator animator = new Animator(canvas);
animator.add(canvas);
animator.start();
```

Display-Method is called repeatly

Idea: Render an object and move it from one curve point to the next over each frame.



Particle system



What is a particle system?

- Animates a large amount of objects
- Main task: Control the movement of the particles
- Common parameters of particles:
  - Position and velocity
  - Lifetime
  - Damping
  - Forces

A simple particle class

```
public class Particle {

float lifetime;
float r,g,b;
float xpos, ypos,zpos;
float xvelo,yvelo,zvelo;


public Particle(){
//…
}

public void evolve(){
//…
}

}
```

Initialize values, e.g.

Particle evolution

Particle evolution (1)

```
xpos += xvelo;
ypos += yvelo;
zpos += zvelo;
yvelo -= 0.00007;// Gravity simulation

lifetime -= 0.001f;
```

Particle evolution (2)

```
if(ypos < ParticleRenderer.PARTICLE_SIZE){
ypos = ParticleRenderer.PARTICLE_SIZE;
yvelo *= -0.6f; // additional damping
lifetime -= 0.01f;
}
```

Particle bounce:

Particle initialization

```
xpos = 0.0f;
ypos = ParticleRenderer.PARTICLE_SIZE;
zpos = 0.0f;
```

Initialization at the origin

```
yvelo = (float)Math.random()*5f/100.0f;
lifetime = (float)Math.random();
```

Random y-velocity and lifetime

```
spread = (float)Math.random()/100;
```

length

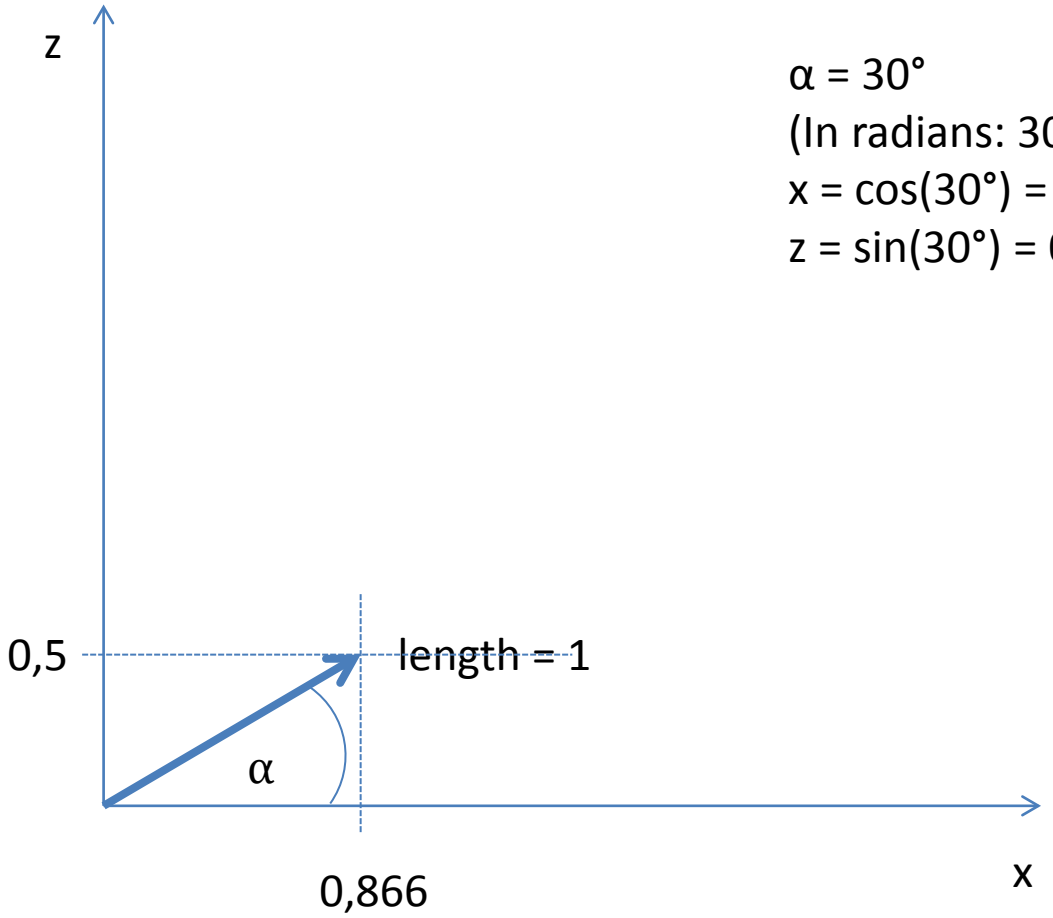
```
angle = (float)(Math.random()*2*Math.PI());
```

angle

```
xvelo = (float)Math.cos(angle)*spread;
zvelo = (float)Math.sin(angle)*spread;
```

Velocity in the XZ-plane

Vector: angle and length



α = 30°
(In radians: 30° ≅ $0.52\ radians$)
x = cos(30°) = 0,866 * length
z = sin(30°) = 0,5 * length

Rendering Particles

In each frame

- Loop through an array of particle objects
- Call the evolution function of the particle
- Render it (e.g. as TRIANGLE_STRIP)

Klausur

- 30. Juli 2012, 10.00 Uhr – 12.00 Uhr
- Theresienstr. 39, B 051 und B 052
- Open-Book: Hilfsmittel erlaubt
- Hilfsmittel:
  - Vorlesungsskript, Übungsfolien, Bücher, etc.
  - Taschenrechner, Stifte etc.
- Nicht erlaubt:
  - Handys, Smartphones, Tablets (alles, was netzwerkfähig ist)

Themen

- Vektoren, Matrizen etc.
- Verständnis der 3D-Programmierung
  - Befehle und Mechanismen kennen
  - Keine syntaktisch korrekten und vollständigen Programme auf Papier
- Verständnis der Rendering-Pipeline
- Wer die Übungsaufgaben gemacht hat, ist gut gerüstet