



Lecture 10

Mid-course (sort of) evaluation/feedback

A bit more on billboards

Object representation

Splines



Information Coding / Computer Graphics, ISY, LiTH

Online interactive feedback

<https://ragnemalm.se/quiz>



Labs and duggas

1) Lab progress is sometimes slow. We want to help you.

Stuck with a bug for a long time? Let me know.

2) I am evaluating the dugga system for future revisions.
(But I can't change it mid-course.)



G2 new limits!

The duggas are hard for G2 level! Much new stuff.

Based on statistics, G2 vs A:

Pass on 14, not 16
Grade 4 on 21, not 24
Grade 5 on 28, not 32



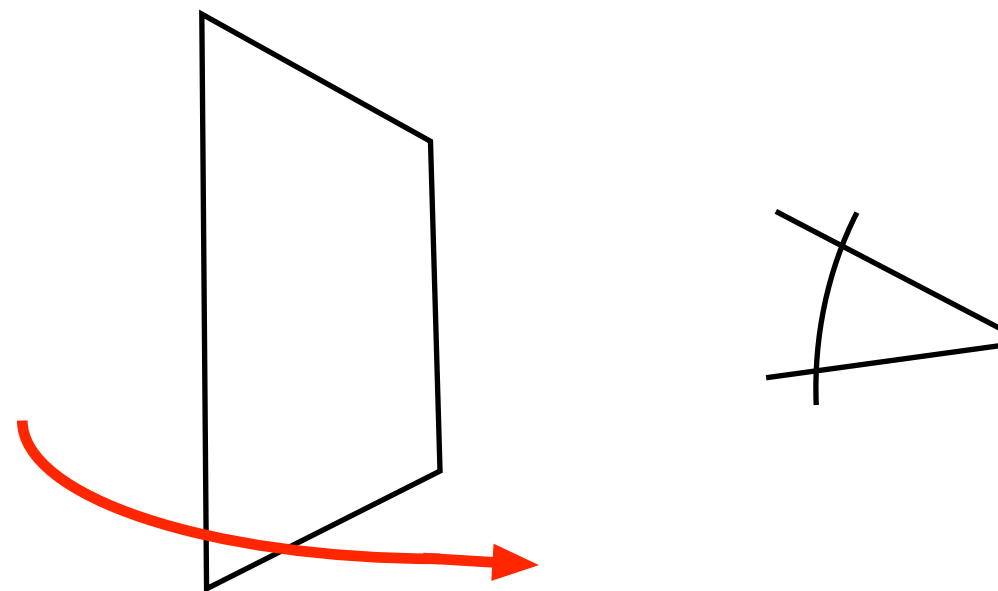
Lecture questions

1. How can you procedurally build a sphere?
2. What is the sum of a set of blending functions?
3. What is the difference between C^1 and G^1 ?
4. Does the Bézier stay in the convex hull of the control points?
5. Why are Catmull-Rom splines good for animations?



Billboards

A texture mapped polygon, which always faces the viewer





A grid of billboards

	Non-axial	Axial
Viewpoint oriented	Construct basis	Clear rotations
View plane oriented	Construct basis based on view plane	Construct axial rotation

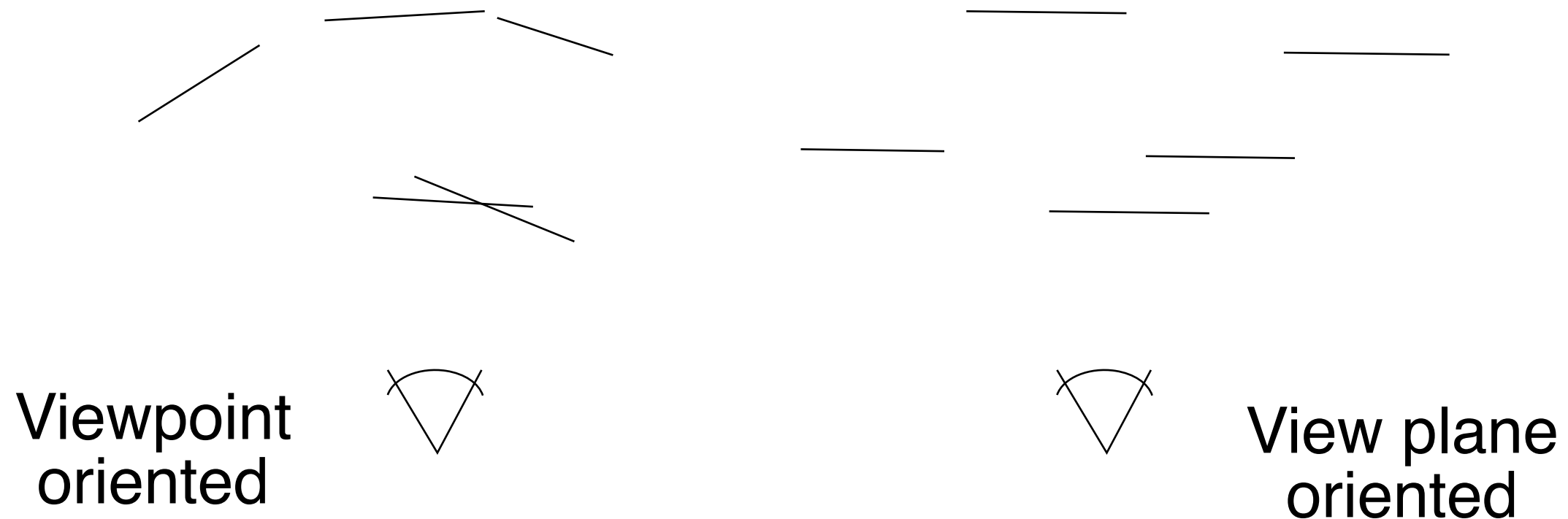
World oriented billboard not in grid



View plane oriented billboard

Easy! Zero out rotation!

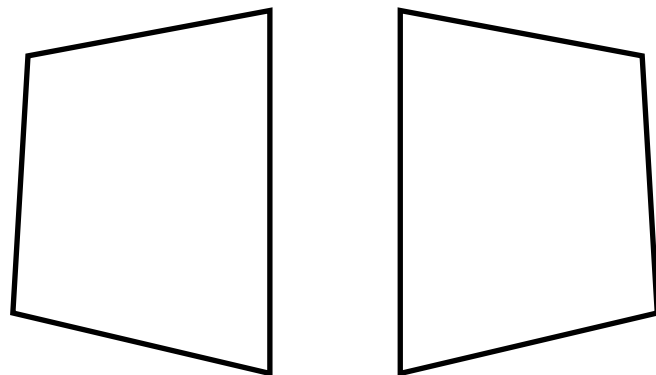
Good - no overlaps!



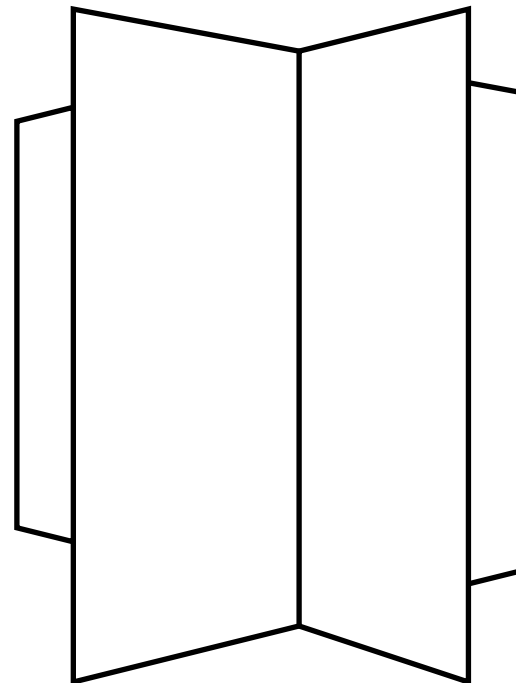


Billboard variants

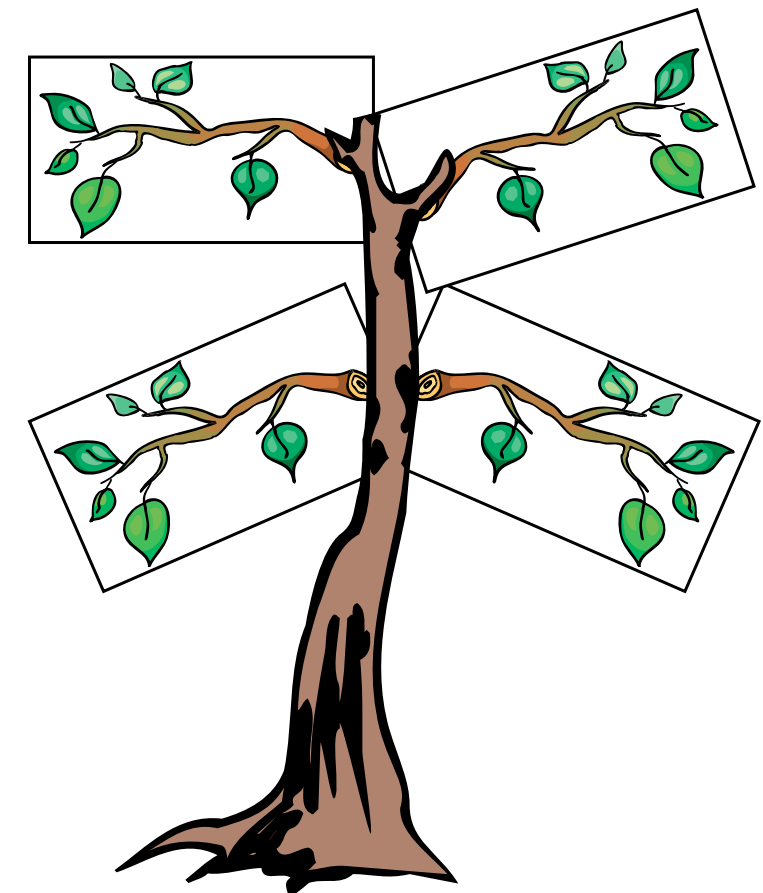
1) Always facing the camera.
One triangle or quad is enough!



2) A few polygons.
Good for world oriented billboards.



3) Multiple billboards.
Simplify complex objects
on moderate distance.





Advanced course
(TSBK03)

Impostors

"Live" billboards

Render to texture, update sometimes

Render as other billboards

Decide when to update







3D object representation

In order of importance:

- Polyhedra
 - Bi-cubic parametric patches
- Procedural representation, fractals
 - Constructive solid geometry
- Implicit representation by quadrics

plus...



3D object representation

Advanced representations:

- Density volumes/voxel representations
- Point-based representations, including blobby objects
 - Level sets







