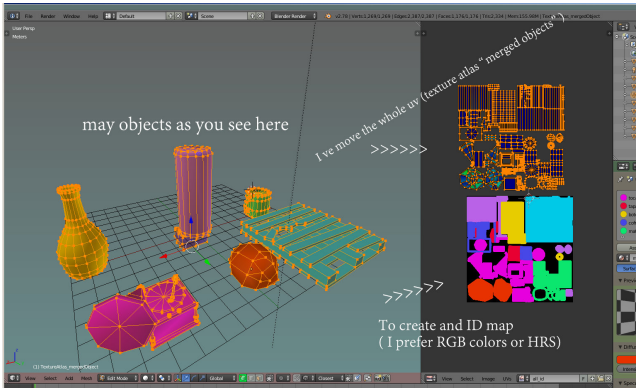
News
1.3.2023.

Using height/normal maps for hit/miss geometry

- Tessellation-free displacement mapping: https://perso.telecom-paristech.fr/boubek/papers/TFDM/
  - Displacement without need for additional surface geometry
  - Look in related work; chapter 2 for additional methods

Texture atlas

- **Optimization idea: having multiple texture images in one image.**
- **Let's assume that scene contains multiple objects.** UV coordinates for all objects must be calculated and for each image texture must be placed using those UV coordinates
  - Image textures of those objects can be stored into one image for memory efficiency → texture atlas
  - Example: https://www.creativeshrimp.com/game-level-texturing-texture-atlas-part-35.html
  - Example: https://www.youtube.com/watch?v=Xwv4vPvVju4&ab_channel=AdobeSubstance3D
  - Texture atlas baking example: https://www.youtube.com/watch?v=-rIANRJMaIs
- If we are working with **complex object, it has to be separated into parts which will have same textures**. For those parts, UV coordinates are calculated and image texture is place using UV coordinates
  - Again, all image texture can be saved into one image → texture atlas
  - Example: https://www.youtube.com/watch?v=gZRDwbHEB34&ab_channel=GrantAbbitt
- **Textures on complex object can be 3D painted directly on mesh.** Note that UV coordinates for mesh must be calculated before.
  - 3D painting software can store all painted textures per parts as texture atlas
  - Example: https://www.youtube.com/watch?v=WjS_zNQNVlw&ab_channel=GrantAbbitt
  - Example: https://armorpaint.org/manual.html



Texture atlas and Ptex

- Texture is stored per quad face of mesh → UV unwrapping is not needed.
- Direct painting on mesh is possible
- Resulting texture is stored for each quad in same image → texture atlas

(a) a single Ptex asset rendered in our real-time graphics engine.

(b) the texture data stored as a texture atlas.

(c) the same base texture data stored as a packed Ptex texture.

- https://wwwx.cs.unc.edu/~sujeong/Ptex/
- https://learn.foundry.com/mari/4.6/Content/user_guide/ptex/ptex.html
- https://ptex.us/
- https://www.sidefx.com/docs/houdini/shade/ptex.html

Lenses and fisheye effect

- Real camera systems can produce fisheye effect especially for wide angles, that is larger field of view
  - Either smaller field of view must be used or effect should be fixed in photo editing software
  - Example: https://www.droneblog.com/barrel-fisheye-effect/
- Achieving fisheye effect on purpose is done with wide-lens camera

Projects and exam

- Exam: **29.3.2023.** at 16h, Raum 136.1B
- Projects deadline: **8.4.2023**, 23:59
- Questions?