

REAL-TIME SHADOWS

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Basic algorithms

- **Jaako Lehtinen's / MIT lecture**

- https://mycourses.aalto.fi/pluginfile.php/167383/mod_resource/content/1/20_shadows.pdf
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2012/lecture-notes/MIT6_837F12_Lec23.pdf

- **SIGGRAPH 2016 “Efficient Real-time shadows” course**

- <http://www.realtimeshadows.com/?q=node/15>

- **Common Techniques to Improve Shadow Depth Maps**

- <https://msdn.microsoft.com/en-us/library/windows/desktop/ee416324%28v=vs.85%29.aspx>

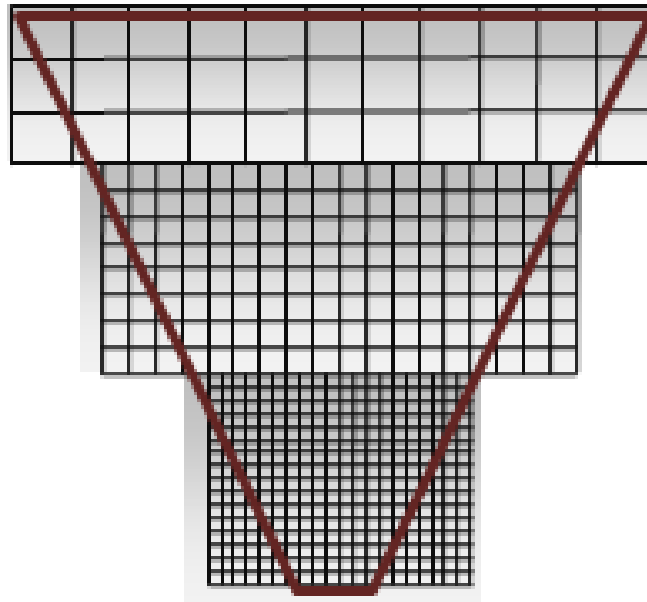
Cascaded Shadow Maps

Based on the Microsoft article at:

<https://msdn.microsoft.com/en-us/library/windows/desktop/ee416307%28v=vs.85%29.aspx>

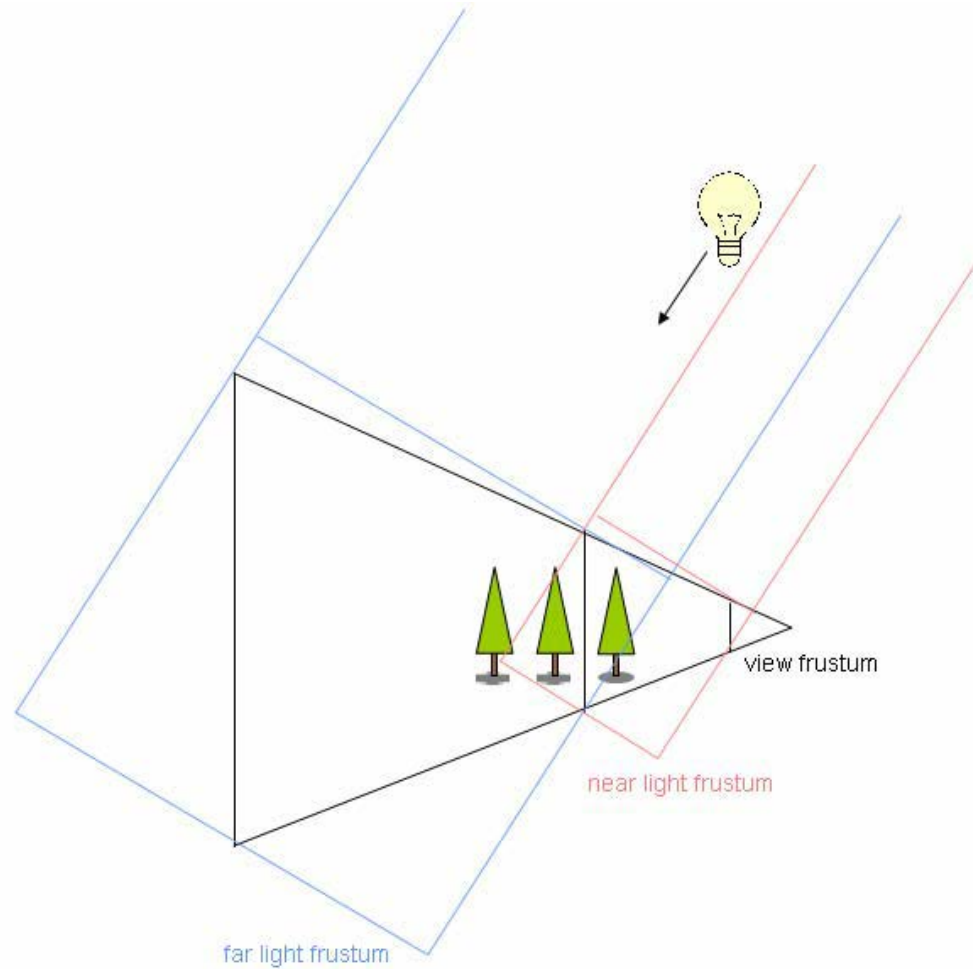
CSM – basic idea

- The basic idea of CSMs is to partition the frustum into multiple frustra. A shadow map is rendered for each subfrustum; the pixel shader then samples from the map that most closely matches the required resolution.
- CSM are usually used for shadows cast by the sun



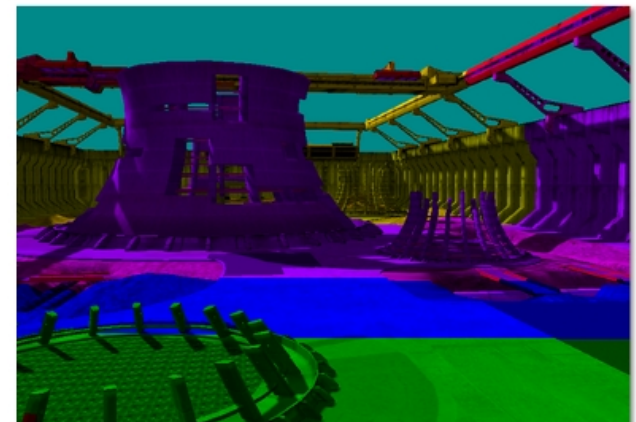
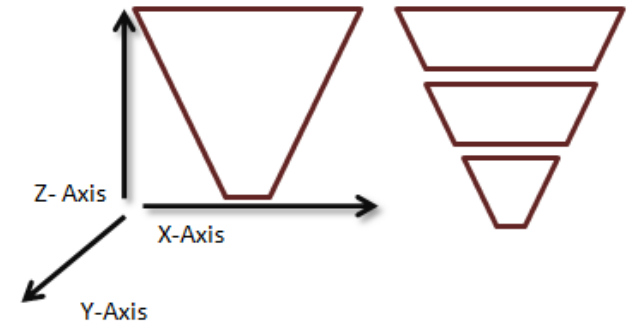
CSM scheme

- For a parallel light source, like the sun



CSM algorithm (per frame)

- Partition the **view** frustum into subfrusta
- Render a shadow map for each subfrustum
- Render the scene
 - Select proper shadow map for each pixel



CSM - CryEngine

- **Show videos**

Character shadow

- Third person view
 - Protagonist in focus at all times
 - High quality self shadows mandatory
- Custom shadow map focused on tight bounding box
- Blended into shadow mask with “max” operator



THANK YOU!

Questions?



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