MANCHESTER 1824
The University of Manchester

COMP37111: Advanced Computer Graphics

Workshop 10 : Spatial Enumeration and Culling

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Breakout 1

Use the first page of scene from the Week 10 Class Materials (available as a pdf or PowerPoint file).

One member of the group should screenshare a fullscreen version of the scene on the first page.

For each of Gridcell, Octree, HBV and BSP:

1. Draw the primary data structure onto the scene.
2. Figure out the spatial complexity (i.e. how much storage space the technique typically takes) and the time complexity for the query 'what objects exist at point (x, y, z) in space'.
3. Discuss what happens to the data structure when an object moves.

O(1) , O(logn) , O(logn) O(logn)

Breakout 2

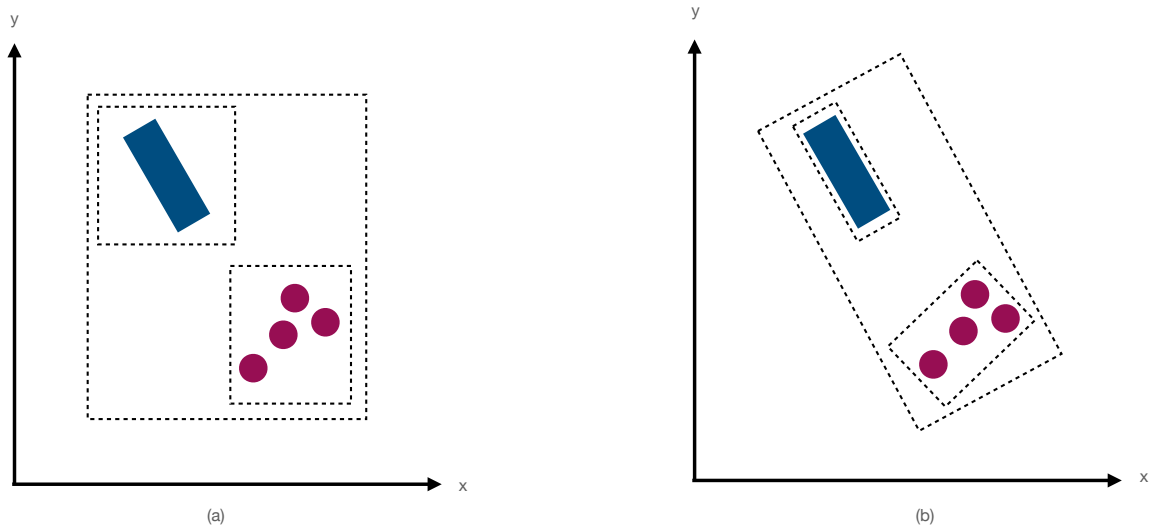

Figure 1: Axis and non-axis aligned bounding boxes

Task 1: Aligned or not aligned?

Some high-end modern GPUs implement Axis Aligned Bounding Boxes (AABB) in hardware. Figure 1 shows a simple 2D scene containing (a) Axis Aligned and (b) non-Axis Aligned bounding boxes. Discuss the pros and cons of the two setups. Why is the AABB option more attractive to implement in hardware?

Task 2: Culling

The second page of the file used in the previous breakout shows a floorplan of the Kilburn Building's Lower First Floor, a view point and an associated field of view.

Work through:

1. how you would use an AABB structure to perform Frustum Culling.
2. how Portal Culling could be used to reduce the number of objects to consider for frustum culling.

using Z-buffer

移除门框之外是某种意义上移除多元上的*FOV*。