Spatial Subdivision

Can be used for both image space and object space culling
Based on bounding boxes or volumes
Bounding Boxes and Volumes

- Polygon clipping is overkill if entire polygon outside the window
- Maintain a bounding box
  - Axis-aligned
- Can be a big savings
- Can be easily extended to 3D
  - For volumes in object-space

Hierarchical Spatial Subdivision (2D)

- Quadtree
  - Each node corresponds to a BB
  - It holds the indices of all primitives in that box
  - Divide each box into four equal sized box
    - Four children per node
    - Can be computed from BB of parent
    - BB stored only at root
Hierarchical Spatial Subdivision (2D)

- Tree building
- View Frustum Culling
  - Depth first traversal of nodes
  - If BB inside the view frustum
    - Draw all triangles
  - If BB outside the view frustum
    - Draw nothing
  - If BB intersects the view frustum
    - Go through the children recursively
  - Creates tree cuts

Extending to 3D

- Cubes instead of boxes
- Octree
  - Eight children
  - Divide in three directions
- Note that may not be optimal
  - Boxes may not be the tightest fit
  - Can have another tree with smaller depth
- Very efficient
  - Since child BB computation is trivial