CS-184: Computer Graphics

Lecture #07: BSP Trees

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BSP-Trees

- **Binary Space Partition Trees**
  - Split space along planes
  - Allows fast queries of some spatial relations

- **Simple construction algorithm**
  - Select a plane as sub-tree root
  - Everything on one side to one child
  - Everything on the other side to other child
  - Use random polygon for splitting plane
BSP-Trees
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- A binary space partitioning (BSP) tree is a data structure that represents a space as a tree of planes, where each node represents a plane that divides the space into two regions. Each leaf node represents a region of space, and each internal node is labeled by a plane that further divides the space. BSP trees are often used in computer graphics and geometric algorithms to efficiently manage and manipulate spatial data.
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Visibility Traversal

Variation of in-order-traversal

- Child one
- Sub-tree root
- Child two

Select “child one” based on location of viewpoint

- Child one on same side of sub-tree root as viewpoint
BSP-Trees

BSP-Trees

g:e₂:c₂:f:e₁:a:c₁:b:d