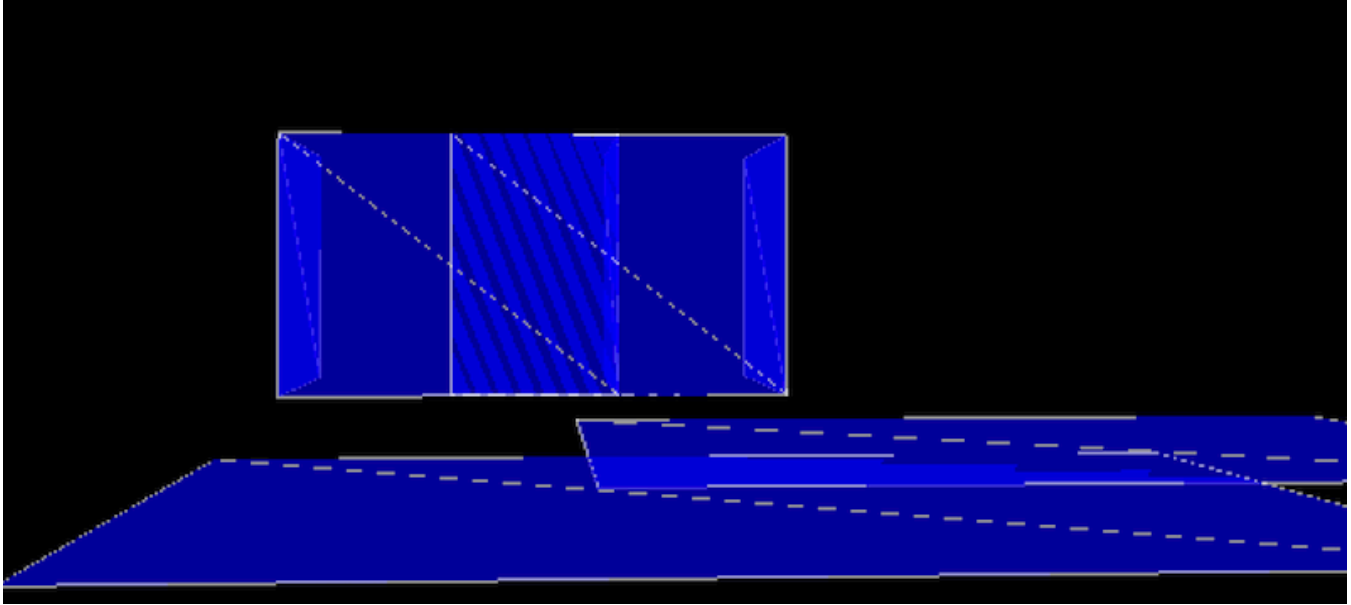


## Bounding Volume Hierarchy

Brute force collision detection is an  $O(n^2)$  operation. A bounding volume hierarchy (BVH) is an abstract tree structure on a set of geometric primitives that helps speed up collision detection. By arranging its leaves to contain geometric primitives and grouping the non leaf nodes in bounding volumes, a BVH tree reduces the time complexity of collision detection to  $O(n \log n)$ . With such a hierarchy, children volumes are not examined if their parents do not intersect.

Construction of a BVH proceeds by partitioning the input set into two (or more) subsets. Each subset is then bounded in a bounding volume and recursively partitioned (and bounded) until each subset consists of only a single geometric primitive.



The implementation linked below resolves z fighting in the scene depicted above by using a BVH to detect overlaps between geometric primitives. The construction and search operation are performed using a stack as in practice it works faster than the recursive approach.

Implementation: <https://github.com/rohan-sawhney/bvh>