

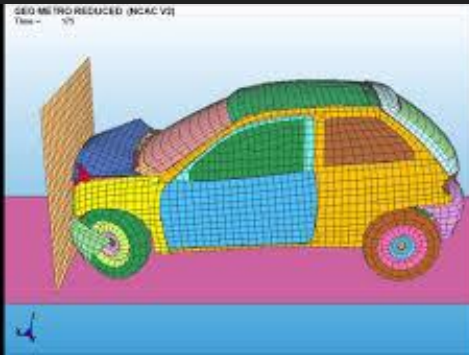
Collision Detection

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What, where?

- the computational problem of detecting the intersection of two or more objects (multiple meshes, a mesh and a line (hitscan))
- most often associated with its use in video games and other physical simulations (+ robotics etc)



Goals

In simulations:

- * making predictions for real-life scenarios
- * be as accurate as possible

In computer games

- * mimic physics in a way that is acceptable (for that type of game)
- * do so cheaply, in real time

Movies? Something in between, most likely...

Self-driving cars? Not to cause accidents...

How?

Posteriori, discrete:

- * Increment the simulation in small steps, see whether anything is intersecting after each step. (most games)

Priori, continuous:

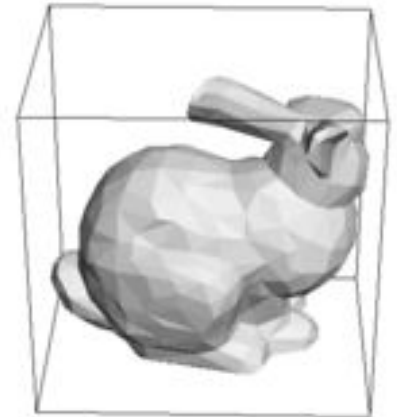
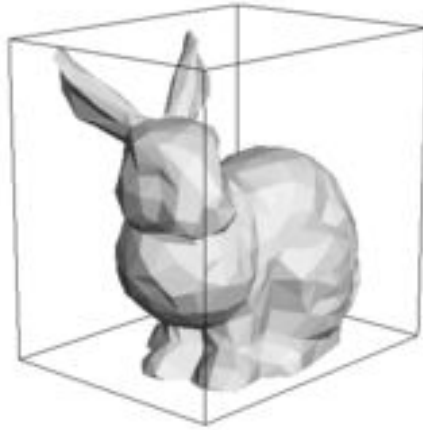
- * Pre-calculate paths, then move objects

Discrete collision detection is simpler, but more likely to produce errors (objects clipping through one another).

Problems?

- Expensive
 - Reuse calculations.
 - Simplify objects.
 - Simplify calculations.

Bounding boxes,
contact caching,
“Sleeping objects”,
space partitioning,
pruning...



Whoops...



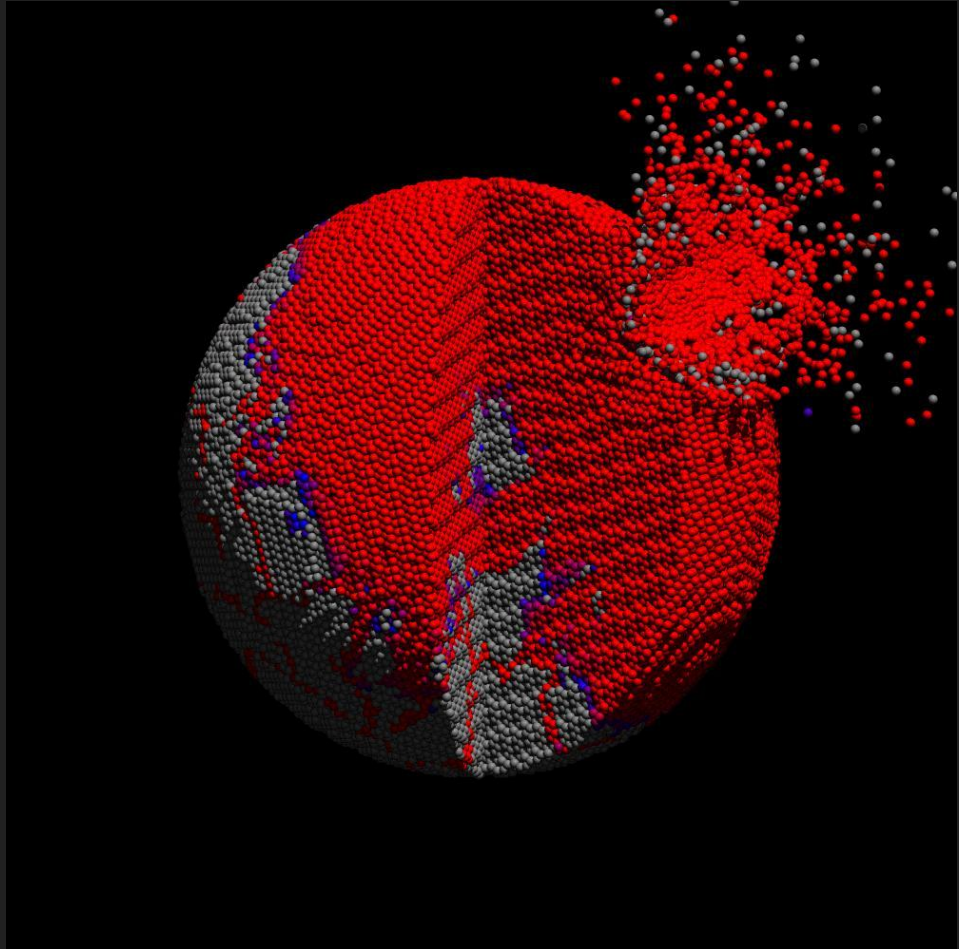
Now what?

Collision response?

Deformation?

Scattering?

Deduct health points?



Thank you!