Blitz3D Collisions

collision overview

Objects (entities) in Blitz3D can have three kinds of collidable boundaries:

- ellipsoids (fast in general, good for rounded shapes)
- polygons (good for simple shapes, slow for complex)
- boxes (fast in general, better for shapes)

As well as three kinds of collision reactions:

- stop moving
- slide in any direction
- slide upwards only (for climbing slopes)

collision fundamentals

Use *EntityType* to assign entities to a group with the same collision behavior (e.g. 'wall', 'spider web').

Use *Collisions* to set up collision modes and responses for source/target group pairs; to make it work in both directions requires two commands!

Use *EntityCollided entity, specific-type > 0* or *CountCollisions(entity)* to check if a collision has occurred and execute additional responses.

IMPORTANT: *UpdateWorld* calculates collisions: don't forget to include it in the game loop!

predicting collisions

EntityDistance can be used as a collision check between specific entities (e.g. character and "floor" plane).

*LinePick* can be used to check for obstacles in a path. *EntityPick* can be used to find the nearest entity of a given type.

<u>Note</u>: must set up entities with *EntityPickMode*

Putting these on timers will really help speed.

bouncy collisions

Popular algorithm:

Take surface normal of target, compute speed of collision vector in direction of the normal (dot product), use that to construct a 2x vector in the normal direction, and add that to the original.
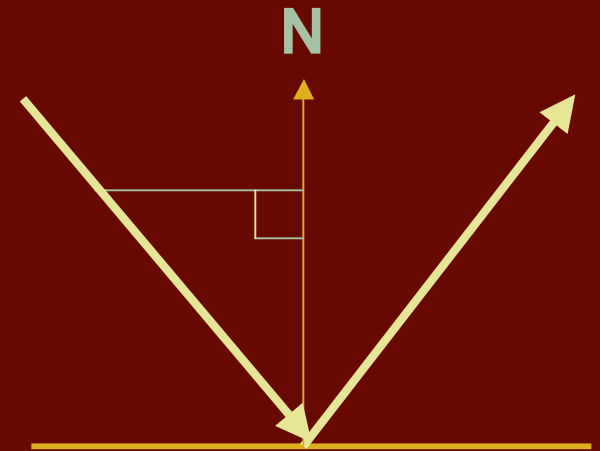
Effect: entity vector reflected across normal, same speed.

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Code Sample

no reaction collisions

How to "collide" without using any of the Blitz3D responses? *EntityReset* is one approach:

```
For i = 1 to CountCollisions(entity)
  count% = count% + 1
  MyReaction(CollisionEntity(entity, i))
  EntityReset entity
Next
```

some limitations

At large scales, collision weakens and entities may pass through seams between polygons.

Fast moving entities may pass (skip) through. (Exception: **_TurnEntity_** with a remote pivot)

Collision support for animated meshes?

Collision support with dynamic polygons?

Blitz3D supports up to 999 collision groups!

more

Tokamak Physics SDK & B3D Wrapper (for rigid body collisions and lots of other stuff)

http://www.freewebs.com/sweenie/

http://www.tokamakphysics.com/

B3D collision plug-in ($15 / free evaluation)

http://www.nuclearglory.com/ngc.php

```
For i = 1 To CountCollisions(entity)
    ;; obtain outward surface normal at collision point
    Nx# = CollisionNX#(entity,i)
    Ny# = CollisionNY#(entity,i)
    Nz# = CollisionNZ#(entity,i)

    ;; compute orthogonal speed towards the target
    VdotN# = Nx# * Vx# + Ny# * Vy# + Nz# * Vz#

    ; calculate the normal force
    NFx# = VdotN# * Nx#
    NFy# = VdotN# * Ny#
    NFz# = VdotN# * Nz#

    ;; subtract twice it from original vector
    Vx# = NFx# - 2.0 * Vx#
    Vy# = NFy# - 2.0 * Vy#
    Vz# = NFz# - 2.0 * Vz#
Next
```

✳ asterisk