

# Lab 4: Intro to Collisions

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## **GPR-350 Game Physics**

**Instructor: Daniel S. Buckstein**

### **Lab 4: Intro to Collisions**

#### **Summary:**

This week we enter intermediate rigid body dynamics by implementing fundamental collision detection algorithms.

#### **Submission:**

Submit a link to your online repository with the completed assignment's branch name and commit ID/index. If you have not created an online repository to keep track of your work, you should do so as part of this assignment; it will be checked. ***Work in pairs.***

#### **Instructions:**

##### **Step 1: Collision hulls**

Create a new behavior script for a base class called CollisionHull2D. The class should have an enum to describe the hull type (set in constructor): circle, axis-aligned bounding box or non-axis-aligned (object) bounding box. Implement specialized classes for each, containing the appropriate properties as members, borrowing from the attached particle/rigid body component where appropriate (e.g. circle collider only needs radius, center can be object's position).

##### **Step 2: Collision detection algorithms**

Implement the following collision detection algorithms: circle-circle, circle-AABB, circle-OBB, AABB-AABB, AABB-OBB, OBB-OBB. These may be static members of the base hull class.

##### **Step 3: Test**

Implement a scene to test all of the above collision algorithms. Demonstrate that collisions work by changing the color when hulls are colliding (e.g. green for collision, red for no collision, or a different color for each type of collision/combo). Consider creating a collision manager or other helper class to subscribe to different hulls and perform the tests.

**Bonus:**

Implement a few complex shapes made of multiple collision hulls (e.g. Bullet Bill). Test collisions between these complex hulls.

**Points** 8

**Submitting** a text entry box

Due	For	Available from	Until
-	Everyone	-	-

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