CS709a: Algorithms and Complexity

Focus: Spatial Data Structures and Algorithms

Instructor: Dan Coming
dan.coming@dri.edu

Thursdays 4:00-6:45pm
Office hours after class
(or by appointment)

Today

- Project 2 Presentations
- Project 3 Specs
- Midterm Questions?

Tentative Calendar

- 2/12 – Paper selection due
- 2/19 – Paper Presenter: Joe
- 2/26 – Paper Presenter: Matt
  - Present Project 1 in class (Project 1 Due 2/25)
- 3/5 – Bounding volumes
- 3/12 – Nearest neighbor
- 3/14-22 Spring Break
- 3/26 – Midterm review
  - Present Project 2 in class (Project 2 Due 3/25)
- 4/2 – Paper Presenters: Mark, Scott, Cody, and Steve
- 4/9 – Midterm
- 4/16 – Present Project 3 in class (Project 3 Due 4/15)
- 4/23 – Paper Presenter: Roger
- 4/30
- 5/7-13 Finals Week
  - Final Projects and Presentations Due

Project 3: Due 4/15 @11:59pm

- Adopt another team's Project 2 code and extend it
- Need to support triangle data (just 3 point_t's)
  - This will affect your build/insert functions (triangles may not fit inside one bin... possibly find a way to chop up the data into pieces that fit
- Find global pairwise intersections...
  - Triangle function has its own intersect_triangle function
  - Main problem is figuring out which pairs of triangles to test, without testing all O(n^2) pairs

Project 2 (continued)

- Ray Cast:

  template <intersect_info>

  bool intersect(const point_t & origin, const point_t & direction, intersect_info & info)

  - Returns whether there was a hit before info.hit_time and if there was a hit, info contains the result
  - template <class T> struct intersect_info {

    T hit_time;

    point_t hit_location;

    };

Project 2 (continued)

- Add unit tests and don't break existing tests
- As before:
  - Documentation in code and a separate document providing design, implementation decisions, complexity analysis, and anything that will help the next group add collision detection
  - Presentation in class (20 minutes, plus time for questions)
- Additional details TBA as necessary – ask questions early if instructions are unclear

Next Time

- Paper Presentations
- Study for Midterm!