MANCHESTER 1824
The University of Manchester

COMP37111: Advanced Computer Graphics

Workshop 5 : Simulations and Collisions

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In this week's workshop you will again split into small groups and reckon the following questions and we will re-gather to discuss our findings and answer some questions in the interactive tool called Mentimeter. We can again safely assume you have already watched the videos for week 5 and we will review on basics computer simulation techniques.

1. What is simulation and how does this fit in the 3D graphics pipeline for making animations? What is rigid body and deformable objects simulations? Name few techniques to solve simulation problems and explore their differences.
2. What is the name of method that individual fluid particles are tracked? In this method description of fluid flow, individual fluid particles are "marked," and their positions, velocities, etc. are described as a function of time.
    - Spring-Mass
    - Lagrangian
    - Eulerian
    - Hybrid
3. Look closely to the movement of your fingers and answer the following: what is the Degree of Freedom (DoF) of each bone? What is the DoF for your index finger?
4. What is collision detection? What is the time complexity of solving the collisions of a scene with N objects in one frame? Discuss some techniques to accelerate this phase (including but not limited to using bounding volumes, hierarchical structure, neighbors lookup).
5. Which of the following bounding volumes generally offers best approximation?
    - AABB
    - OBB
    - Sphere
    - k-DOP
6. Review: What are the topics you learnt during the first half of the course in modeling and animation steps? Type them in and keep this high level soup of concepts for your future references.