Collision Detection on the GPU

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Challenges

• How to transfer SDF information to GPU.
  – Ended up having a collection of basis SDFs that each body could use.

• `nvcc` is a C compiler -- unable to use complicated C++ code in kernels.
  – Had to re-code some sections to imitate old C++ code.
Algorithm

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(3) Find where they are colliding.
Time Comparison of 100-s Simulation, 0.1-s Timestep, No Rendering

3x Speedup
Future Work

• Use better broad-phase detection scheme.
• Use __shared__ memory, other cool GPU tricks.
• Implement the force accumulator, integrator, and collision response routines in CUDA.
  – Keep all information on GPU; avoid costly CPU-GPU I/O.