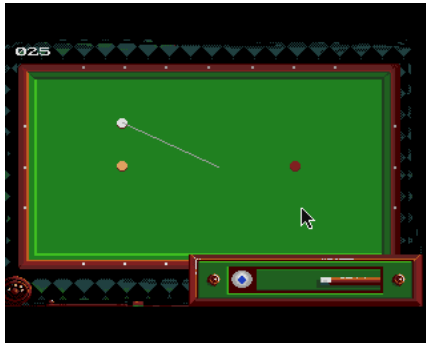
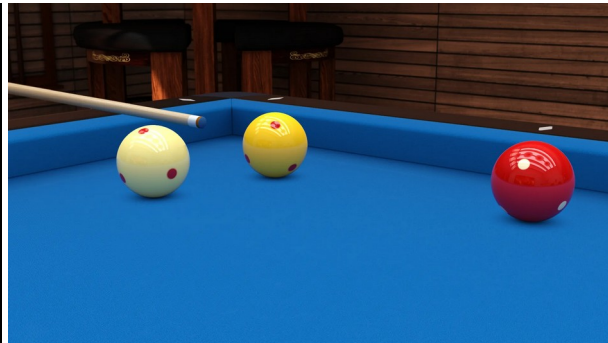


Physics-based Game: Rigid Bodies

This project aims for a simple playable game, e.g., Billiards, utilizing a physics engine for rigid bodies. This requires essential programming/software engineering skills for developing an application and good understanding of numerical simulations for rigid bodies.



[Src: www.lemonamiga.com]



[Src: www.shooterspool.net]

Objectives

The first step is to understand the fundamental knowledge of physics-based rigid-body simulation including collision detection and collision handling [1]. You can aim for either 2D or 3D game as long as the program works within the physics-based simulation context. For the game, you can implement your own minimal physics engine or utilize any open-source software such as Bullet¹ or PhysX². Billiards is just an example application of such a physics engine. You can aim for any type of games. In summary, this topic expects a playable game application including the following requirements:

- Game design that works under the physics-based simulation context
- Application codes written in C/C++ utilizing an in-house or open-source physics engine

You are strongly encouraged to use your creativity.

Topic difficulty: easy | **intermediate** | advanced

Prerequisites

- Good programming skill in C/C++ for implementing new codes and utilizing existing codes
- Knowledge of physic-based modeling as well as numerical simulation
- Experience of 3D computer graphics programming

Reference

- [1] 1997, Witkin and Baraff, Physically Based Modeling: Principles and Practice, SIGGRAPH Course Note.

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¹ <https://pybullet.org/wordpress/>

² <https://nvidia-omniverse.github.io/PhysX/physx/5.1.3/index.html>