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2024 Fall Semester SWCON211 Introduction to Game Programming
Department of Software Convergence, Kyung Hee University Teaching Assistant: Jinyoung Lee; Email: coolget159@khu.ac.kr Professor: Seungjae Oh; Email: oreo329@khu.ac.kr

Project #3: Develop Your Own Physics Engine

Let's take a look at the Pygame framework as a base.

An important evaluation element is to introduce and deepen the functions and skills learned in class and practice and develop them into a single framework.

The goal is not to create a perfect engine, but to gain experience in developing and programming the features you are interested in and want to implement among the various details of the engine.

Let's create a simple demo program that allows you to create a simple demo program that allows you to implement the functionality of your engine.

It is not possible to utilize an external library that was developed. In other words, using the API of the already implemented function or importing the library to execute it will not work. It aims to implement additional functionality by leveraging the already implemented API or open source.
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- ÿ Project Consulting: 2024.11.28 17:00 – 18:15
  (make up class & only those who want to participate)
- ÿ Presentation: 2024.12.10 - 2024.12.12 (3 min/student)
- ÿ Due Date: 2024.12.14 23:59:59 -> Upload to e-campus

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main points

- ÿ Submission: Code, Report, Short Execution Video, GitHub Link, Executable File (Link #1 & #2)
- ÿ Report Contents: Physics Engine Design & Structure, Engine Features with Code Descriptions, Technical Implementation & Contribution.
- ÿ Report Format: PDF -> All the other files in a “single” zip file.

evaluation

- ÿ Implementation and contribution to the element you selected among the physical engine-related technology in class and practice
- ÿ engine technology development difficulty (30%)
- ÿ engine technology development (20%)
- ÿ engine technology development completion (50%)

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A. Reference Text Book: Game Engine Architecture & Real-time Collision Detection

B. Collision Detection: GJK collision detection, SAT, OBB, Moving Objects, Concave Object, Bounding volume hierarchy, Convex Hull Algorithm, Optimization, …

C. Rigid Body Dynamics

D. Impulsive Collision Response (with Torque)

E. Particle System & Simulation: fluid, smoke, fire, explosion,…

F. Numerical Methods: modified Euler method, RK4, Verlet Integration, Velocity Verlet, …

G. Model Deformation (Free-form Deformation)

H. Deformable Body