AN INTRODUCTION TO PHYSICS ENGINES

DESCRIPTION

A physics engine is computer software that provides an approximate simulation of certain physical systems, such as rigid body dynamics (including collision detection), soft body dynamics, and fluid dynamics, of use in the domains of computer graphics, video games and film.

CLASSES

- high-precision engines
  - precision and accuracy
  - scientists
  - animated movies
- real-time engines
  - simplified calculation
  - faster

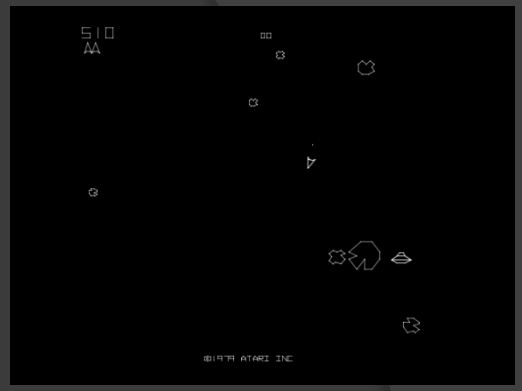
SCIENTIFIC ENGINES

- ENIAC - 1946 *Electronic Numerical Integrator And Computer*

- Supercomputers - 1980
  - fluid dynamics
  - weather forecasting

GAME ENGINES

- pong – 1972
- asteroids – 1979
- lunar lander – 1979
- the incredible machine - 1992



CALCULATION METHODS

- CPU – central processing unit
- PPU – physics processing unit
  - PhysX – Ageia 2002
    - Switchball – 2007
- GPGPU – general-purpose graphics processing units
  - CUDA

TP – ENVIRONMENT

- CodeBlocks + SDL + OpenGL 3 + Glut
  - https://docs.google.com/file/d/0B1ZoBpxrAhWkeTBTdmx1MllrYTA/edit?usp=sharing
  - un-rar `CodeBlocks` into `C:\Program Files (x86)\`
  - un-rar `glut32.dll` & `glu32.dll` into
    - `C:\Windows\System32`
    - `C:\Windows\SysWOW64`
- Project
  - https://docs.google.com/file/d/0B1ZoBpxrAhWkand5TThtN2pTNWs/edit?usp=sharing
  - we will work in a 2D environment (3d if you want)

TP – SUBJECT – COLLISIONS

- create a square
- make it move
- make it bounce on the screen borders

- make another square
- make it move also
- make it bounce with the other square

- make a lot more of them

TP – SUBJECT – GRAVITY

- add a global gravity (earth like) on the scene
- add custom gravity spots (strength and aoe)
- add to objects the friction coefficients
  - speed reducers and accelerators