

Box2D & OpenGL

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Uvod

- Biblioteka (eng. library) napisana u C++ programskom jeziku koja omogućava simulaciju fizike u igrama
- C++
- Cross-platform
- Angry Birds, Sprite Kit, Unity2D, itd.
- Chipmunk (2D), Bullet (3D)

Instalacija

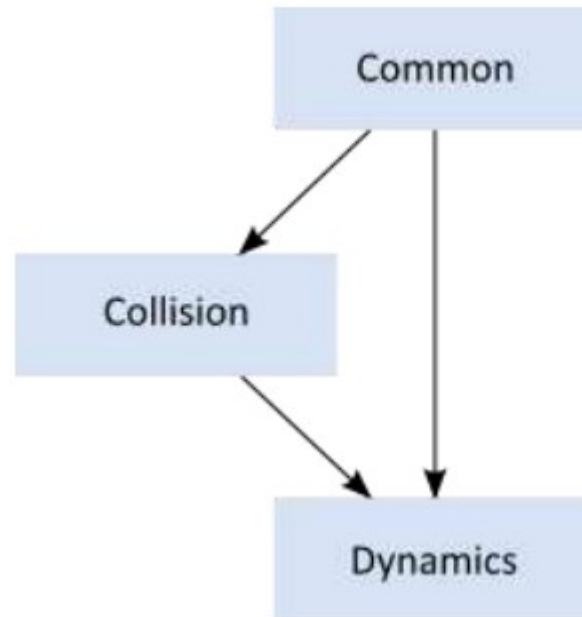
- Potrebno kompajlirati izvorni kod
- Prije kompilacije potrebno instalirati pakete o kojima ovisi
- `sudo apt-get install g++ cmake libglu-dev libxi-dev`
- Zatim potrebno linkati sa projektom
- `-L/path/to/Box2D_v2.3.0/Box2D/Build/gmake/bin/Debug`
`-lBox2D -I/path/to/Box2D_v2.3.0/Box2D`

Koncepti

- World
- Body
- Fixture
- Shape
- Joint

Moduli

- Common
- Collision
- Dynamics



Mjerne jedinice

- Metri
- Pikseli vs metri
- Skaliranje
- Optimalna veličina tijela (0.1m do 10m)
- Radijani

Programsko sučelje

- Kreiranje svijeta
 - `b2Vec2 gravity(0.0f, -10.0f);`
 - `b2World world(gravity);`
- Kreiranje definicije tijela
 - `b2BodyDef bodyDef;`
 - `bodyDef.type = b2_dynamicBody;`
 - `bodyDef.position.Set(0.0f, 4.0f);`
- Kreiranje tijela
 - `b2Body* body = world.CreateBody(&bodyDef);`

Programsko sučelje

- Definiranje svojstava tijela
 - `b2PolygonShape dynamicBox;`
 - `dynamicBox.SetAsBox(1.0f, 1.0f);`
 - `b2FixtureDef fixtureDef;`
 - `fixtureDef.shape = &dynamicBox;`
 - `fixtureDef.density = 1.0f;`
 - `fixtureDef.friction = 0.3f;`
- Povezivanje svojstava sa tijelom
 - `body->CreateFixture(&fixtureDef);`

Joint

- Više vrsta
- Mouse joint
- Weld joint
- Distance joint
- Revolute joint
- ...

Sile i impulsi

- Kako bi micali tijela unutar Box2D svijeta trebamo djelovati na tijela silama i impulsima
- `body->ApplyForce(b2Vec2(0,50), body->GetWorldCenter());`
- `body->ApplyLinearImpulse(b2Vec2(0,50), body->GetWorldCenter());`
- `body->ApplyAngularImpulse(0);`

Ostalo

- Simulacija eksplozija
- Simulacija fluida
- World querying
- Predviđanje putanje tijela
- ...

Projekt

Zaključak

- Široko rasprostranjen
- Pojavio se editor za Box2D
- Dobre performanse
- Produktivnost
- C++

Literatura i linkovi

- <http://www.box2d.org/manual.html>
- <http://www.iforce2d.net/b2dtut/>
- <http://blog.allanbishop.com/>
- <http://www.raywenderlich.com/28602/intro-to-box2d-with-cocos2d-2-x-tutorial-bouncing-balls>
- <http://www.kerp.net/box2d/>
- <http://www.raywenderlich.com/14302/how-to-make-a-game-like-fruit-ninja-with-box2d-and-cocos2d-part-1>
- <http://www.raywenderlich.com/28604/how-to-create-a-breakout-game-with-box2d-and-cocos2d-2-x-tutorial-part-1>