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Using Blender 2.7 for Animation - **Advanced 1.1 - Physics**

GOAL: Make a simulation of an object falling onto a floor, then record it and make a video.

Each physics simulation usually has at least two parts: a **Static** object for the floor, & a **Rigid Body** to fall or be pushed.

* Save As, click home drive (such as T:\username or H:, or Documents if none), then in second box name it 3dad1
* Start by making a **floor** (such as Add, Mesh, Plane), & any mesh such as a **Cube above it** (not touching):

To use physics, you need to be in the Blender Game engine.

Click Blender Render at the top and change it to Blender Game:

In the Blender Game engine, the physics tab looks different. Make the right pane bigger by dragging the black line so that you can see the physics button:

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| Can’t see physics button? | Drag black line over so you can see physics button. |

* Click the  Physics button
* Select the cube or other object that will fall.
* Change Physics Type to Rigid Body:
* Check “Collision Bounds” then change Bounds to Triangle Mesh (other types of Bounds use less of the computer’s speed but reduce accuracy) :
* Repeat these steps for the floor, except leave Physics Type as **Static** (instead of Rigid Body) so it doesn’t move.

After you are done setting up the simulation, move the mouse pointer onto the 3D View then press the **‘p’ key to play**.

When you are done viewing the simulation and need to use the mouse, press

*“Esc” (escape) key to exit* the simulation.

**Advanced 1.2 - Controllers** (how to be a puppeteer)

To combine animation and physics, you need to program the objects instead of adding keyframes (since the simulation is interactive). For example, you can make a “Baseball Bat” then program it so that the object rotates when you hit the Ctrl key on the keyboard. A **Sensor** detects a keypress, button, or other event, **Controller** groups keys, and **Actuator** is what happens (such as swinging the baseball bat)



* Add, Mesh, Cylinder or other, to **make an object the user will control**.
* For screen layout, change from Default to Game Logic (see picture)🡪
* Make sure the object that you want to control using the keyboard is selected (such as a baseball bat), then Click “Add Sensor”, “Keyboard”
* Now set which key will control the object (just **click the blank box**—**see first pic below**—**then press any key** such as the right Ctrl key):

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|   | (That will cause Right Ctrl to control the object) |

* Click “Add Controller”, “Or”

*(all the controller does is combine keys. For example, you can choose “Or” then connect more than one key so each do the same thing)*

* Click “Add Actuator”, “Motion”.
* Drag to draw lines to connect the sensor to the controller:



* And controller to actuator:



* Next you must choose how the actuator affects the motion of the object: Under the “Motion” actuator, change the values for how much you want the keypress to affect the object—about 5 degrees moves fast enough (example shows 5 degrees on y so the z axis [ends] swings like a baseball bat).

**Advanced 1.3 - Recording & Rendering Simulations**

If you want to render a simulation to a video file, you would record the simulation, including your “puppetry” (such as using the Ctrl key) to an animation.

* In Blender Game engine, click Game (at top) then make sure “Record Animation” is checked
* Press ‘**p**’ to play simulation
* Press Ctrl to control your object to play your part as puppeteer (or whatever key you added to the Sensor)
* When simulation has run enough (a few seconds or whenever you are finished) press “**Esc**” key
* Change engine to Blender Render  (at top of screen)
* Click **Render** button 
* For Render Presets choose **HDTV 720p**. Under output change /tmp to **T:\*username*\3dad1 video** and Change PNG to H.264. At the top of the screen click Render, **Render animation**

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| TIPS* After checking record & pushing ‘p’, the only way to **PLAY** is to change from Blender Game to **Blender Render**,

then (jump to beginning, play).* After checking record & pushing ‘p’, The only way to **ERASE** is to change the timeline to a **Dopesheet** view

 then place the mouse over the dopesheet, then hit the ‘a’ key a couple times to select all (make sure all of the diamonds are orange) then Delete key, Enter key (then you can change the view back to a Timeline, by clicking on it again like the picture above except choosing Timeline) |

Overview

* Have at least 1 **Static** object, 1 **Rigid Body**, and 1 working **Actuator** that controls the object with a key (can be same as static object if you want the floor to move)
* **Record the simulation**, using the Ctrl key to puppeteer before you press Esc to stop recording
* **Render Animation**: see settings above or Computer, Resources*: “R:\Classes\3DAnimation\ANIMATION SETTINGS for all Blender projects (except change Output part number to which one we are on).docx”*