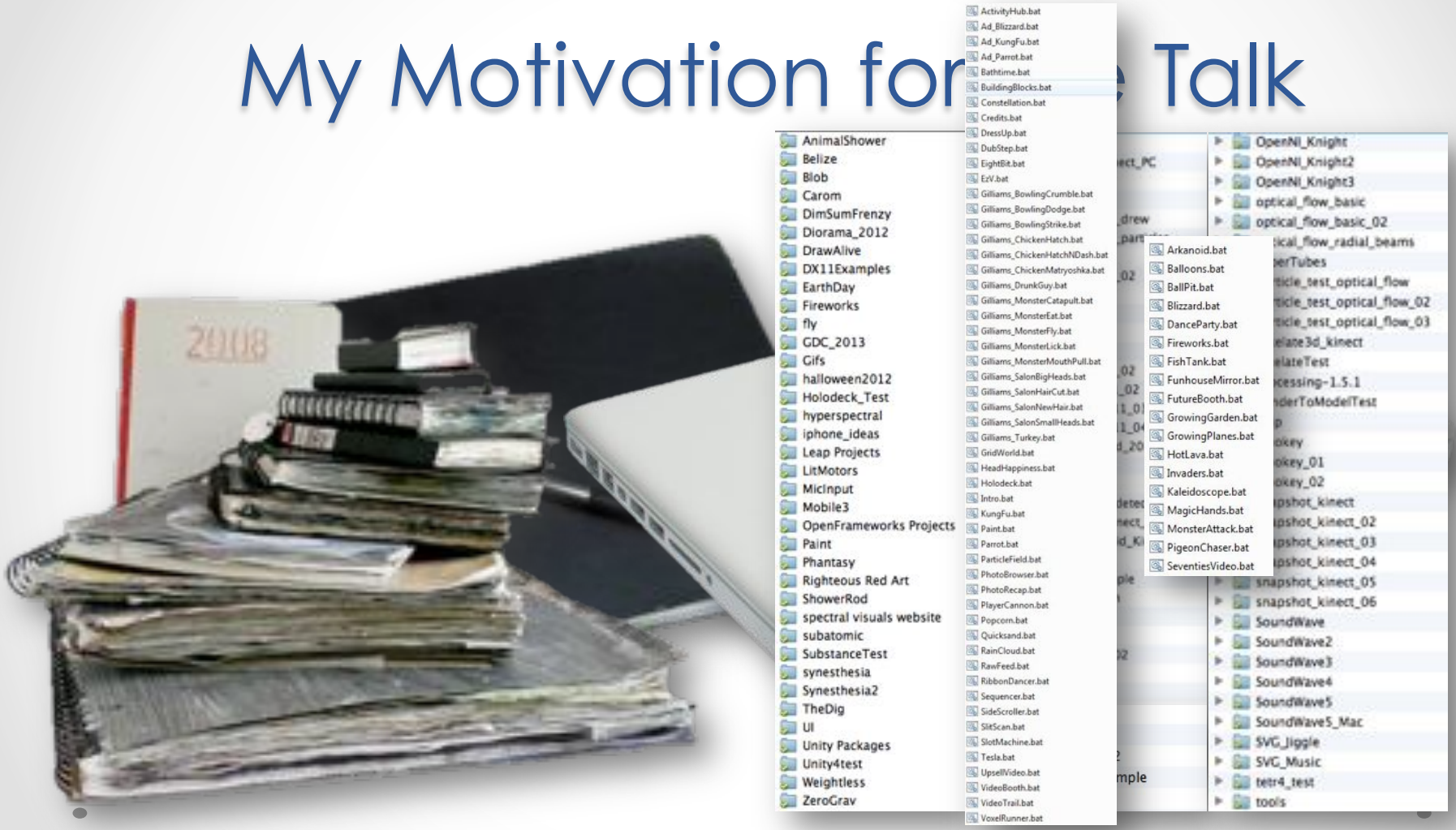

Rapid Prototyping
at
Double Fine

Introductions

- Hi, I'm Drew Skillman
- Project Lead: Kinect Party
- Background in Tech Art / VFX

My Motivation for [illegible] Talk



Rapid Prototyping Feels Different

- Don't worry about doing things "Right"
- No Expectations
- No Pressure
- *Cool things still happen!*


KINECT
Party

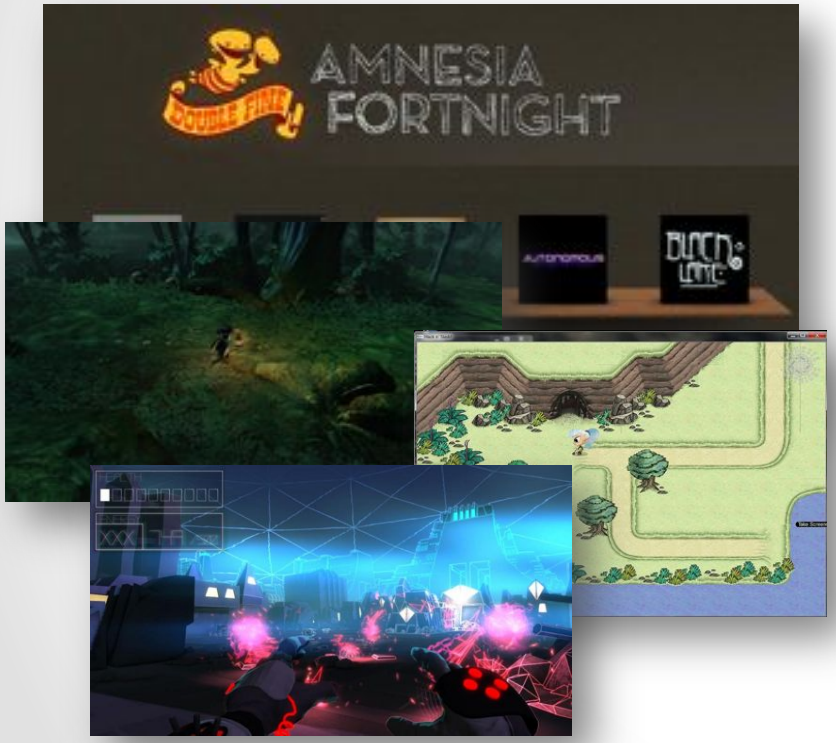
Prototyping Payoffs

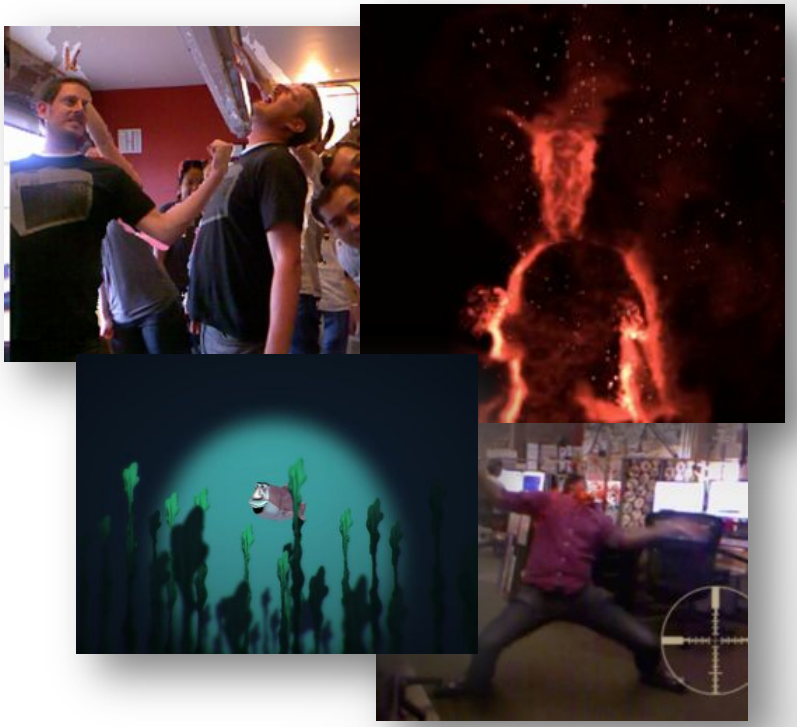
- ☑ Build confidence in new ideas, and share them
- ☑ Learn engine strengths and limitations
- ☑ Learn input strengths and limitations
- ☑ Fail fast
- ☑ Sign projects
- ☑ Happy accidents

Technical Artists

- Fantastic Background for Rapid Prototyping
- Fast iteration on art, code, and design

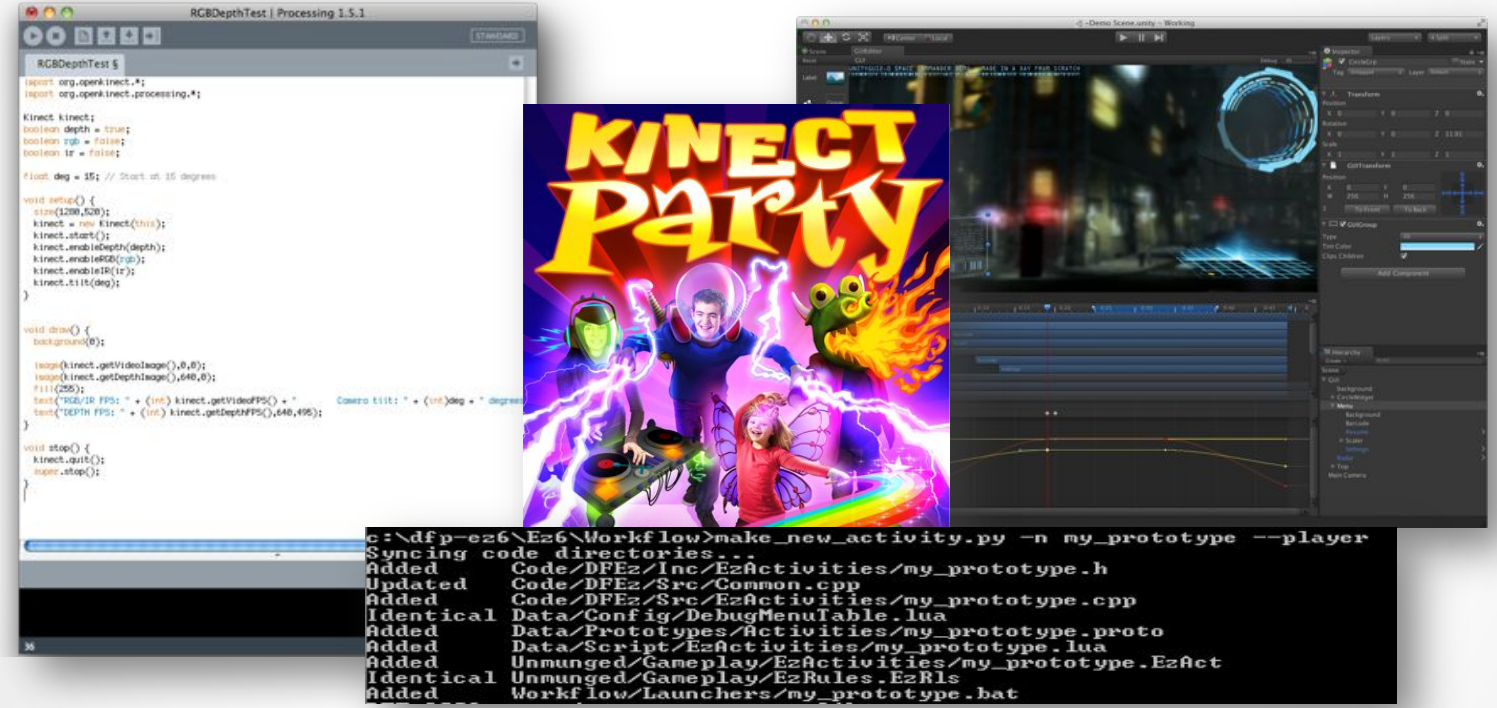
Prototyping VS *Rapid* Prototyping



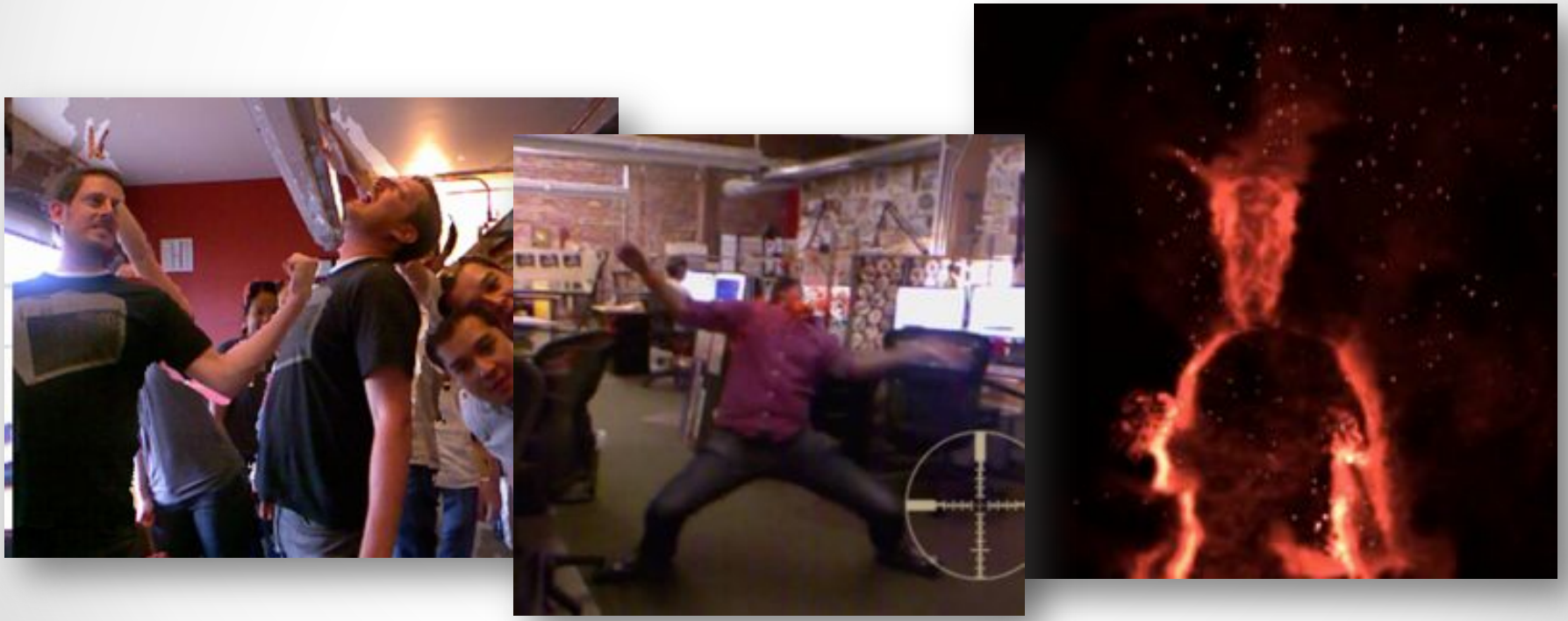


Talk Overview

Prototyping Platforms

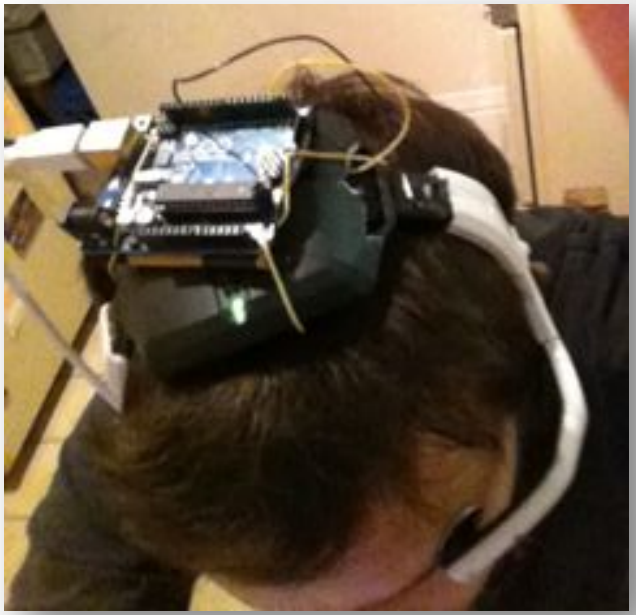


Examples from Kinect Party



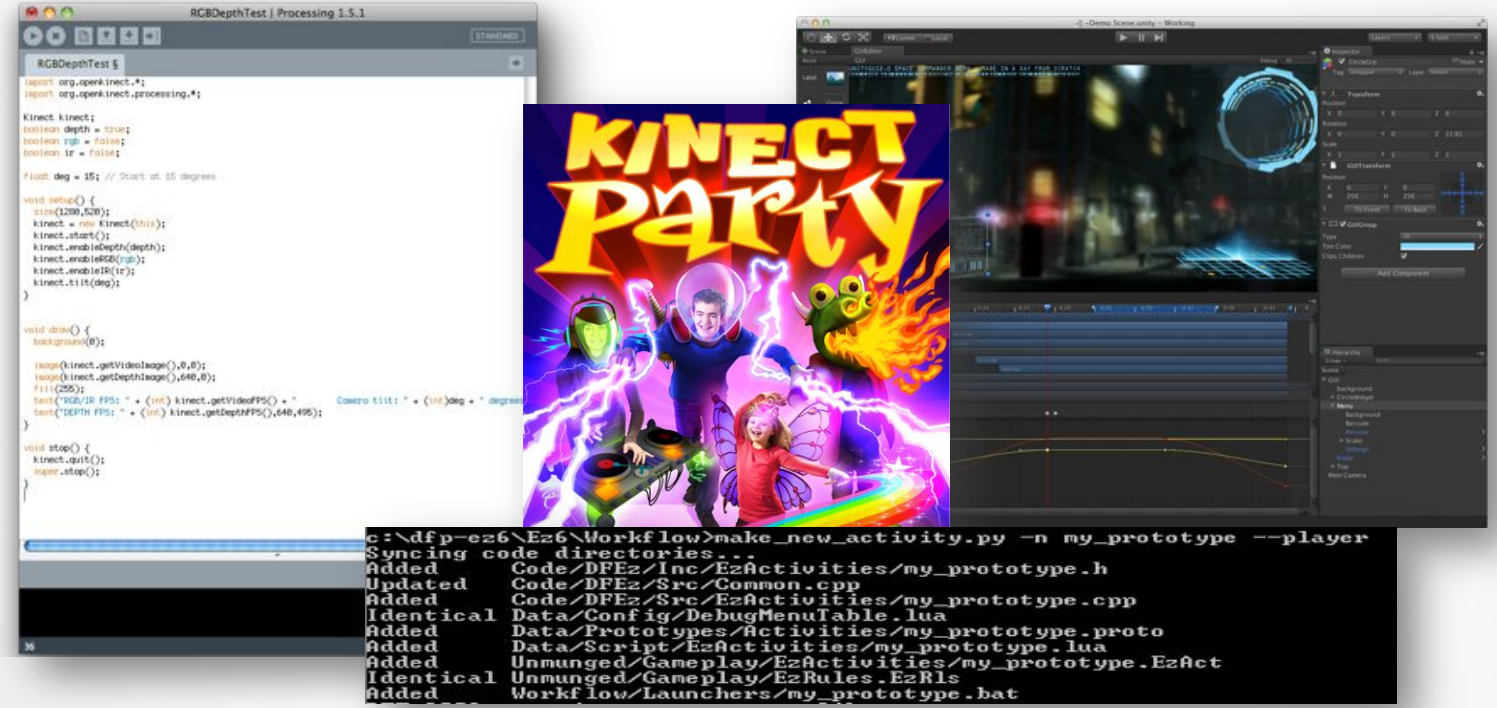
Prototyping for Next Gen

Prototyping for New Input Devices



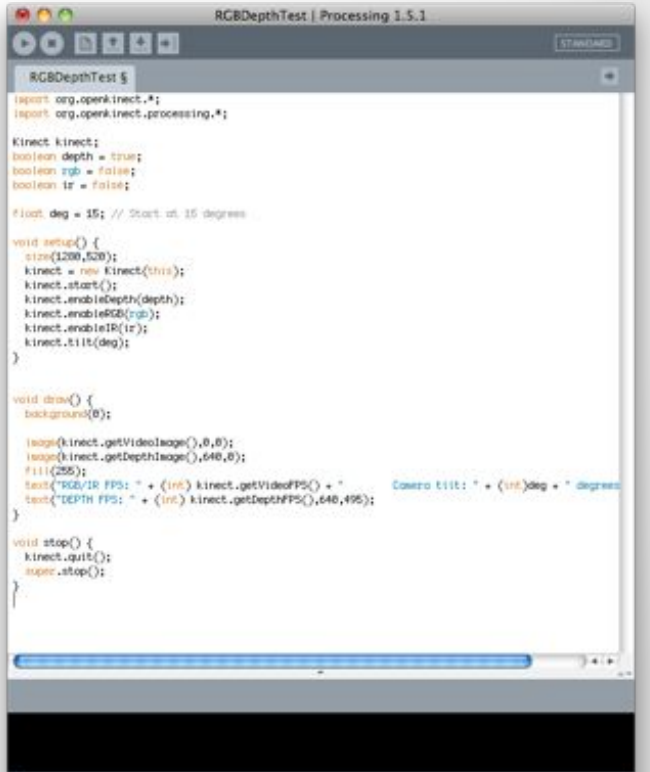
Links!

Prototyping Platforms

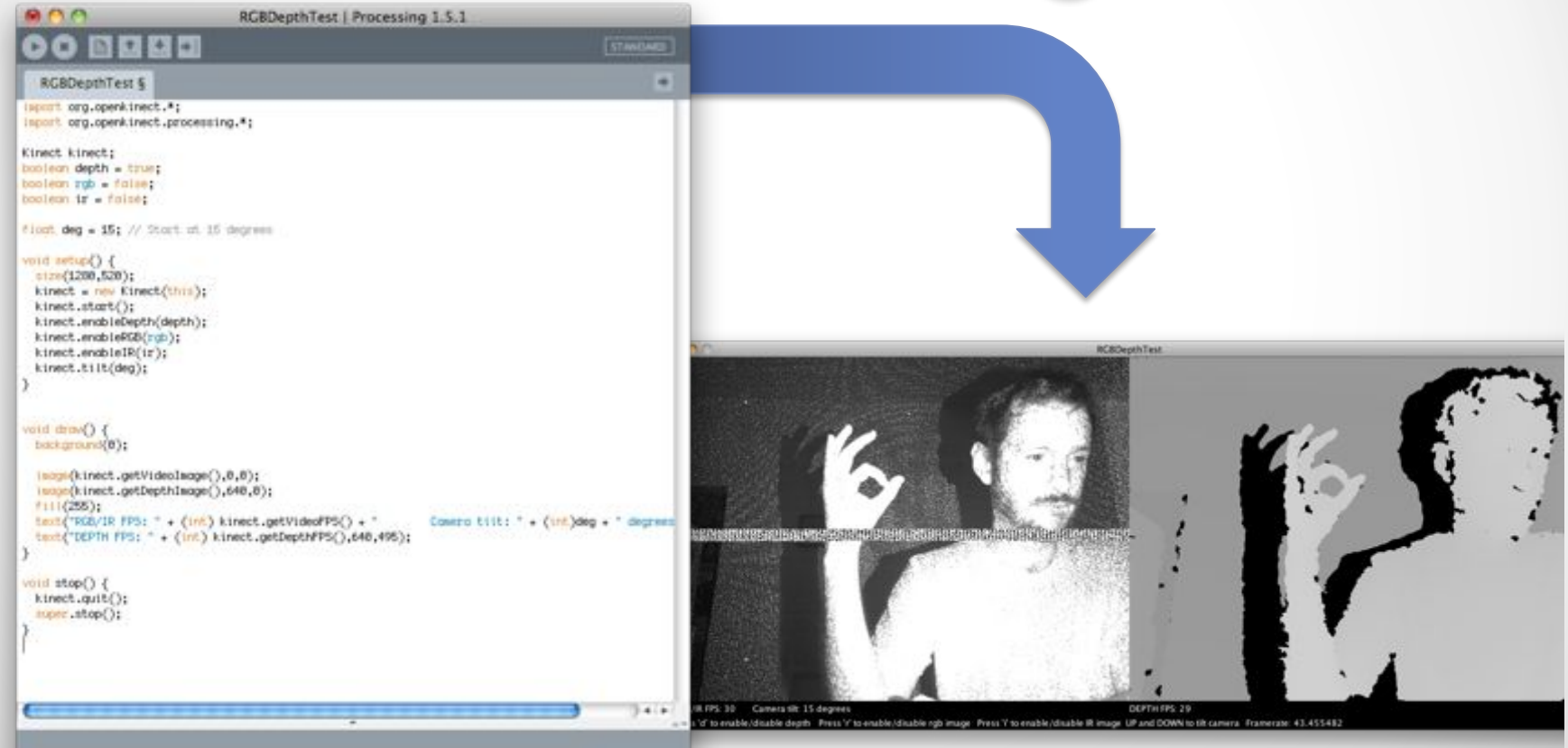


Processing

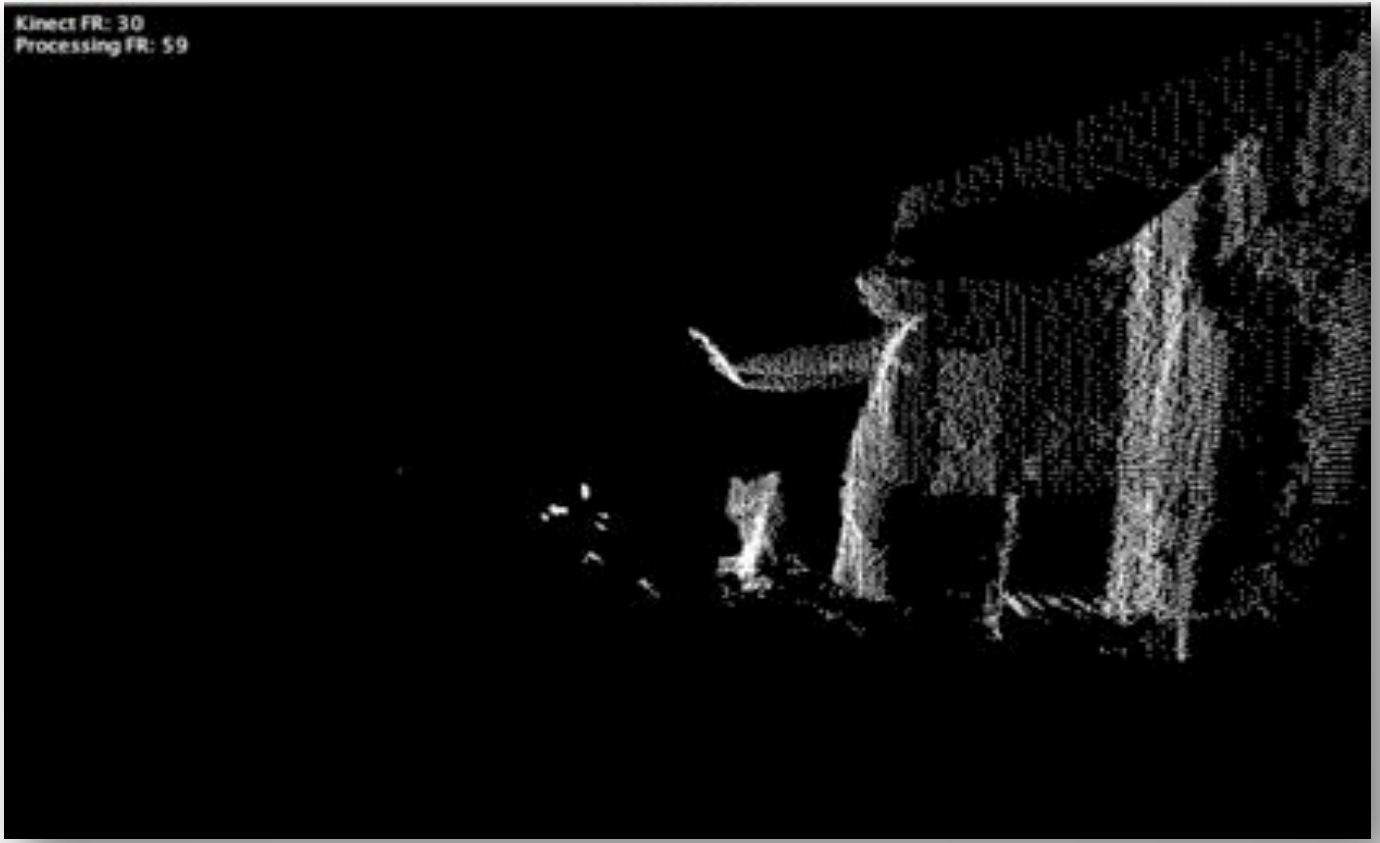
- Java Programming Environment
- Cross platform (Mac/PC/Linux)
- (Also Android)
- Great for 2D!



Processing


RGBDepthTest | Processing 1.5.1
RGBDepthTest §
import org.openkinect.*;
import org.openkinect.processing.*;
Kinect kinect;
boolean depth = true;
boolean rgb = false;
boolean ir = false;
float deg = 15; // Start at 15 degrees
void setup() {
size(1200,520);
kinect = new Kinect(this);
kinect.start();
kinect.enableDepth(depth);
kinect.enableRGB(rgb);
kinect.enableIR(ir);
kinect.tilt(deg);
}
void draw() {
background(0);
image(kinect.getVideoImage(),0,0);
image(kinect.getDepthImage(),640,0);
fill(255);
text("RGB/IR FPS: " + (int) kinect.getVideoFPS() + "
Camera tilt: " + (int)deg + " degrees
text("DEPTH FPS: " + (int) kinect.getDepthFPS(),640,495);
}
void stop() {
kinect.quit();
super.stop();
}
RGBDepthTest
DEPTH FPS: 29

Processing



Unity

UNITYGUI2.0 SPACE COMMANDER DEMO - MADE IN A DAY FROM SCRATCH

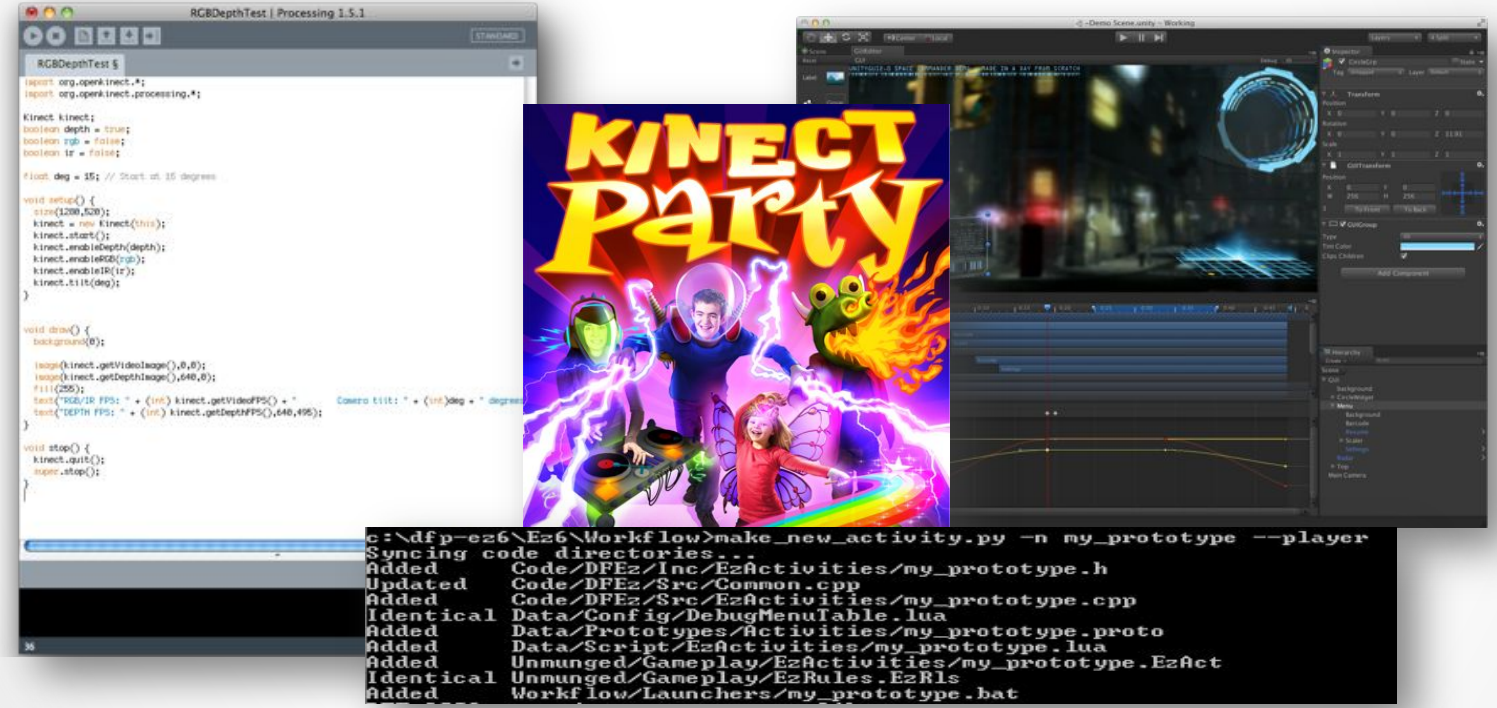
Unity

- C# and Javascript
- High level 3D support including OpenGL ES 2.0, DirectX 11, etc…
- Massive Community
- Great for 3D!

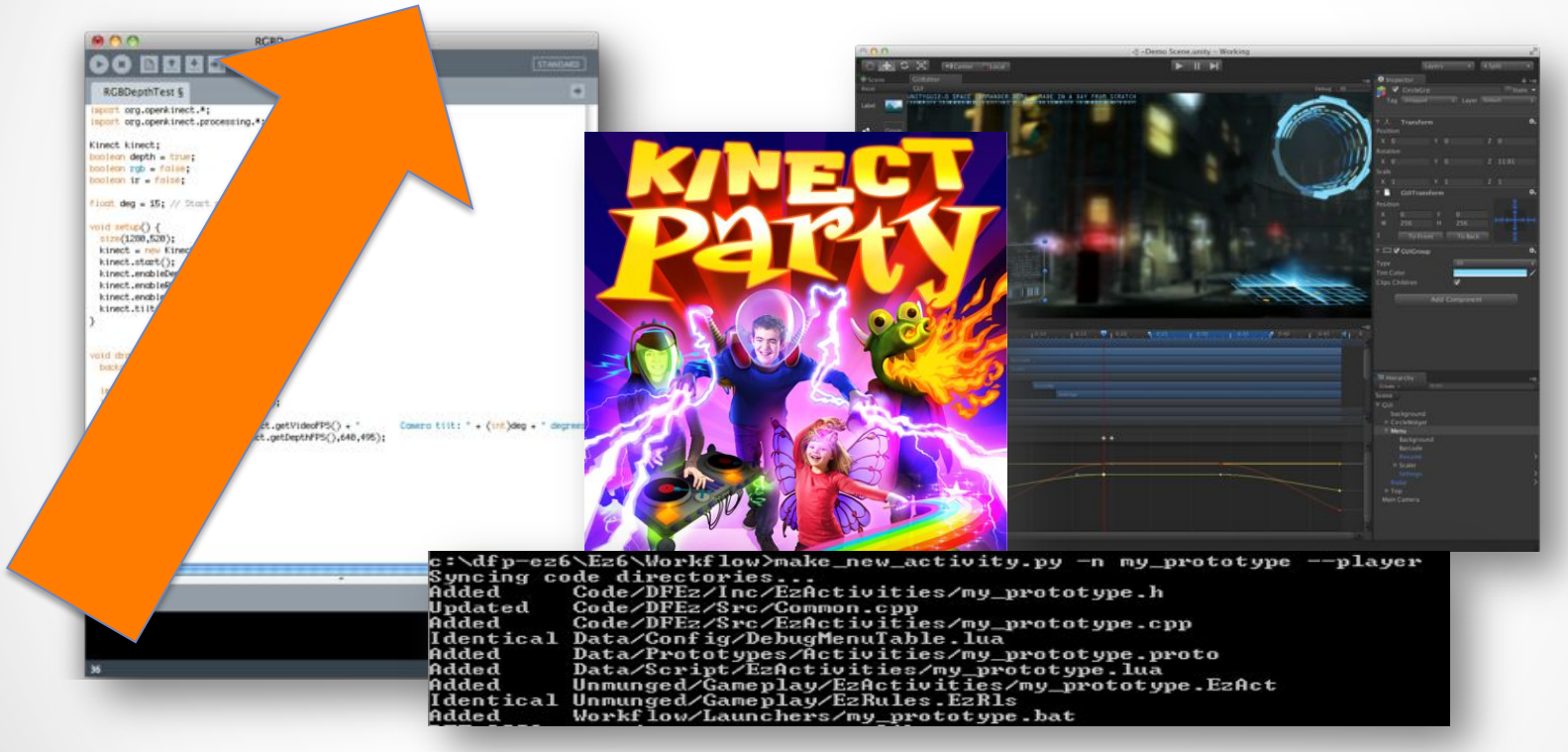
Double Fine's Buddha Engine

- Proprietary C++/Lua based engine
- Developed for Brutal Legend
- Used for Kinect Party and Happy Action Theater

Rapid Prototyping

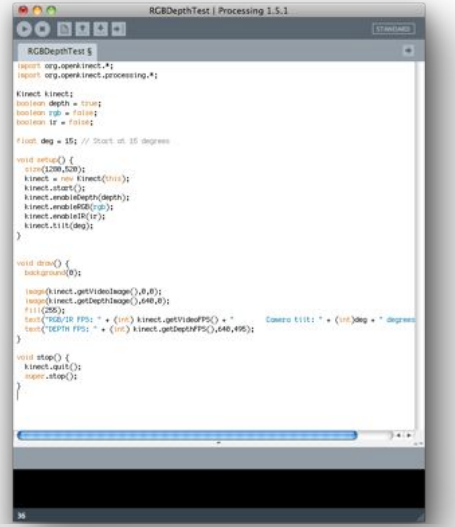


Rapid Prototyping



Rapid Prototyping

- **Minimize Compile Times**
  - Maximize iteration



Rapid Prototyping

- **Minimize Compile Times**
  - Maximize iteration
- **Use Building Blocks**
  - Don't ever start from scratch if you can help it

Building Blocks

- **Processing**: Libraries
  - http://processing.org/reference/libraries/

Video
Read images from a camera, play movie files, and create movies.

Network
Send and receive data over the Internet through simple clients and servers.

Serial
Send data between Processing and external hardware through serial communication (RS-232).

PDF Export
Create PDF files. These vector graphics files can be scaled to any size and printed at high resolutions.

DXF Export
Create DXF files to save geometry for loading into other programs. It works with triangle-based graphics including polygons, boxes, and spheres.

» Minim
Uses JavaSound to provide an easy-to-use audio library while still providing flexibility for more advanced users.

» Arduino
Directly control an Arduino board through Processing.

» Netscape.JavaScript
Methods for interfacing between Javascript and programs exported from Processing.

Simulation / Math

» Physics
by Jeffrey Traer Bernstein
Simple particle system physics engine. No collisions, just particles, springs, gravity & drag.

» MSAFluid
by Memo Akten
A library for solving real-time fluid dynamics simulations.

» AI Libraries
by Aaron Steed
A set of libraries to assist with artificial programming tasks such as genetic algorithms and the AStar algorithm.

» peasy
by Adla Faruk
A collection of utilities for performing some statistical and matrix-related manipulations.

» Cell Noise
by Carl-Johan Rosen
Explores cell noise (Worley noise), a pattern generation algorithms useful for animation.

» Eliza
by Andres Colubri
Implementation of the classes A.I. bot, Eliza.

» LSystem Utilities
by Martin Prout
A library for exploring and creating Lindenmayer Systems in 2D and 3D.

» fisica
by Ricard Marxer Piñon
A wrapper for JBox2D, a 2D physics engine.

» MatrixMath
by Francis Bitonti
Helpful code for matrix operations.

» Cellular Automata
by Francis Bitonti
Simplifies making cellular automata calculations.

» BoxWrap2D
by ewjordan
BoxWrap2D runs on top of JBox2D enabling simple integration of JBox2D with Processing.

» Combinatorics
by Florian Jenett
Generate combinations, variations and permutations.

Computer Vision / Video

» GSVideo
by Andres Colubri
Uses GStreamer as an alternative to QuickTime for movie playback and camera capture.

» BlobDetection
by v3ga
Performs the computer vision technique of finding "blobs" in an image.

» OpenCV
by Stephane Cousot and Douglas Edric Stanley
An OpenCV implementation for processing including blob detection, face recognition and more. This library is highly recommended.

» integralhistogram
by Giovanni Tarducci and Alessio Barducci
The integral histogram method allows to obtain the color or intensity histogram of all possible target regions in a Cartesian data space.

» fiob
by André Sier
A fast multi-blob detector and tracker using flood-fill algorithms

» blobscanner
by Antonio Molinaro
A library for blob detection and analysis in image and video streams.

» jmcvideo
by Angus Forbes
A simple wrapper for playing videos and grabbing video data for any of the formats that the JMC library supports.

» Face Detect (PC)
by Bryan Chung
Face detection library made with WebCamXtra and the openCV framework. PC only.

» TUIO Client
by Martin Kaltenbrunner
Client library for the simple creation of tangible interactive surfaces, receiving TUIO data from object and multi-touch trackers such as reacTIVision.

» P-SURF
by Claudio Fantacci and Alessandro Martini
An implementation of the SURF (Speeded Up Robust Features) feature detector to search for discrete image correspondences.

» openkinect
by Daniel Shiffman
A kinect implementation for Processing.

» simple-openni
by Max Rheiner
A simple OpenNI and NITE wrapper for Processing.

» JMyron (WebCamXtra)
by Josh Nimoy et al.
Camera library for motion detection, color tracking, glob distinction, and pixel addressing. Does not require QuickTime or WinVDIG for Windows machines.

» LibCV
by toxi
Grabs video frames from a camera using the Java Media Framework (JMF). Does not require QuickTime or WinVDIG for Windows machines.

» tuioZones
by jLyall
tuioZones provides a way to set zones within a multi-touch screen to respond to TUIO messages sent from a tracking application.

» CbModel
by Federico Bartoli
CbModel is a library for motion detection based on background modeling and subtraction.

» dLibs
by Thomas Diewald
This kinect library is based on the libfreenect-software, it currently only works on windows.

Building Blocks

- **Unity**: Unity Packages
  - Asset Store

Building Blocks

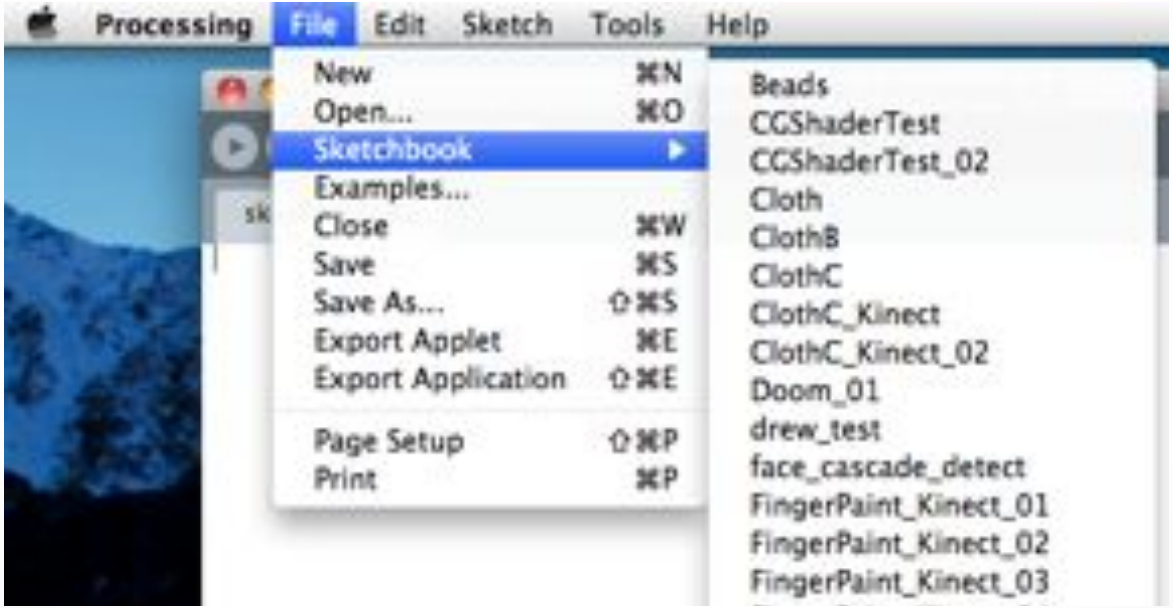
- **Buddha Engine**: Perforce!
  - Every Double Fine game is a possible building block for art assets or code

Rapid Prototyping

- **Minimize Compile Times**
  - Maximize iteration
- **Use Building Blocks**
  - Don't ever start from scratch if you can help it
- **Sketchbook Approach**
  - Make it easy to start, easy to branch, easy to experiment

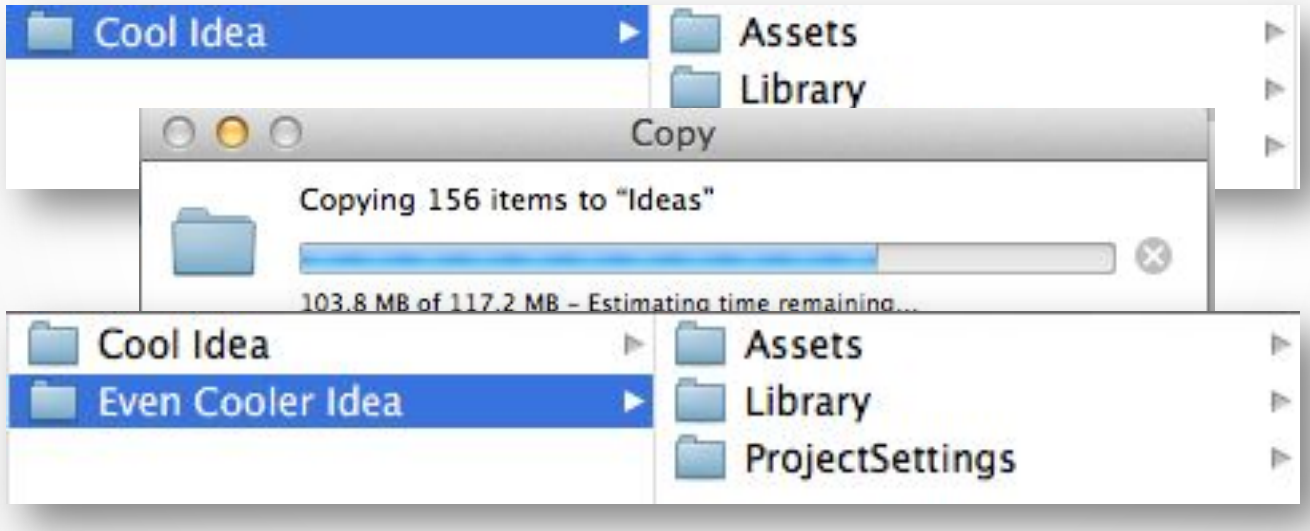
Sketchbooks

- **Processing:**



Sketchbooks

- **Unity**: Branching an Idea
  - Every asset path is relative, just duplicate project folders



Sketchbooks

- **Buddha Engine:**

Sketchbooks

- **Buddha Engine:** make_new_activity.py


```
c:\dfp-ez6\Ez6\Workflow>make_new_activity.py -n my_prototype --player
Syncing code directories...
Added      Code/DFEz/Inc/EzActivities/my_prototype.h
Updated    Code/DFEz/Src/Common.cpp
Added      Code/DFEz/Src/EzActivities/my_prototype.cpp
Identical  Data/Config/DebugMenuTable.lua
Added      Data/Prototypes/Activities/my_prototype.proto
Added      Data/Script/EzActivities/my_prototype.lua
Added      Unmunged/Gameplay/EzActivities/my_prototype.EzAct
Identical  Unmunged/Gameplay/EzRules.EzRls
Added      Workflow/Launchers/my_prototype.bat
```

Rapid Prototyping

- **Minimize Compile Times**
  - They kill creativity dead
- **Use Building Blocks**
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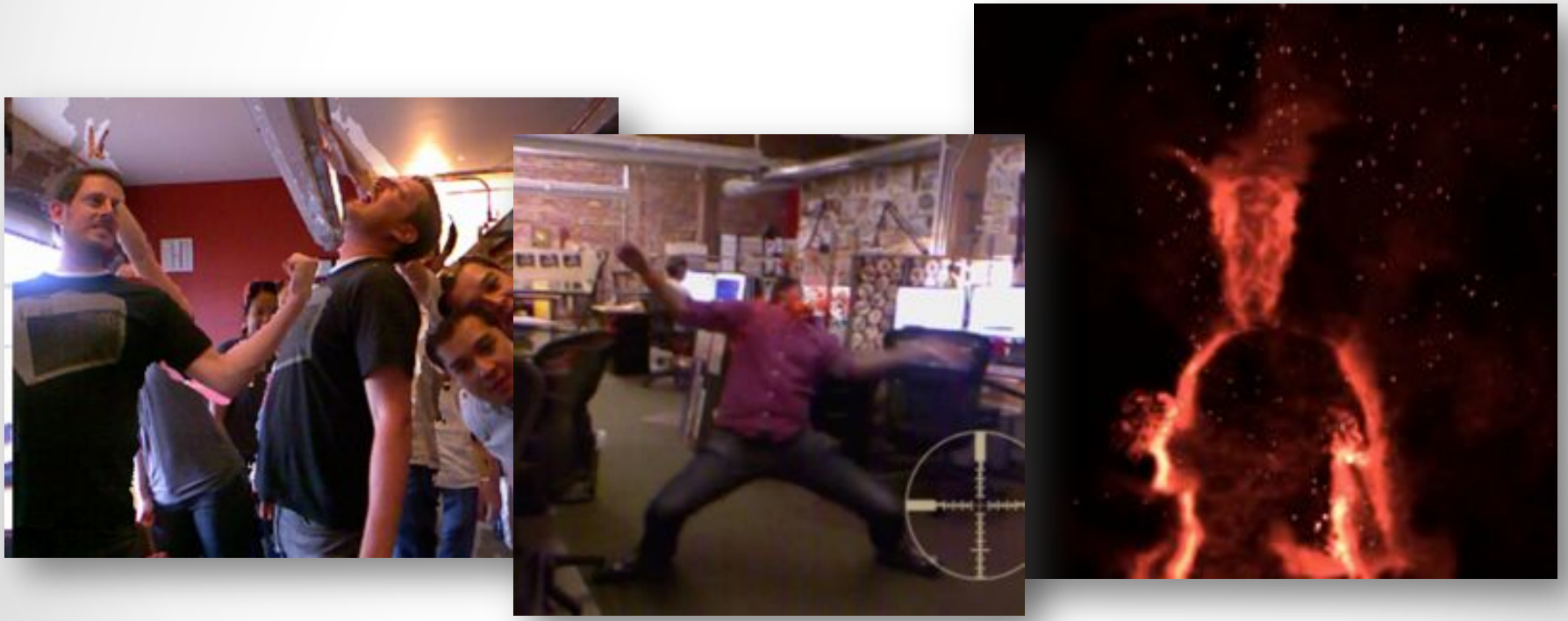
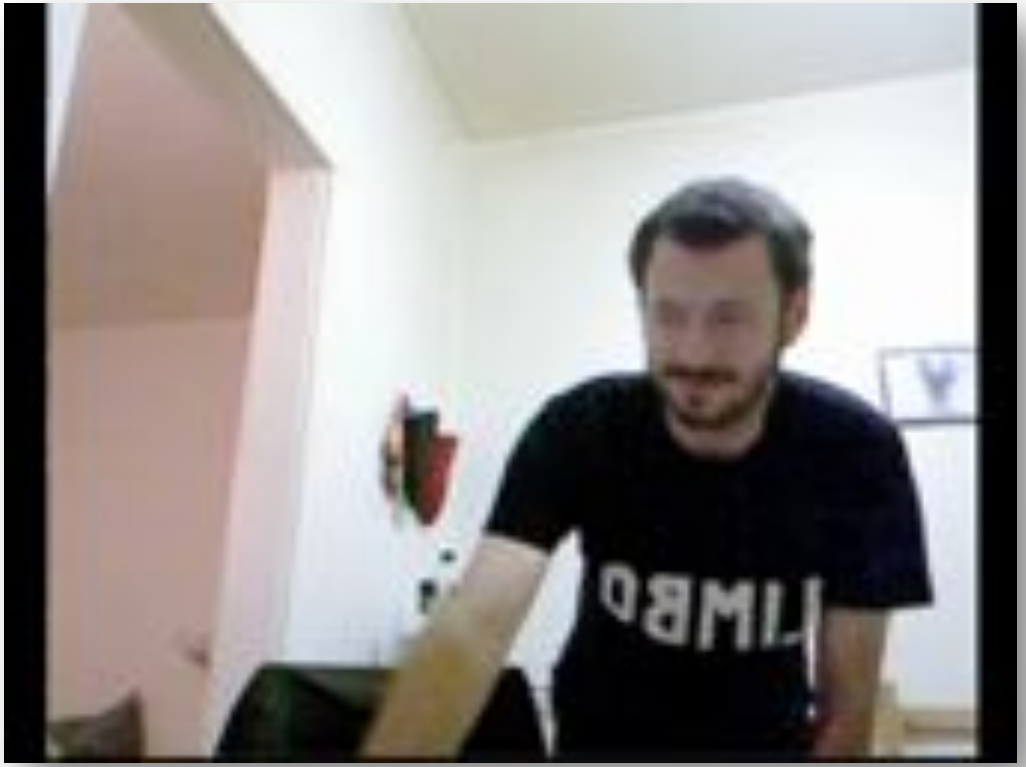
Examples from Kinect Party



Processing Prototype: Depth Freeze



Processing Prototype: Depth Freeze

- We had fun with this

Shipping Version: Future Booth

Rapid Prototyping Payoffs

- ☐ Build confidence in new ideas, and share them
- ☐ Learn engine strengths and limitations
- ☐ Learn input strengths and limitations
- ☐ Fail fast
- ☐ Sign projects
- ☐ Happy accidents

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Processing Prototype: Fire

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GLGraphics Library

- Revealed the potential for full screen shaders

GLGraphics Library

- Define some textures, render targets, and full screen shaders

```
// Textures
GLTexture gradientTex;
GLTexture videoTex;
GLTexture fluidTex;

// Render Targets
GLGraphicsOffScreen gi_buffer_scratch;
GLGraphicsOffScreen gi_buffer_accum;
GLGraphicsOffScreen gi_buffer_finalcolor;

// Full Screen Shaders
GLTextureFilter blurFilter;
GLTextureFilter remapFilter;
GLTextureFilter combineFilter;
GLTextureFilter compFilter;
GLTextureFilter copyFilter;
GLTextureFilter dimFilter;
```

GLGraphics Library

- Initialize Them

```
void initTextures()
{
    gradientTex = new GLTexture(this, "grad.png");
    gl_buffer_scratch = new GLGraphicsOffScreen(this, width, height);
    gl_buffer_accum = new GLGraphicsOffScreen(this, width, height);
    gl_buffer_finalcolor = new GLGraphicsOffScreen(this, width, height);
    videoTex = new GLTexture(this, width, height);
    fluidTex = new GLTexture(this, width, height);
    videoTex.loadPixels();
    fluidTex.loadPixels();
}
```

GLGraphics Library

- Initialize Them

```
void initFilters()
{
    blurFilter = new GLTextureFilter(this, "Blur.xml");
    blurFilter.setBlendMode(ADD);

    copyFilter = new GLTextureFilter(this, "CopyImage.xml");
    copyFilter.setBlendMode(REPLACE);

    dimFilter = new GLTextureFilter(this, "DimImage.xml");
    dimFilter.setBlendMode(REPLACE);

    remapFilter = new GLTextureFilter(this, "RemapImage.xml");
    remapFilter.setBlendMode(ADD);

    combineFilter = new GLTextureFilter(this, "CombineImage.xml");
    combineFilter.setBlendMode(ADD);

    compFilter = new GLTextureFilter(this, "CompImage.xml");
    compFilter.setBlendMode(SCREEN);
}
```

GLGraphics Library

- Apply Shaders to Textures (like a video feed)

```
// add fluid to the accumulation buffer
copyFilter.setBlendMode(ADD);
copyFilter.apply(fluidTex, gl_buffer_accum.getTexture());

// Blur the output of the fluid simulation
copyFilter.setBlendMode(REPLACE);
copyFilter.apply(gl_buffer_accum.getTexture(), gl_buffer_scratch.getTexture());
gl_buffer_accum.getTexture().clear(0, 0, 0, 255);
blurFilter.setParameterValue("width", 3.2);
blurFilter.apply(gl_buffer_scratch.getTexture(), gl_buffer_accum.getTexture());

// Apply gradient remap effect
GLTexture[] inputTex = { gl_buffer_accum.getTexture(),  gradientTex};
remapFilter.apply(inputTex, gl_buffer_finalcolor.getTexture());

// Draw the render target to the frame buffer
image(gl_buffer_finalcolor.getTexture(), 0,0,width,height);
```

make_new_activity.py -n Blizzard

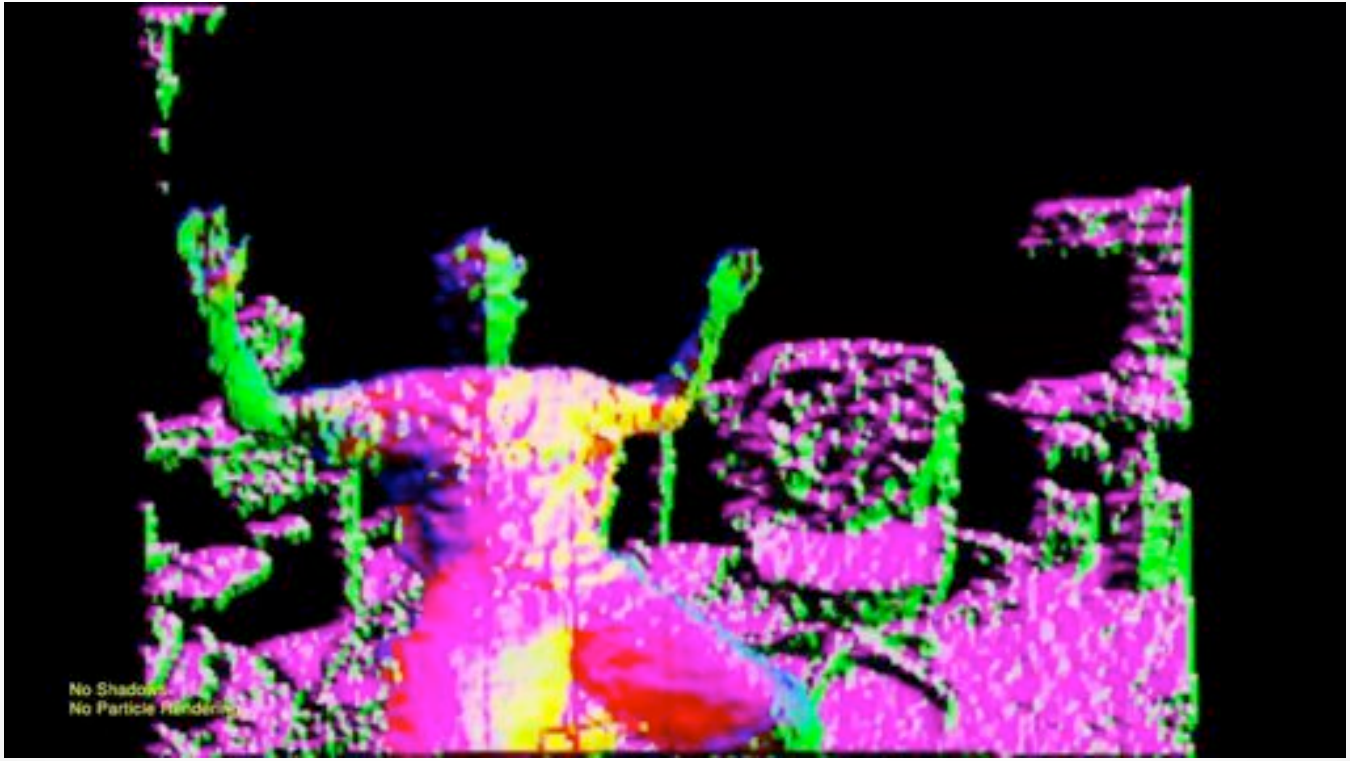
make_new_activity.py -n Blizzard

make_new_activity.py -n Blizzard

- Raw Depth

make_new_activity.py -n Blizzard

- Sobel filtered depth



make_new_activity.py -n Blizzard

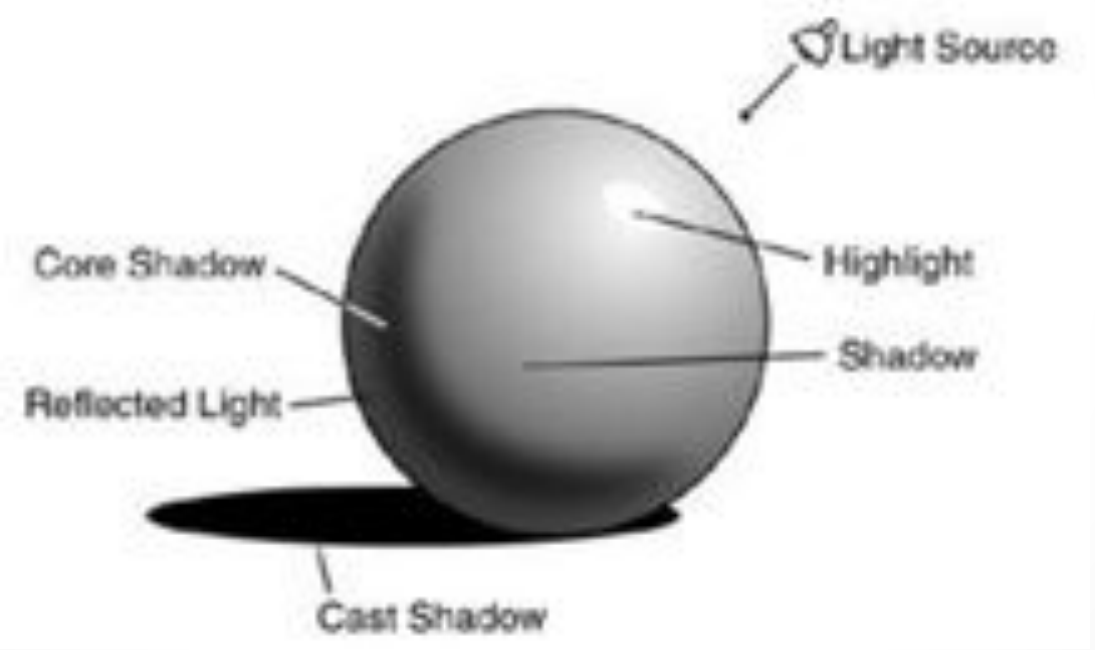
- Isolating upward facing normals

make_new_activity.py -n Blizzard

- Accumulation

Shipping Version: Blizzard

- It's cool – let's polish it up!



Shipping Version: Blizzard

- Approximate illumination from normals

Shipping Version: Blizzard

- Shift normals up to round out the snow

Shipping Version: Blizzard

- Shift entire snow texture upward

Shipping Version: Blizzard

- Apply post processing

Shipping Version: Blizzard

- Particle Effects

Shipping Version: Blizzard

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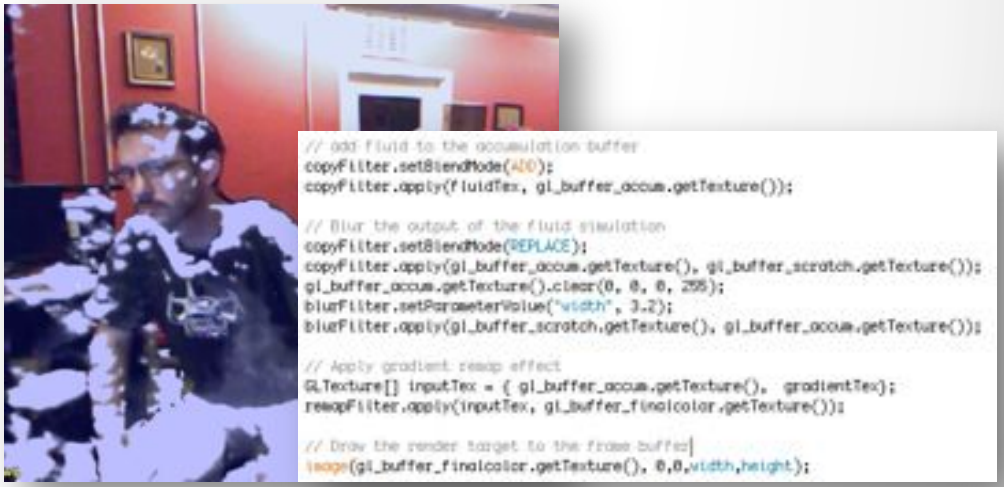

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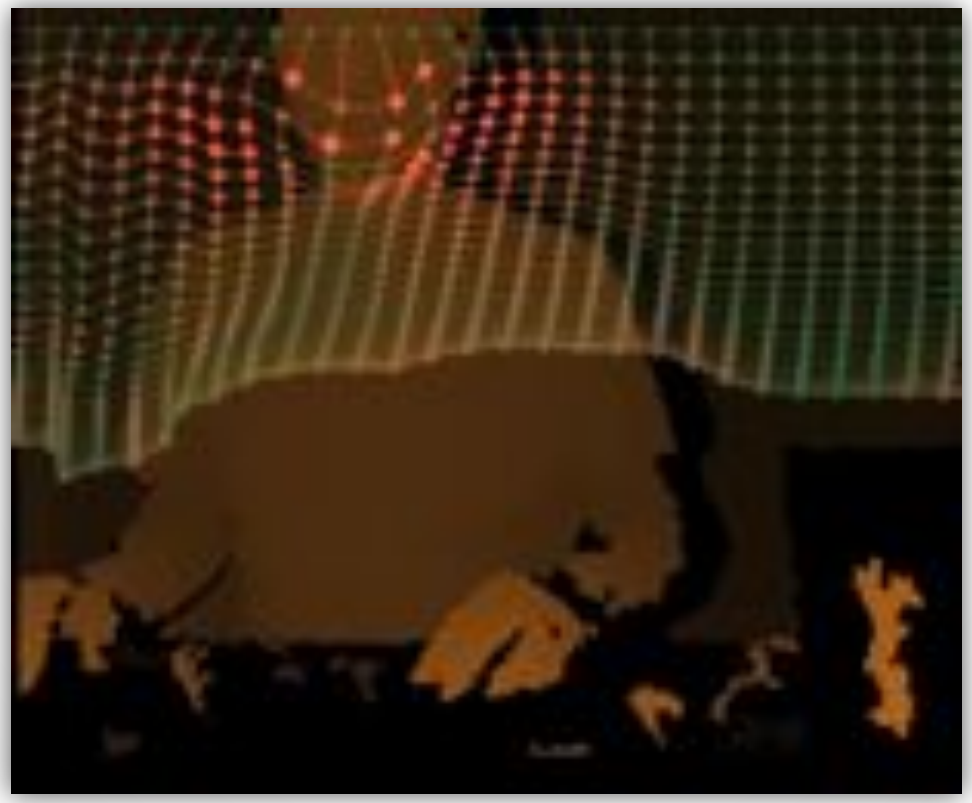
Processing Prototype: Cloth



Motion Blobs

Motion Blobs Example

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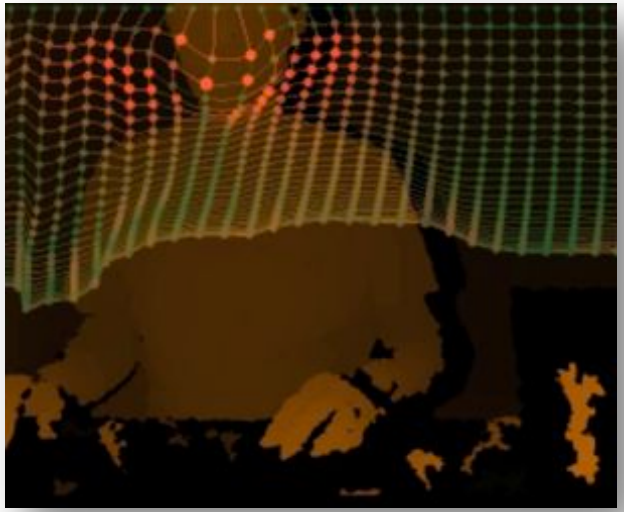

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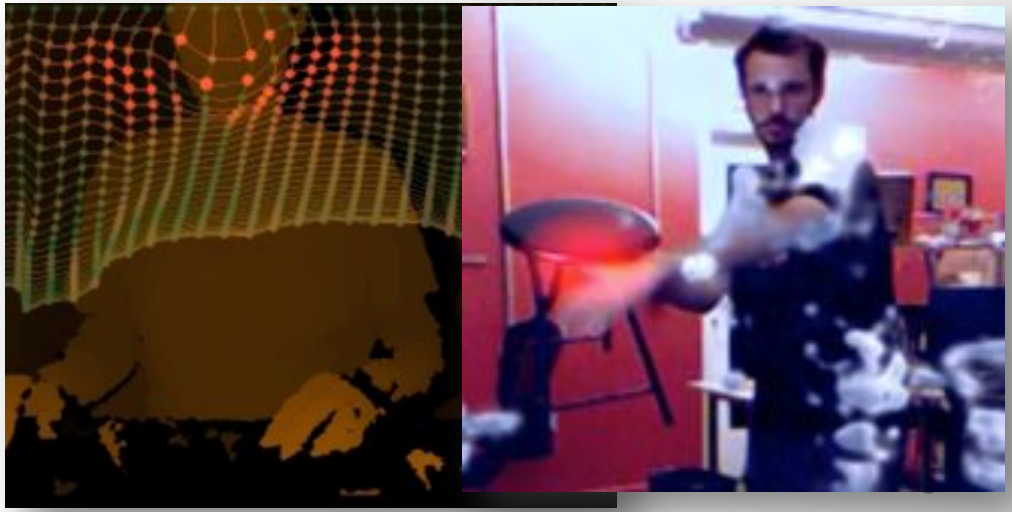
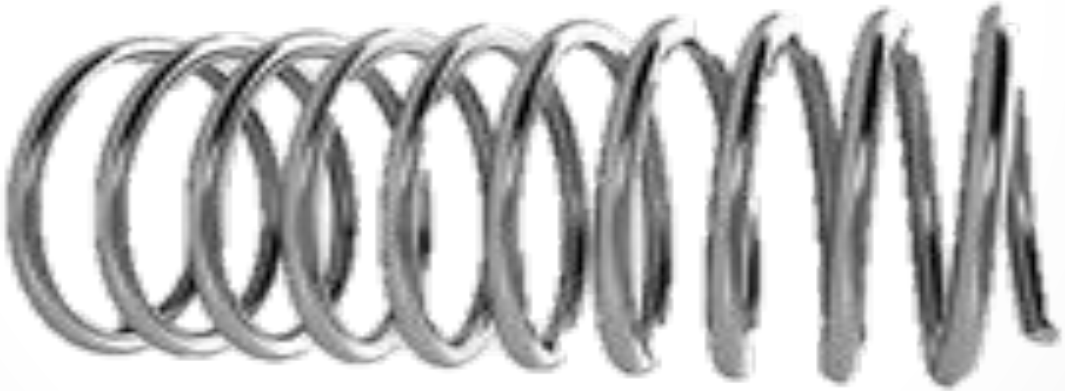


make_new_activity.py -n Funhouse

Physics + Lots of Full Screen Shaders

- Force on a spring: F = -K × x
  - **K** is "*Hookes Constant*"
  - X is spring length



Physics + Lots of Full Screen Shaders

- Force on a spring: F = -K * x
- In HLSL:

```
// retrieve this frames simulation texture
float4 CurrentFrame = ToWorldUnits(tex2D(g_samSourceA, Tex));
float2 dist = CurrentFrame.xy;
float2 velocity = CurrentFrame.zw;

// hookes law
velocity -= 1 * normalize(dist) * pow(length(dist),2);

// damping
dist = dist * .95;
velocity = velocity * .95;

// Step simulation
dist += velocity * dt;

// output
vCurrentFrame = ToTextureUnits(float4(dist.xy, velocity.xy));
return vCurrentFrame;
```

Displacement Texture

Weak Springs

Strong Springs

Shipping Version: Jello

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- ☐ Happy accidents

make_new_activity.py -n Forbidden

`make_new_activity.py -n Forbidden`

- Sketch put together entirely by our Character TD…

Shipping Version: Costume Party

Rapid Prototyping Payoffs

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- ☐ Learn engine strengths and limitations
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Kinect Party: Unused Prototypes

Unused for *various* reasons


HATERS GONNA HATE

make_new_activity.py -n EnergySwords

make_new_activity.py -n Splosion

make_new_activity.py -n Colbert

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Prototyping for Next Gen

Kinect Party 2.0?

- What would we do with the fancy hardware?
- Let's experiment in Unity!

Dub Step

Unity Prototype: Audio Driven Dub Step

```
using UnityEngine;
using System.Collections;

public class DubStep : MonoBehaviour {

    public Texture2D[] textureStack;
    public int writeID = 0;
    public int readID = 0;
    public int frameDelay = 0;
    public Texture2D movieRenderTexture;

    int textureCount = 30;
    WebCamTexture webcamTexture;

    Color32[] data;
    bool texturesInitialized = false;
    int width = 640;
    int height = 480;
```

```
    IEnumerator Start ()
    {
        yield return Application.RequestUserAuthorization(UserAuthorization.WebCam | UserAuthorization.Microphone);

        if (Application.HasUserAuthorization(UserAuthorization.WebCam | UserAuthorization.Microphone))
        {
            webcamTexture = new WebCamTexture(width,height,30);
            data = new Color32[width * height];
            webcamTexture.Play();
        }
        textureStack = new Texture2D[textureCount];
        for (int i = 0; i < textureCount; i++)
        {
            textureStack[i] = new Texture2D(width, height);
        }
    }

    // Update is called once per frame
    void Update () {

        if (!webcamTexture)
        {
            Debug.Log ("Waiting for webcam...");
            return;
        }

        UpdateFrameDelay();

        webcamTexture.GetPixels32 (data);

        textureStack[writeID].SetPixels32(data);
        textureStack[writeID].Apply();
        readID =  (writeID + (textureCount - frameDelay)) % textureCount;
        renderer.material.mainTexture = textureStack[readID];

        writeID++;
        writeID = writeID % textureCount;

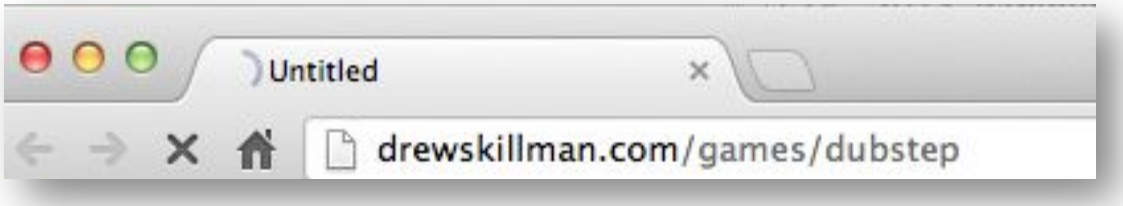
    }

    // The frame delay is currently being driven by the visualization studio
    void UpdateFrameDelay()
    {
        frameDelay = (int)(transform.localScale.y * textureCount);
    }
}
```

Unity Prototype: Audio Driven Dub Step

Unity Prototype: Audio Driven Dub Step

- Web Browser can be a great way to share ideas



Unity Prototype: Audio Driven Dub Step

- Prototyping tools make it easy to manipulate data flow

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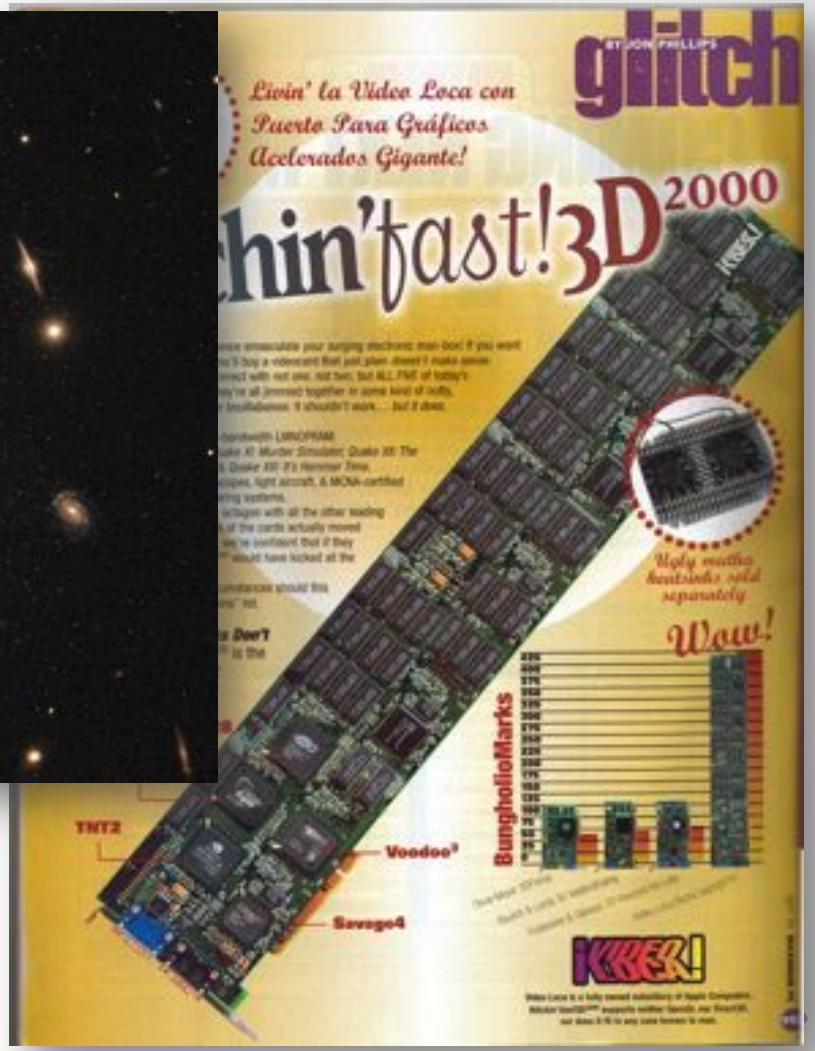


- *(Of course we have to make a compute shader based particle system!)*
-

Define Buffers and the Shader

```
private ComputeBuffer bufferPoints;
private ComputeBuffer bufferPos;
private ComputeBuffer bufferPreviousPoints;
private ComputeBuffer bufferColors;
private ComputeBuffer bufferAccelerations;
public ComputeShader cs;
```

Initialize Buffers

```
void Start () {
    last_delta_time = Time.deltaTime * timestep;

    var verts = new Vector3[vertexCount];
    for (var i = 0; i < vertexCount; ++i)
    {
        verts[i] = Random.insideUnitSphere*10.0f;
    }

    ReleaseBuffers ();

    bufferPoints = new ComputeBuffer (vertexCount, 12);
    bufferPreviousPoints = new ComputeBuffer (vertexCount, 12);
    bufferPoints.SetData (verts);
    bufferPreviousPoints.SetData (verts);
    material.SetBuffer ("buf_Points", bufferPoints);
    bufferColors = new ComputeBuffer (vertexCount, 12);
    material.SetBuffer ("buf_Colors", bufferColors);
    bufferAccelerations = new ComputeBuffer (vertexCount, 12);

    origPos = new Vector3[instanceCount];
    for (var i = 0; i < instanceCount; ++i)
        origPos[i] = Random.insideUnitSphere * 1.0f;
    pos = new Vector3[instanceCount];

    bufferPos = new ComputeBuffer (instanceCount, 12);

    for (var i = 0; i < instanceCount; ++i)
    {
        pos[i] = origPos[i] + Random.insideUnitSphere*.2f;
    }
    bufferPos.SetData (pos);

    material.SetBuffer ("buf_Positions", bufferPos);
}
```

Run the Compute Shader

```
void OnRenderImage (RenderTexture src, RenderTexture dst)
{
    cs.SetBuffer(0, "buf_Points", bufferPoints);
    cs.SetBuffer(0, "buf_PreviousPoints", bufferPreviousPoints);
    cs.SetBuffer(0, "buf_Colors", bufferColors);
    cs.SetBuffer(0, "buf_Accelerations", bufferAccelerations);
    cs.SetFloat ("_time", Time.timeSinceLevelLoad);

    cs.SetFloat ("_deltatime", Time.deltaTime * timestep);
    cs.SetFloat ("_lastdeltatime", last_delta_time);
    last_delta_time = Time.deltaTime * timestep;

    cs.SetFloat ("_drag", drag);
    cs.SetFloat ("_temperature", temperature);
    cs.SetFloat ("_mag", mag);
    cs.SetFloat ("_worldscale", worldscale);
    cs.SetVector("_origin", origin.position);
    cs.Dispatch (0, 128, 128, 1);

    Graphics.Blit (src, dst);
}
```

Blit the results to the screen

```
void OnPostRender () {
    material.SetPass (0);
    material.SetFloat("_time", Time.timeSinceLevelLoad);
    material.SetFloat("_vertexCount", vertexCount);
    material.SetBuffer ("buf_Points", bufferPoints);
    material.SetBuffer ("buf_Colors", bufferColors);
    Graphics.DrawProcedural (MeshTopology.Points, vertexCount, instanceCount);
}
```

The Compute Shader

```
// each #kernel tells which function to compile; you can have many kernels if you wish
#pragma kernel CSMain

RWStructuredBuffer<float3> buf_Points;
RWStructuredBuffer<float3> buf_PreviousPoints;
RWStructuredBuffer<float3> buf_Accelerations;
RWStructuredBuffer<float3> buf_Colors;

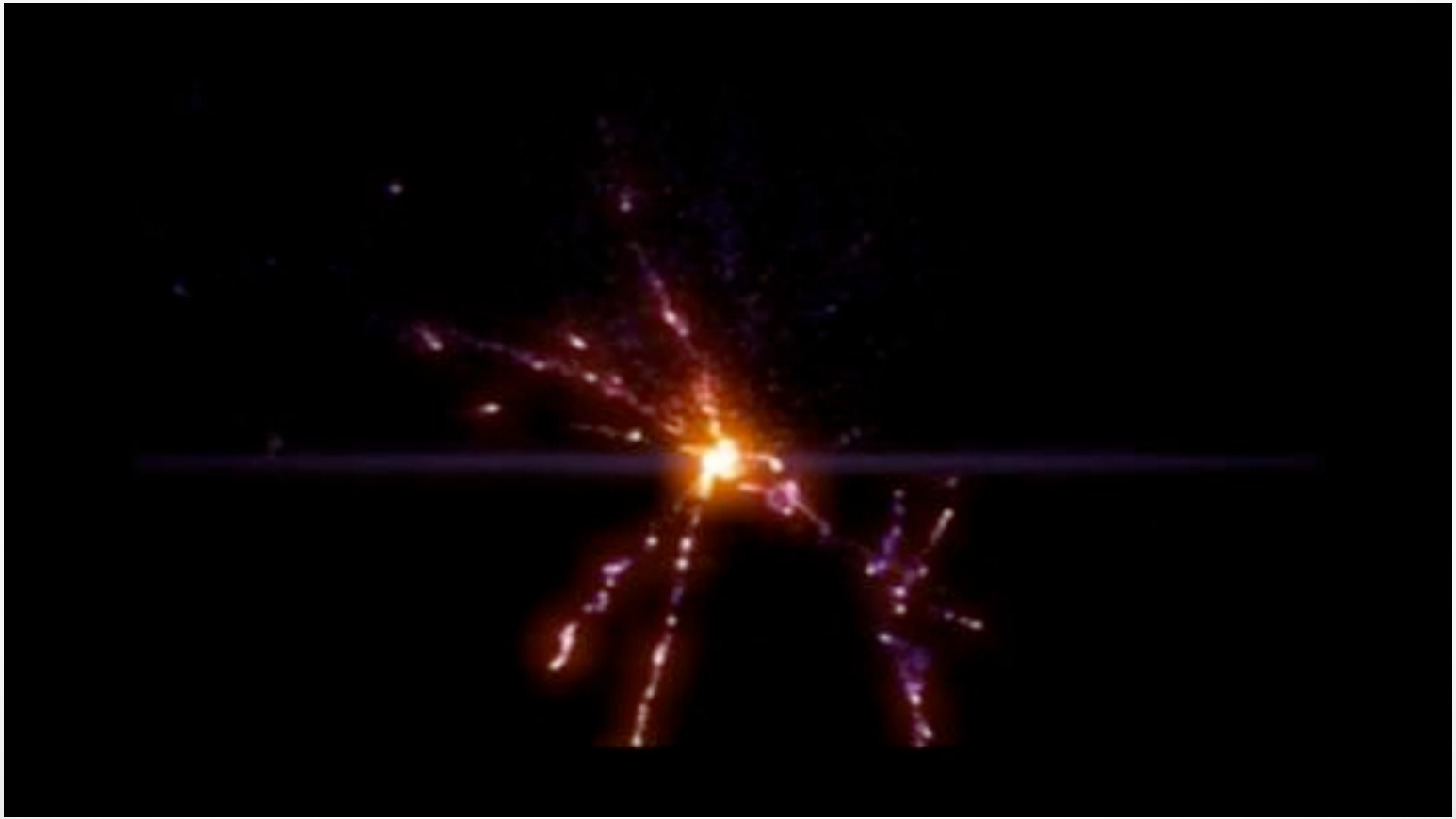
float _time;
float _deltatime;
float _lastdeltatime;
float3 _origin;
float _vertexCount;
float _drag;
float _temperature;
float _mag;
float _worldscale;

[numthreads(32,32,1)]
void CSMain( uint3 Gid : SV_GroupID, uint3 DTid : SV_DispatchThreadID, uint3 GTid : SV_GroupThreadID, uint GI : SV_GroupInde
{
    uint uniqueID = DTid.x + DTid.y*(128*32) + DTid.z * (0);
    float3 pos = buf_Points[uniqueID];
    float3 previous_pos = buf_PreviousPoints[uniqueID];
    buf_PreviousPoints[uniqueID] = pos;

    float3 orig_accel = buf_Accelerations[uniqueID];
    float3 accel = 0;

    if (true)
    {
    if (uniqueID <20000)
    {
        for (uint i = 0; i < 20000; i++)
        {
            if (i == uniqueID) continue;
            float3 pos2 = buf_Points[i];
```

Unity Prototype: Galaxy



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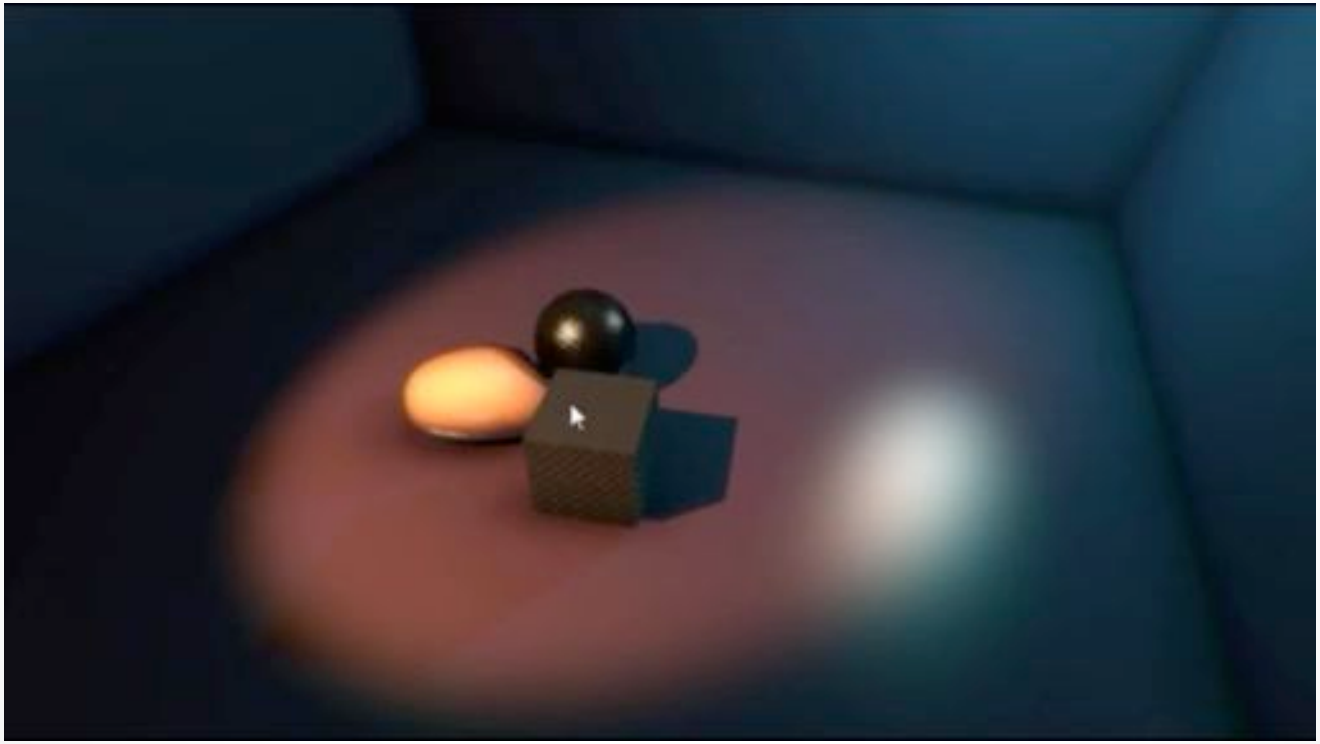
[numthreads(32,32,1)]
void CSMain( uint3 Gid : SV_GroupID, uint3 DTid : SV_DispatchT
{
    uint uniqueID = DTid.x + DTid.y*(128*32) + DTid.z * (0);
    float3 pos = buf_Points[uniqueID];
    float3 previous_pos = buf_PreviousPoints[uniqueID];
    buf_PreviousPoints[uniqueID] = pos;

    float3 orig_accel = buf_Accelerations[uniqueID];
    float3 accel = 0;

    if (true)
    {
    if (uniqueID <20000)
    {
        for (uint i = 0; i < 20000; i++)
        {
            if (i == uniqueID) continue;
            float3 pos2 = buf_Points[i];
```

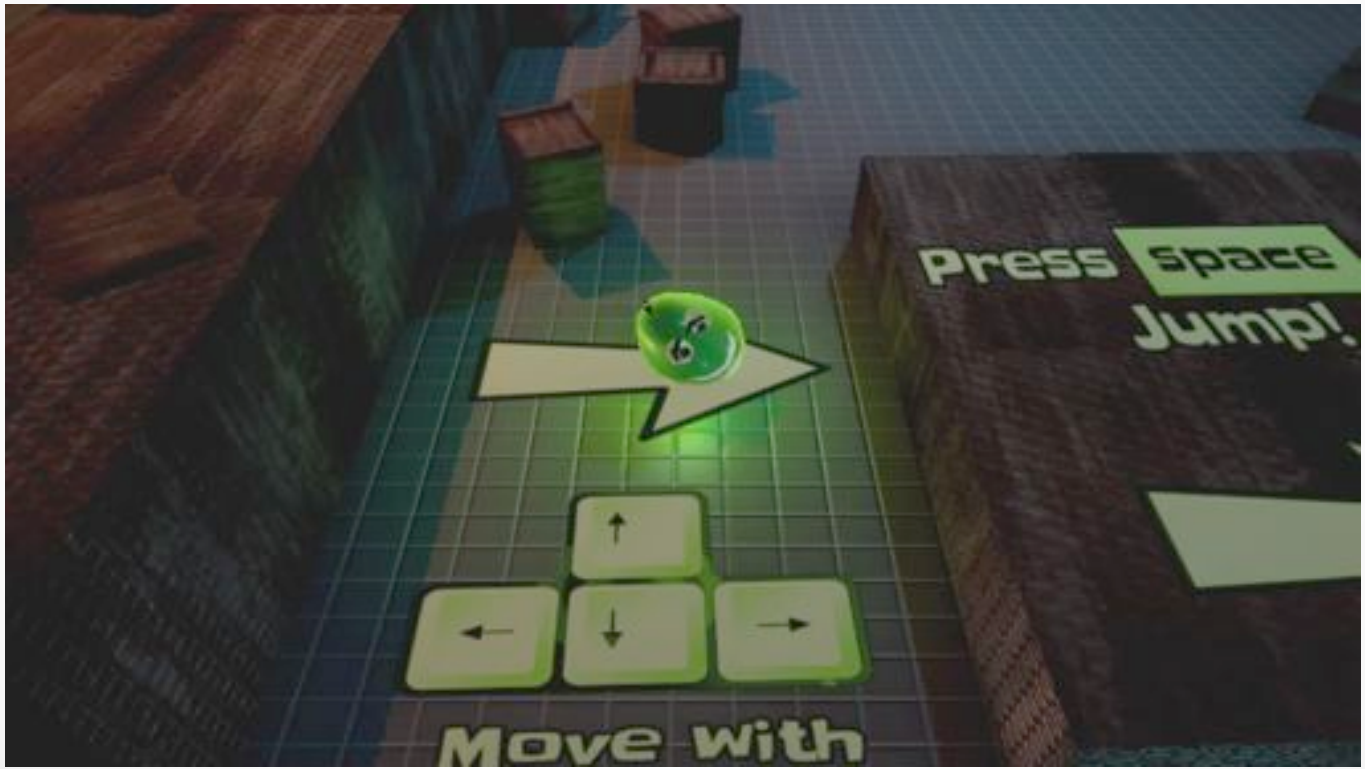
Next Gen Physics

- What about physics performance on PS4 / XBOX3?



Soft Body Physics

- Soft body physics is cool!



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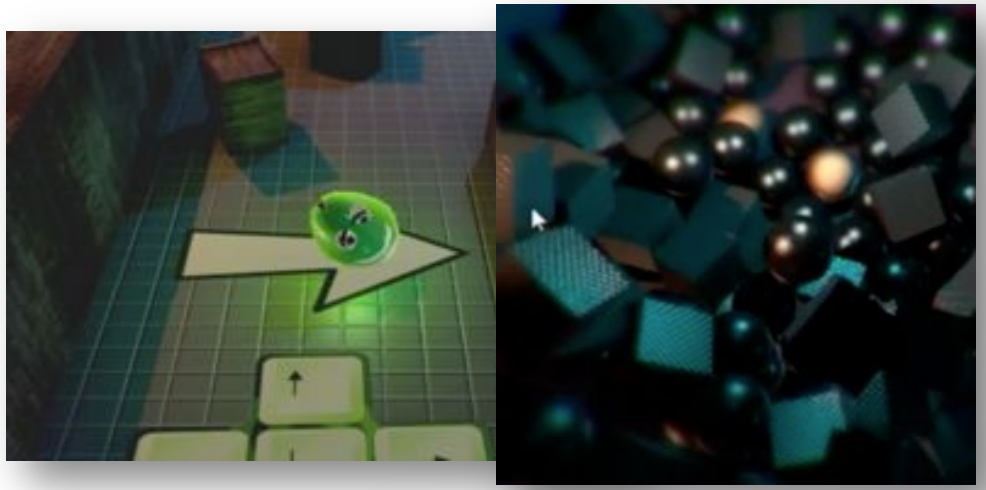

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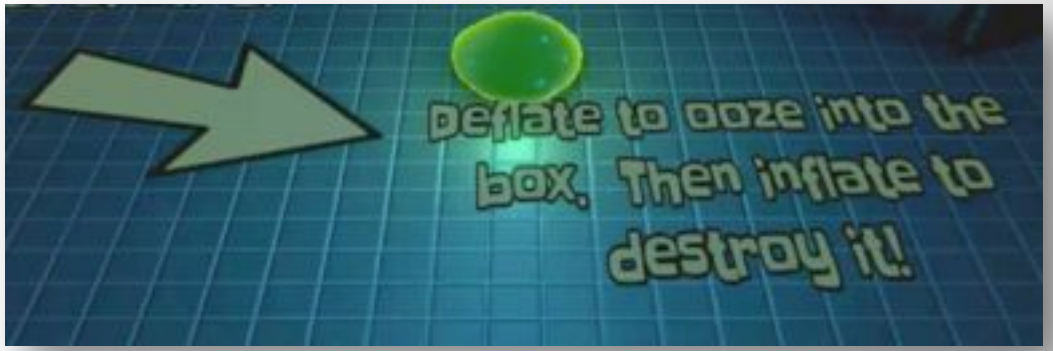
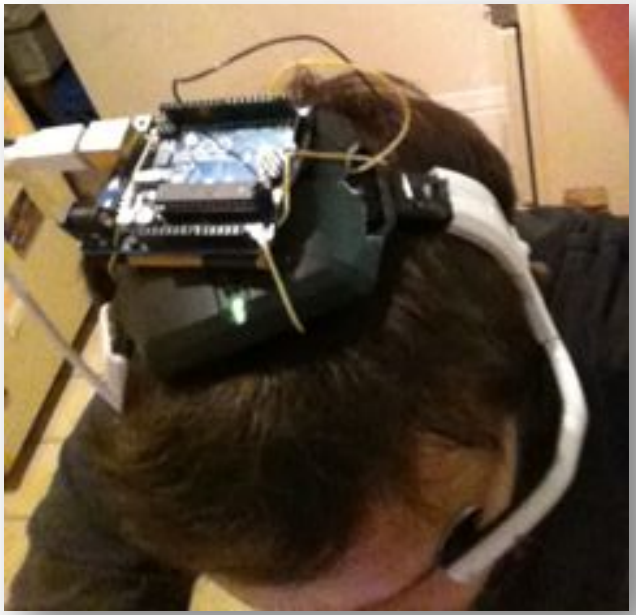


Prototyping for New Input Devices



New Input Devices

- Explosion of Inputs!
  - Motion Control (wii, kinect)
  - Inertial sensors (6 axis, iPhone accelerometer)
  - Touch, multi-touch
- A lot more is coming!
  - Leap Motion
  - Eye Tracking
  - Face Tracking
  - PS4 Controller
  - High precision body tracking
  - Oculus Rift
  - **BRAIN TRACKING**

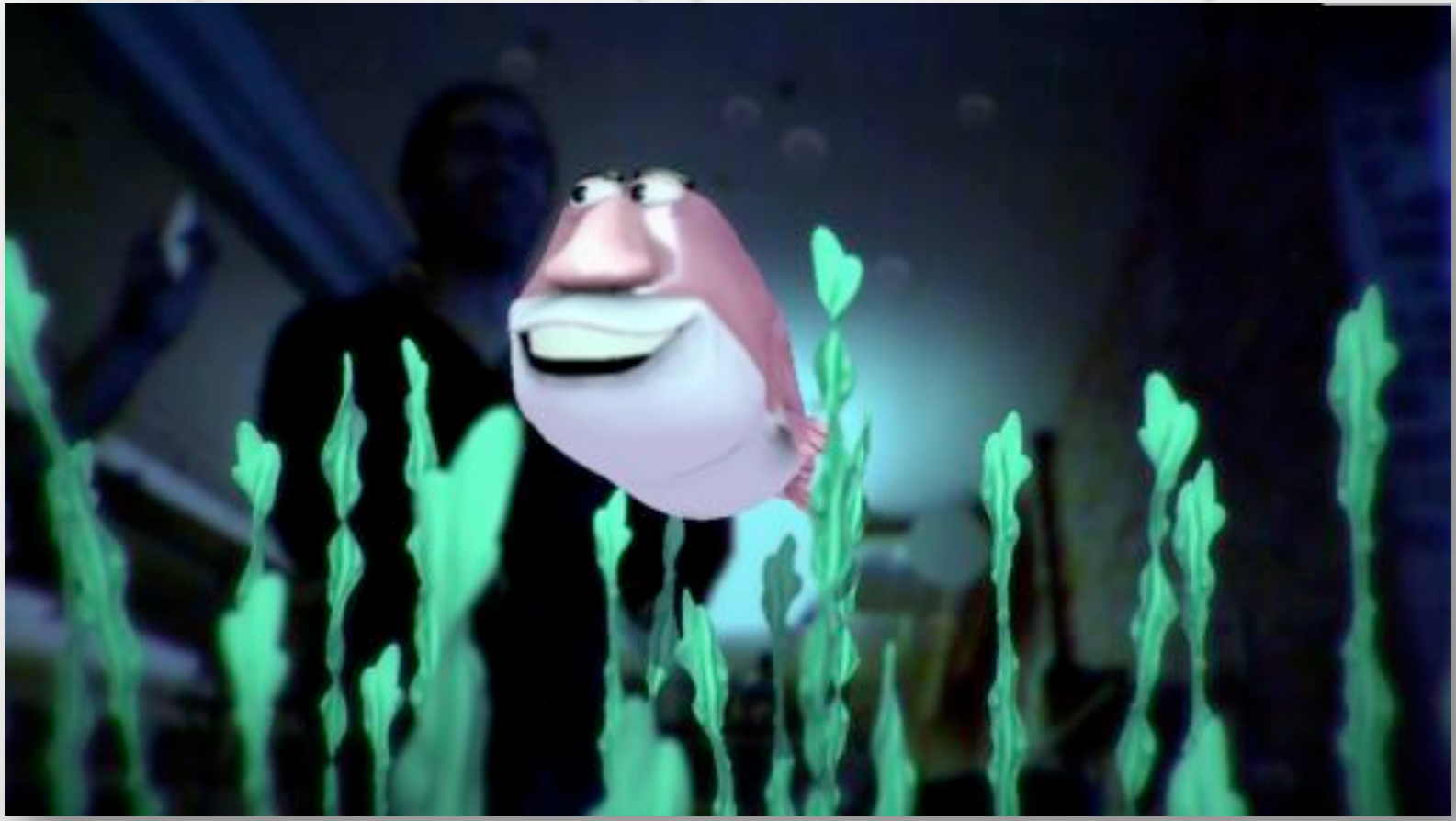
Rapid Prototyping PS4

Rapid Prototyping PS4

- Faking it!

Unity Prototype: Funny Fish

Unity Prototype: Funny Fish



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Kinect in Unity is Really Awesome

Rapid Prototyping Leap

- Works great with Unity and Processing

Leap Prototype

Leap Prototype: Lil Bunny

Leap Prototype: Dropchord

MOAI Version

Rapid Prototyping Payoffs

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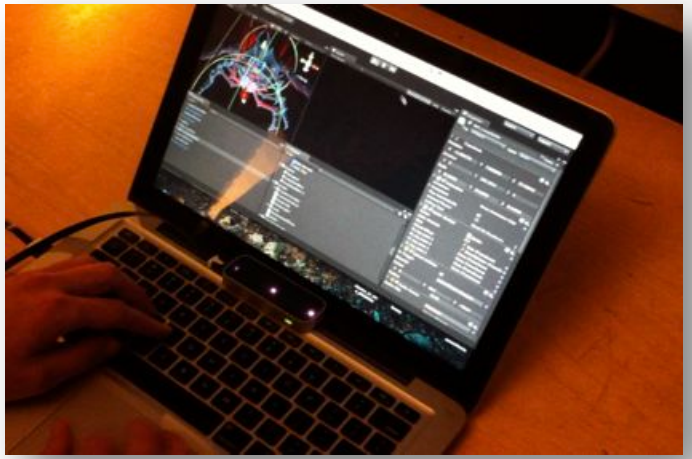

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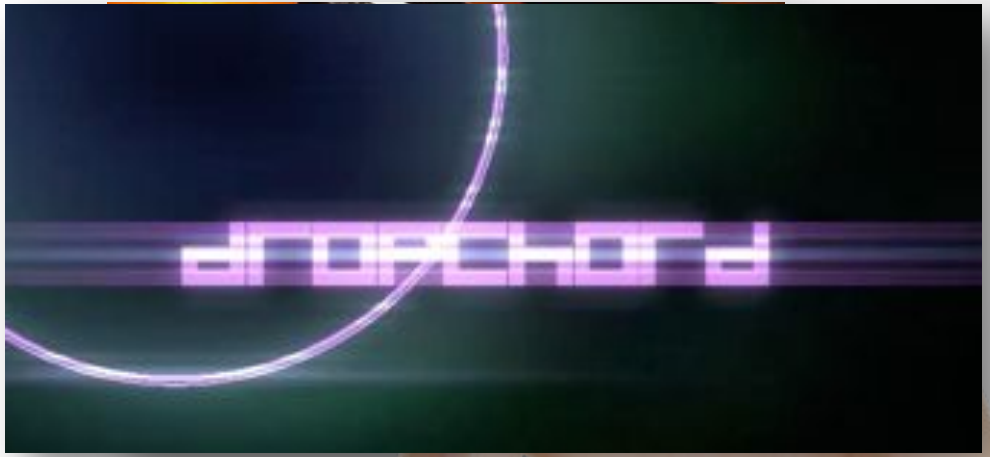

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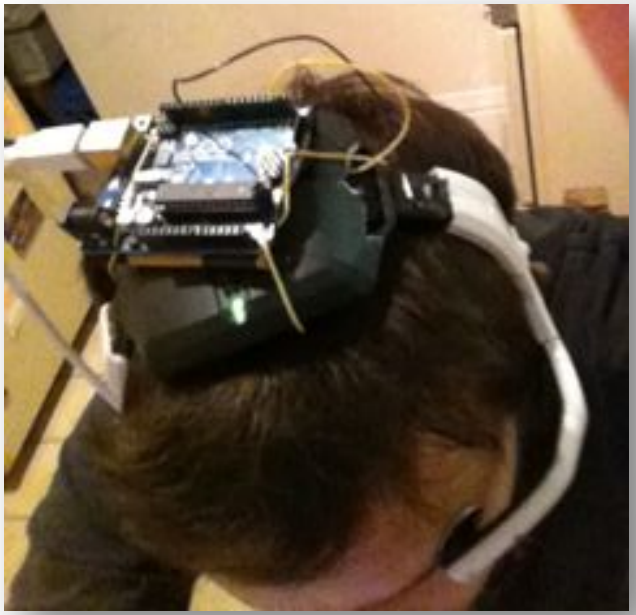


Hackers Hack it First

- Experiment and Evaluate new tech *crazy* early!

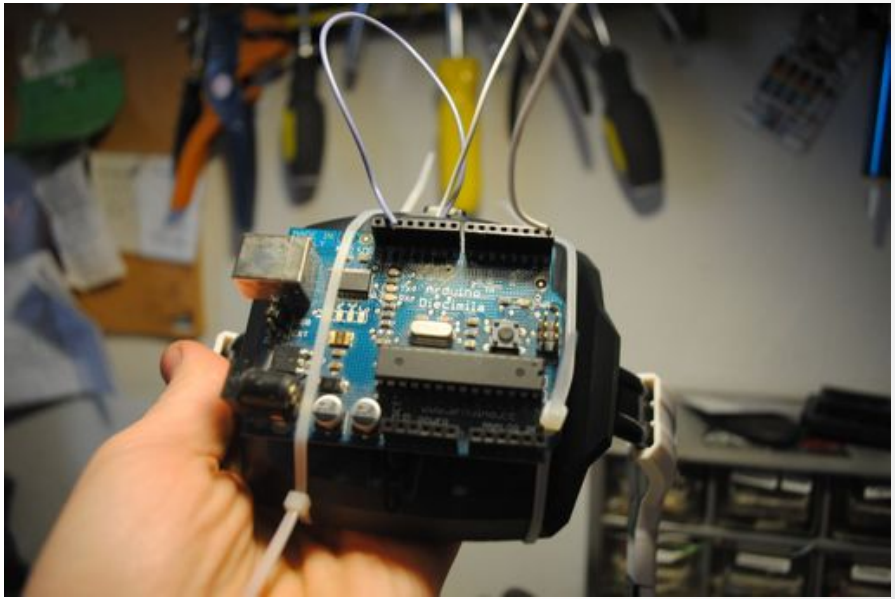
ARDUINO

Arduino IDE

- Looks identical to Processing
- Integrates tightly with Processing
- Can communicate with Unity as well

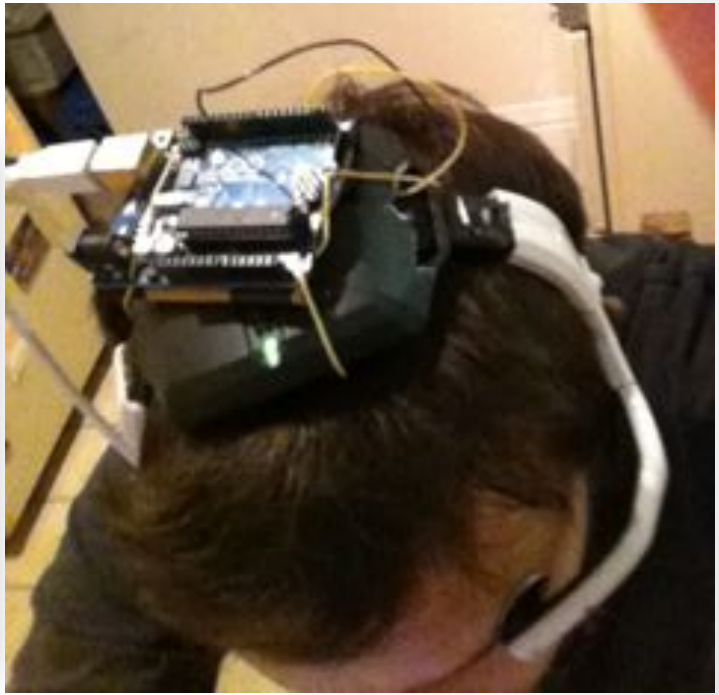
BRAIN TRACKING!

- Can you make fun, interactive stuff with it??



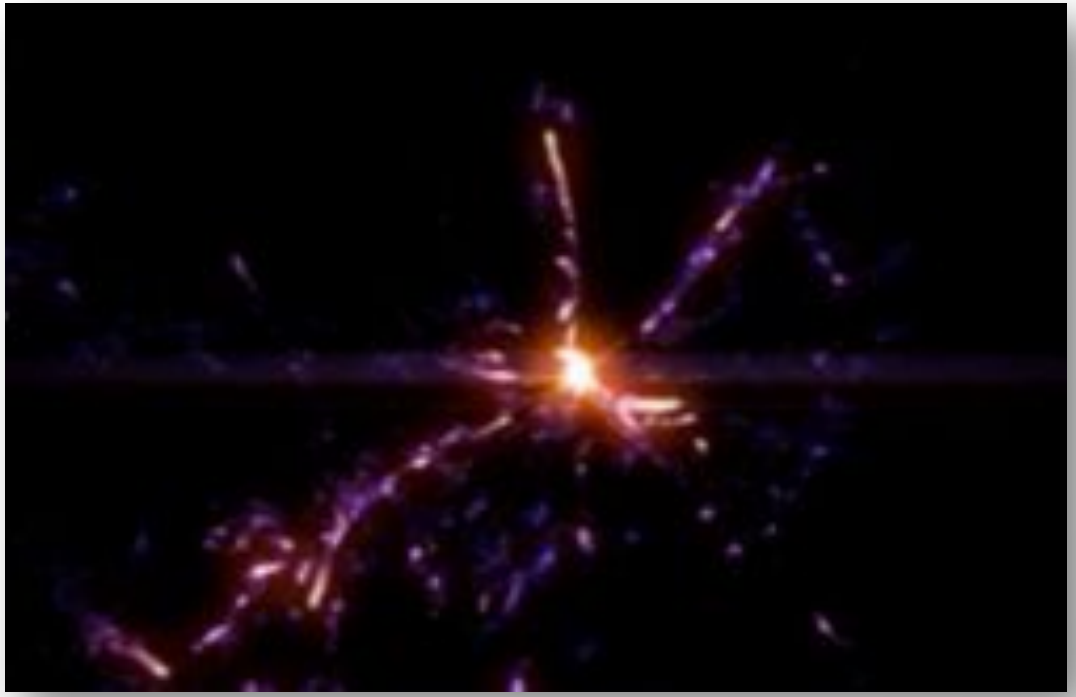
Arduino Tutorials are Great

- Force Trainer + Arduino Uno



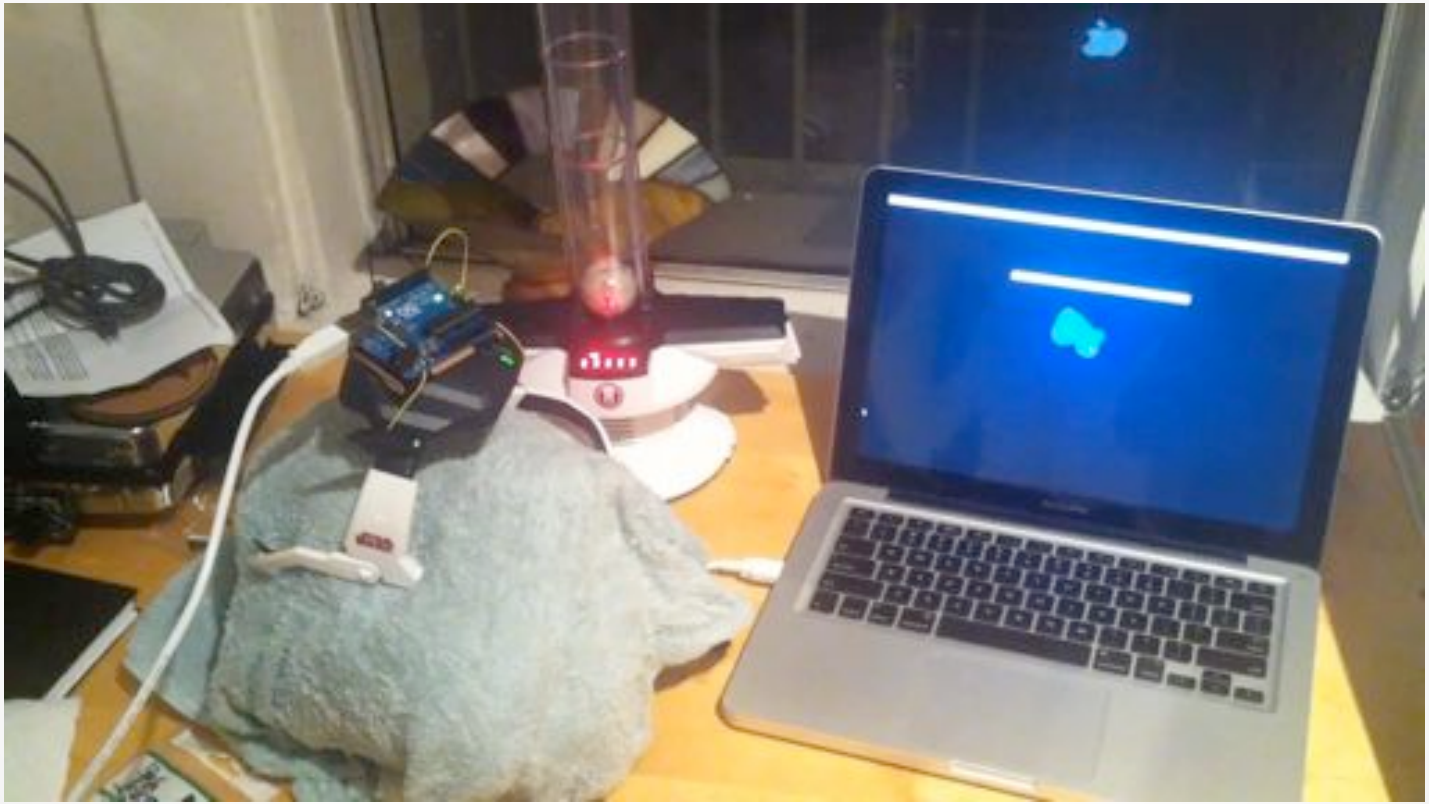
Hrmmm…. What Next

- Obviously we *MUST* to wire this up to a particle system…



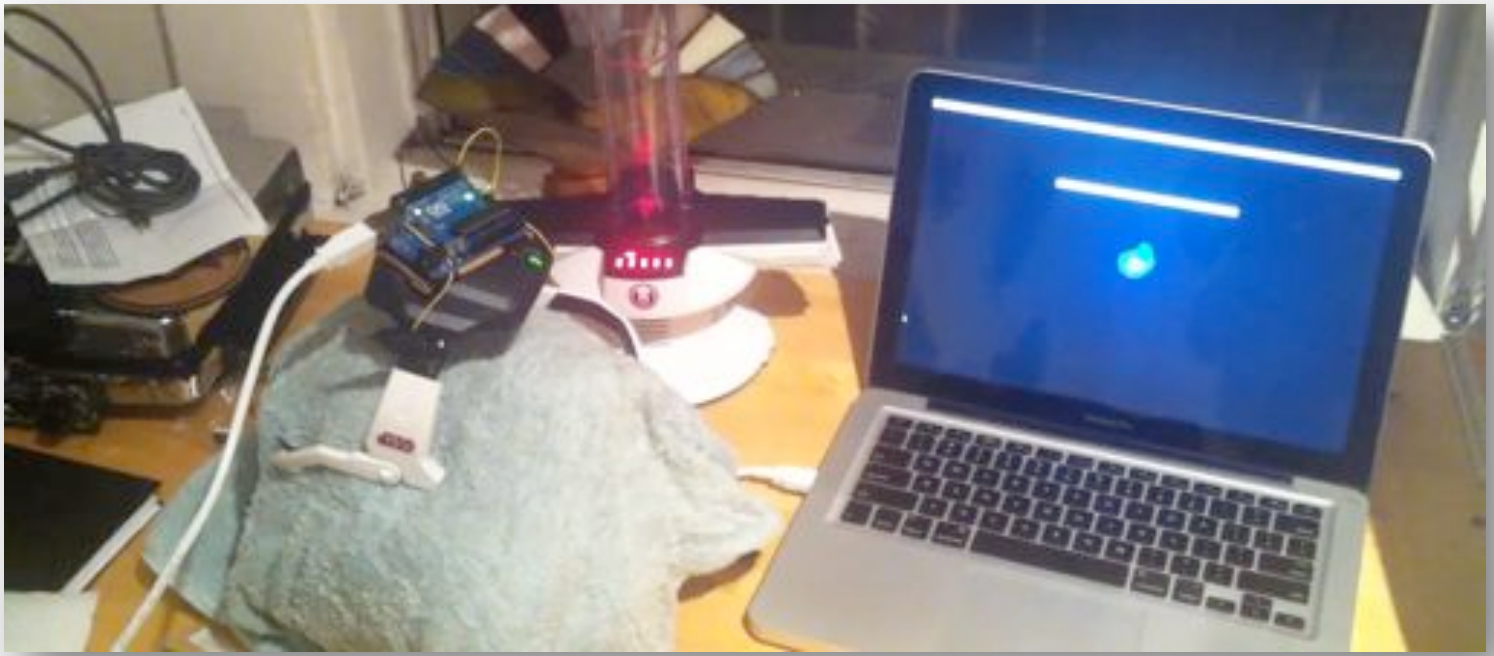
Arduino Prototype: Brain Particles

Wet Towel Midichlorians



Wet Towel Midichlorians

- $50 mind control isn't there quite yet…



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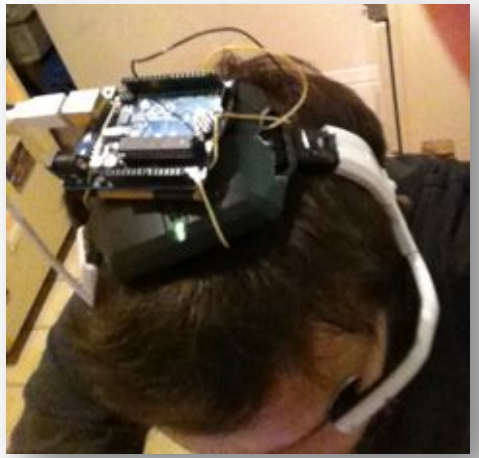

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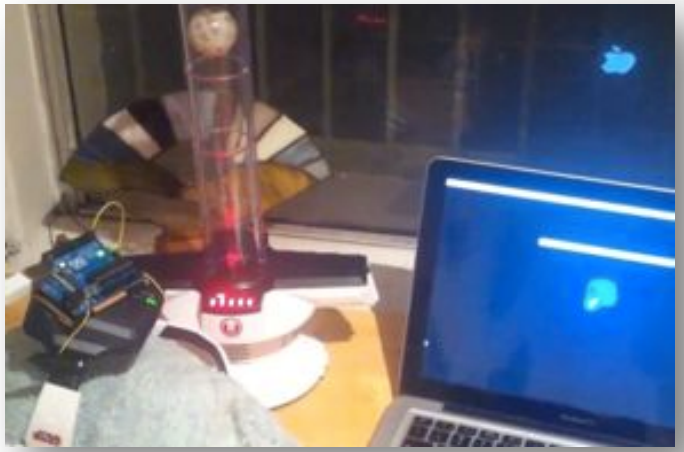
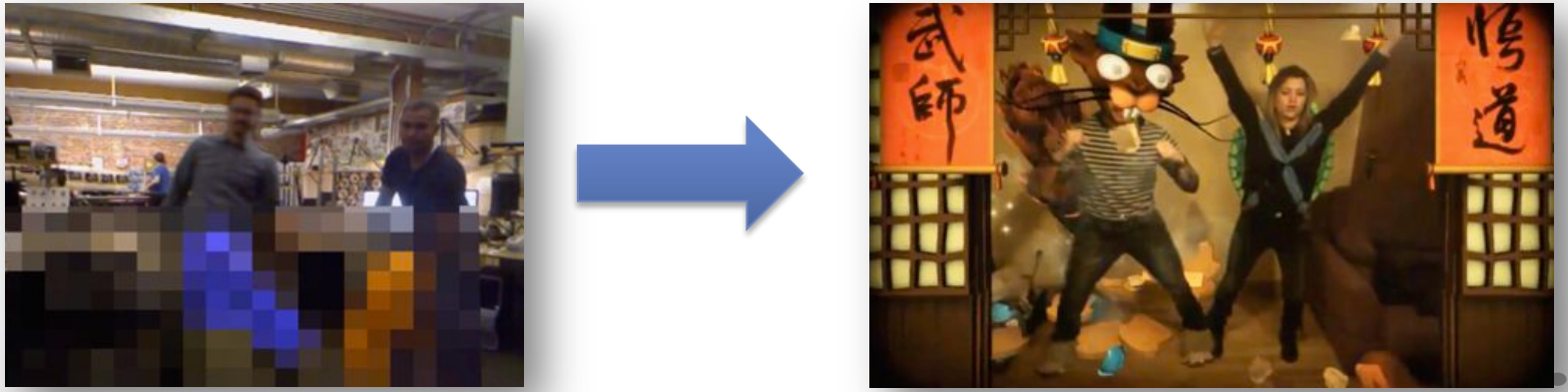


Rapid Prototyping

- **Minimize Compile Times**
- **Use Building Blocks**
- **Sketchbook Approach**
  - *Cool things will still happen!*



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☑ **IT'S SUPER FUN**

Getting Time at Work

- Get fast on your own time
- Use that speed to
  - Communicate ideas
  - Look dev
  - Profile hardware
  - Etc…
- Results pave the way for prototyping during work hours

We have the tools for **Interactive Sketchbooks**

We ***finally*** have the tools for **Interactive Sketchbooks**

Links!

Processing Versions

- Processing 1.5
  - I used this for all the prototypes in this presentation
- Processing 2.0 (beta)
  - Will be great soon (fully OpenGL)
  - GL Graphics library doesn't exist so I'm not switching yet
- The following libraries were all used with 1.5

Processing + Kinect Setup

- Processing
  - www.processing.org
- Simple OpenNI
  - code.google.com/p/simple-openni
- Drivers and Libraries
  - OpenNI, NITE, PrimeSensor, SensorKinect
  - All downloadable from:
  - code.google.com/p/simple-openni/wiki/Installation

Other Processing + Kinect Libraries

- OpenKinect (Mac OS X Only)
  - http://www.shiffman.net/p5/kinect
- dLibs_freenect
  - http://thomasdiewald.at/processing/libraries/dLibs_freenect

Processing Libraries

- Some of my favorite libraries:
  - Fluid Simulation: `msafluid`
    - http://www.memo.tv/msafluid_for_processing_v1_3
  - Blob Detection: `OpenCV`
    - http://ubaa.net/shared/processing/opencv/
  - Open GL: `GLGraphics` `*Not compatible with processing 2.0`
    - http://glgraphics.sourceforge.net/
  - Spring Physics: `traer.physics`
    - http://murderandcreate.com/physics
  - Box2D Physics: `fisica`
    - http://www.ricardmarxer.com/fisica

Arduino Libraries

- Brain Control
  - http://frontiernerds.com/brain-hack

Unity + Kinect Setup

- Unity
  - www.unity3d.com
- Zig Fu
  - Zigfu.com
  - Install
    - Zig Fu drivers
    - Zig Fu Unity example package

Some Cool Unity Packages

- Some of my favorite packages
  - Easy Touch
    - https://www.assetstore.unity3d.com/#/content/3322
  - Decal System
    - https://www.assetstore.unity3d.com/#/content/3779
  - Visualizer Studio
    - https://www.assetstore.unity3d.com/#/content/1761

Prototyping on Mobile Devices

- Processing deploys to Android
  - Almost instantaneous. Performance limited. No support for iOS
- Unity deploys to iOS and Android
  - Very performant and robust. ~2 minute compile time on my 2010 macbook.
  - Unity Remote helps mitigate some of that


Thanks!

Session PDF

- www.drewskillman.com/gdc2013_rapid_prototyping.pdf

Visual Effects Artist Roundtable

Room 120, North Hall

11am – 12pm	Wednesday
5:30pm – 6:30pm	Thursday
2:30pm – 3:30pm	Friday

Augmented Imagination: Exploiting Kinect for Happy Action Theater

Patrick Hackett | Weds 2pm-3pm | 303 South Hall