Stavros Vassos   Sapienza University of Rome, DIAG, Italy   vassos@dis.uniroma1.it   Spring 2016
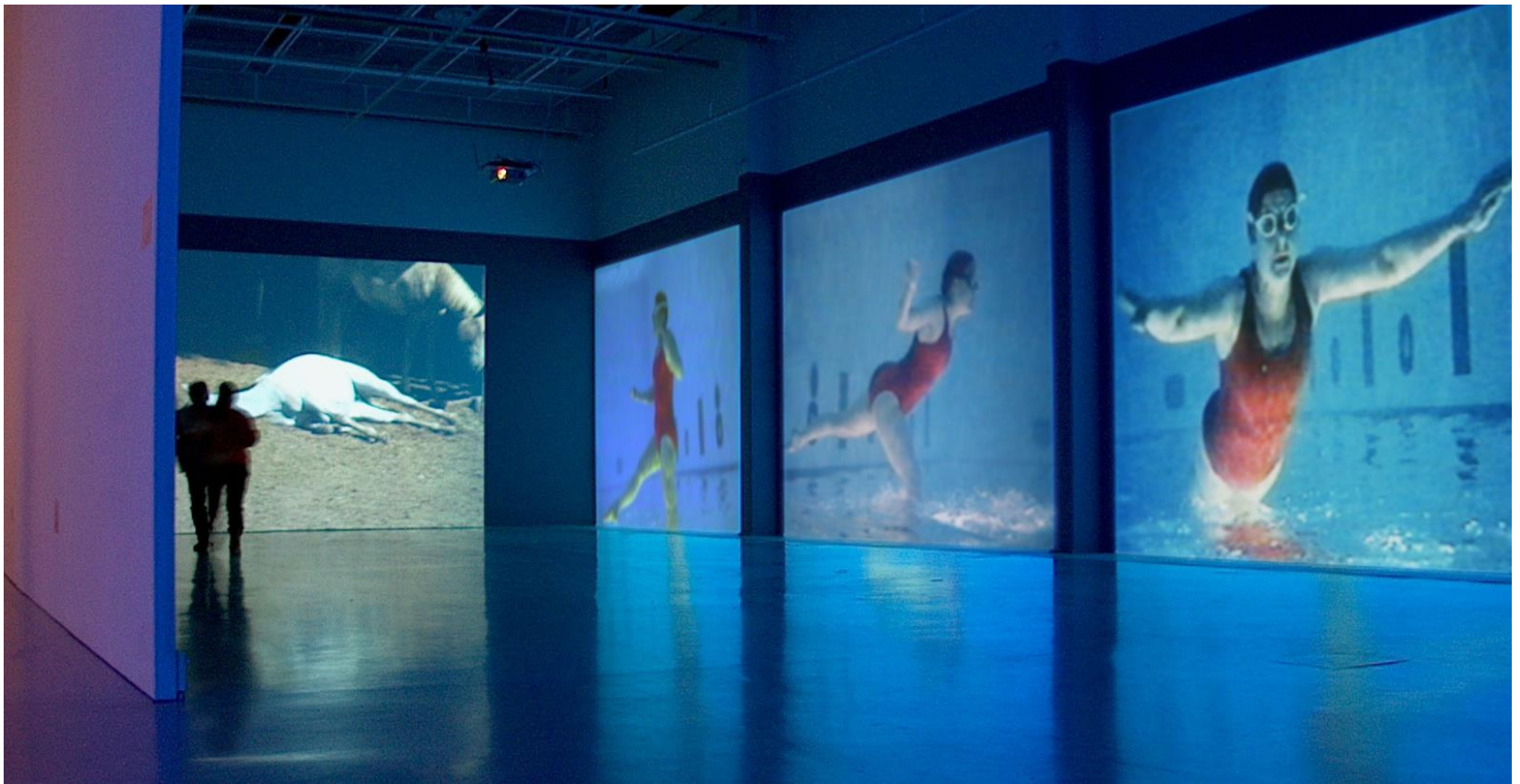
INTERACTIVE MULTIMEDIA DESIGN

With an AI touch :)

Interactive Multimedia Design

- Let's start with a multimedia experience like a projected video clip: **photos** and **videos**

Interactive Multimedia Design

☐ Let's start with a multimedia experience like a projected video clip: **images** and **animation**

Interactive Multimedia Design

- Let's start with a multimedia experience like a projected video clip: **text**

Interactive Multimedia Design

- ☐ How they can become **"alive"**?

Interactive Multimedia Design

- Interactive wall art projection
  - https://www.youtube.com/watch?v=OGoZktCzMS4

Interactive Multimedia Design

- Interactive scene with physics
  - https://www.youtube.com/watch?v=KLOB-T1mgdY

Interactive Multimedia Design

□ Interactive characters in video

■ https://www.youtube.com/watch?v=z7QZ84RvzJE

Interactive Multimedia Design

□ Interactive table interface

　□ https://vimeo.com/118354861

Interactive Multimedia Design

- Augmented/Mixed reality experience
  - https://vimeo.com/77109691
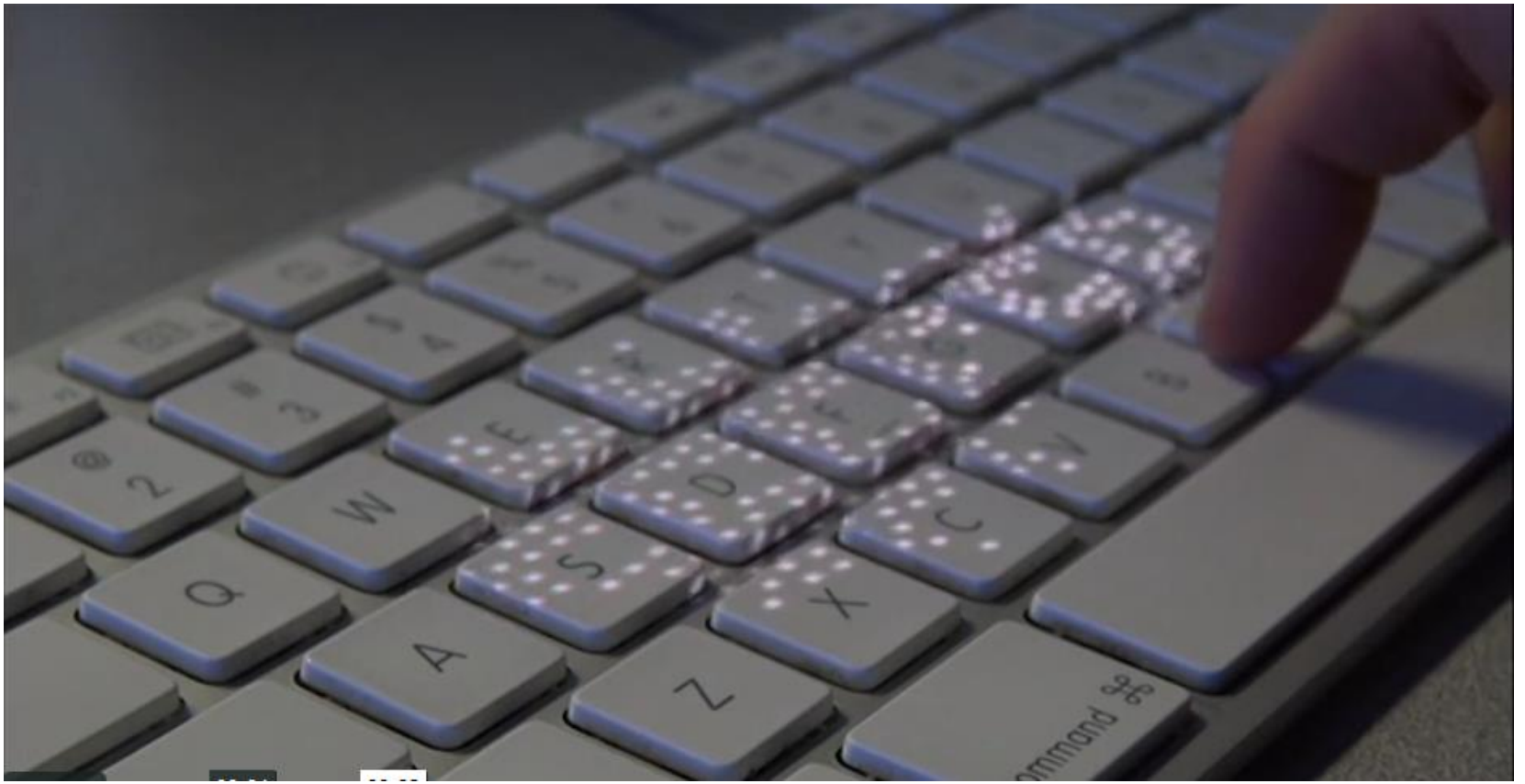
Interactive Multimedia Design

- "Just landed infographic" video (uses twitter input)
  - https://vimeo.com/4583713

Interactive Multimedia Design

- How they can become **"alive"**?
- How do we think about **designing** them?

Interactive Multimedia Design

- Let's start with some multimedia products and see how they can become **"alive"**:   **video clip**

Interactive Multimedia Design

- There are **fixed elements** that are used in the scenes
  - Photo / Image
  - Video / Animation
  - Text
  - Audio
  - Effects and timing

Interactive Multimedia Design

- Let's start with some multimedia products and see how they can become **"alive":   video clip**

Interactive Multimedia Design

- There are **fixed elements** that are used in the scenes
  - Photo / Image
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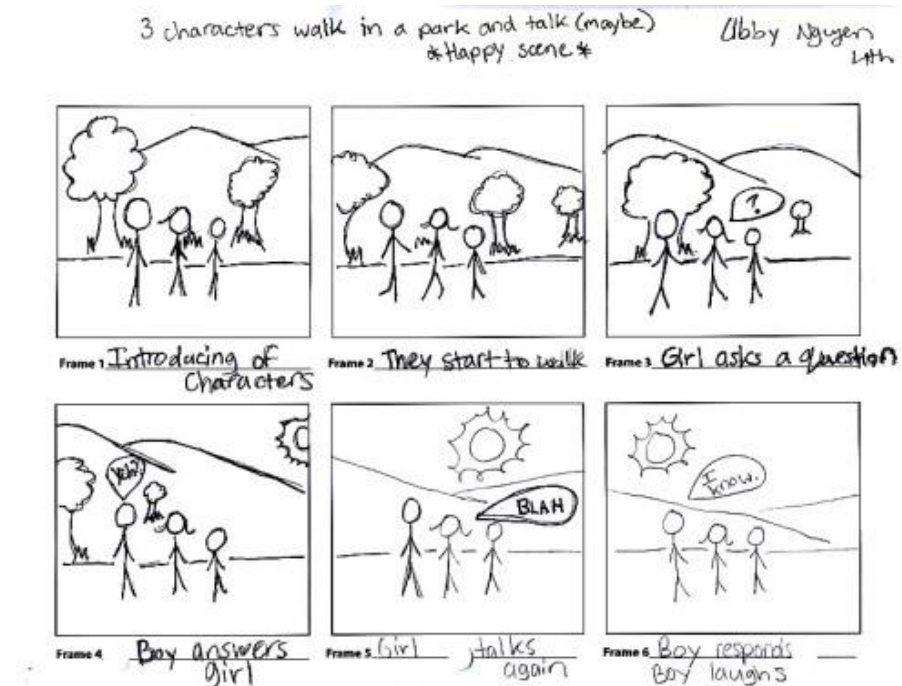
Interactive Multimedia Design

- ☐ Think of a video clip as a set of **objects** over which we can **apply animations** and **effects**

- ☐ Now imagine we can write a **"recipe"** that specifies
  - ◘ The number of objects
  - ◘ The animation of each object over time
  - ◘ The effect to be applied to the area around each object
  - ◘ The animation when two objects collide

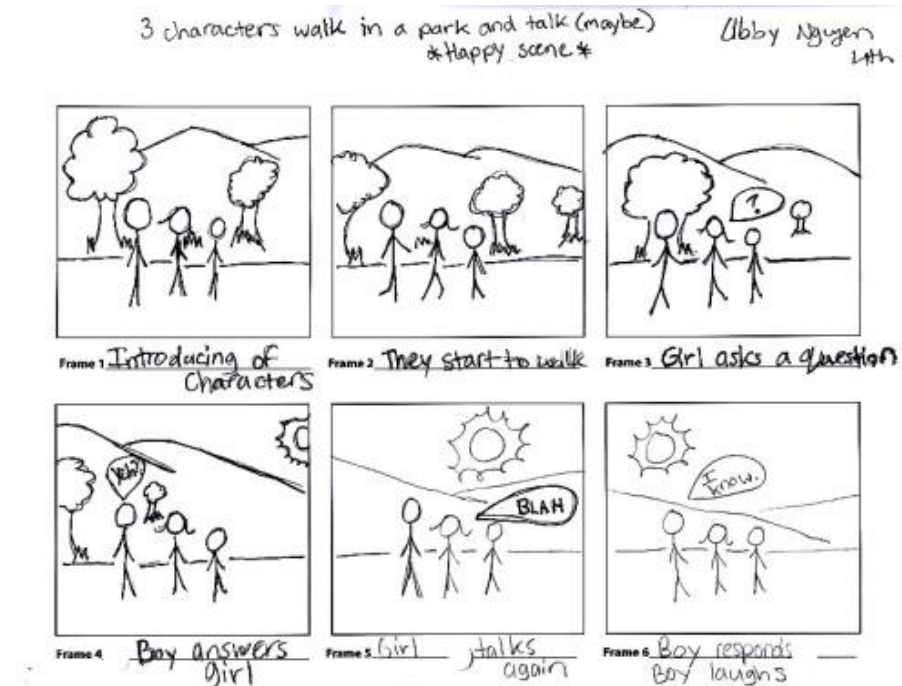# Interactive Multimedia Design

- There are **fixed elements** that are used in the scenes
  - Photo / Image
  - Video / Animation
  - Text
  - Audio
  - Effects and timing
- and a **fixed storyboard**

Interactive Multimedia Design

- There are **fixed elements** that are used in the scenes
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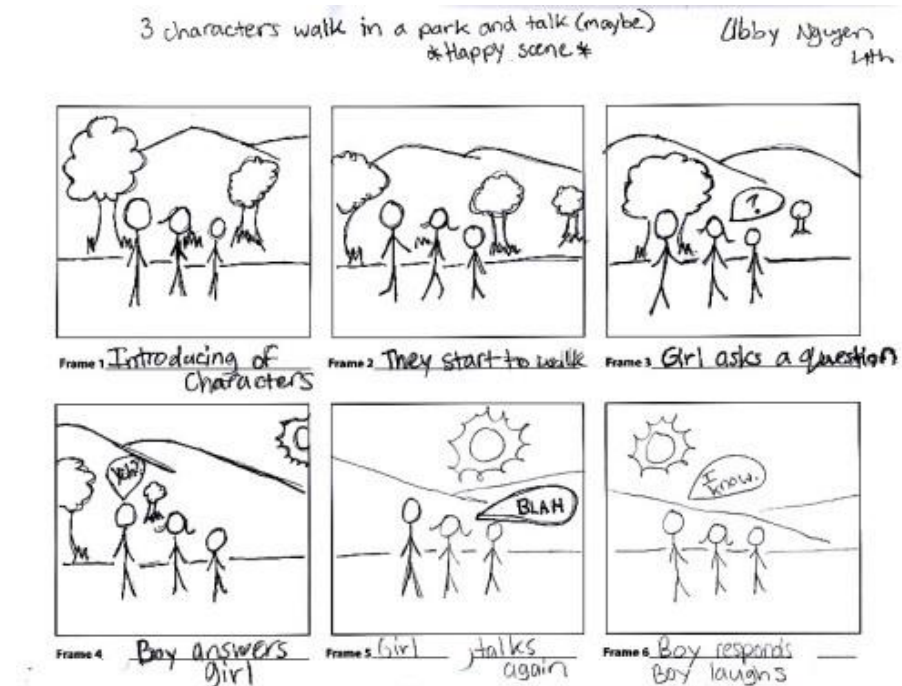# Interactive Multimedia Design

- There are **fixed elements** that are used in the scenes
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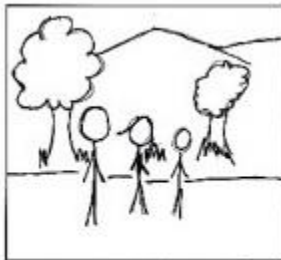 - Audio
  - Effects and timing
- and a **fixed storyboard**

3 characters walk in a park and talk (maybe)
Happy scene

Abby Nguyen
4th

Frame 1 Introducing of Characters
Frame 2 They start to walk
Frame 3 Girl asks a question
Frame 4 Boy answers girl
Frame 5 Girl talks again
Frame 6 Boy responds Boy laughs
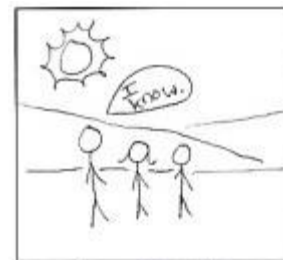
Interactive Multimedia Design

□ Think of a video clip as a set of objects over which we can apply animations and effects

□ Now imagine that **objects** behave **autonomously** in an **interactive environment**
  ▪ This corresponds to one scene of the storyboard

□ Now imagine that **each scene** works this way!

□ Now imagine that the **storyboard sequence** is also **not fixed** – interactive storytelling!
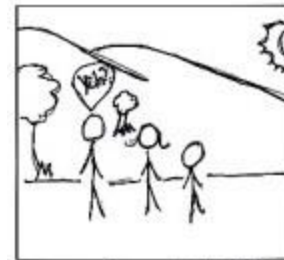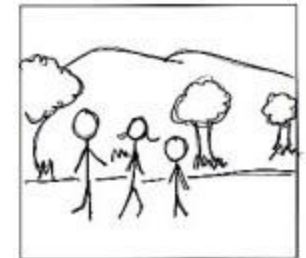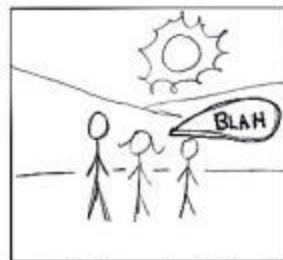
Interactive Multimedia Design

Interactive Multimedia Design

- ☐ This is similar to regular video clips, but now there is a much wider space to experiment with **interaction**

Interactive Multimedia Design

□ This is similar to regular video clips, but now there is a much wider space to experiment with **interaction**

Input   **Environment**   **Output**

Recipe

Interactive Multimedia Design

- This is similar to regular video clips, but now there is a much wider space to experiment with **interaction**

- **Interplay** between the **physical space** of the installation and the digital **virtual environment** of the interactive multimedia output
  - Augmented reality
  - Mixed-reality

Interactive Multimedia Design

- Let's summarize a bit
  - All that is projected on the real world looks like a normal "fixed" video clip (that is shown on a screen or projected on a wall or projected on a usable surface)
  - It cannot be fixed though because the video needs to take into account the interaction with the user (e.g., their movement, position, look, etc)
  - Therefore we use a system that is similar to a videogame: a computer is projecting an interactive "game" and the user interaction acts similar to a controller

Interactive Multimedia Design

- So, we need to build games?
  - No, but we can take advantage of the nice tools for building games in order to create our interactive multimedia experiences
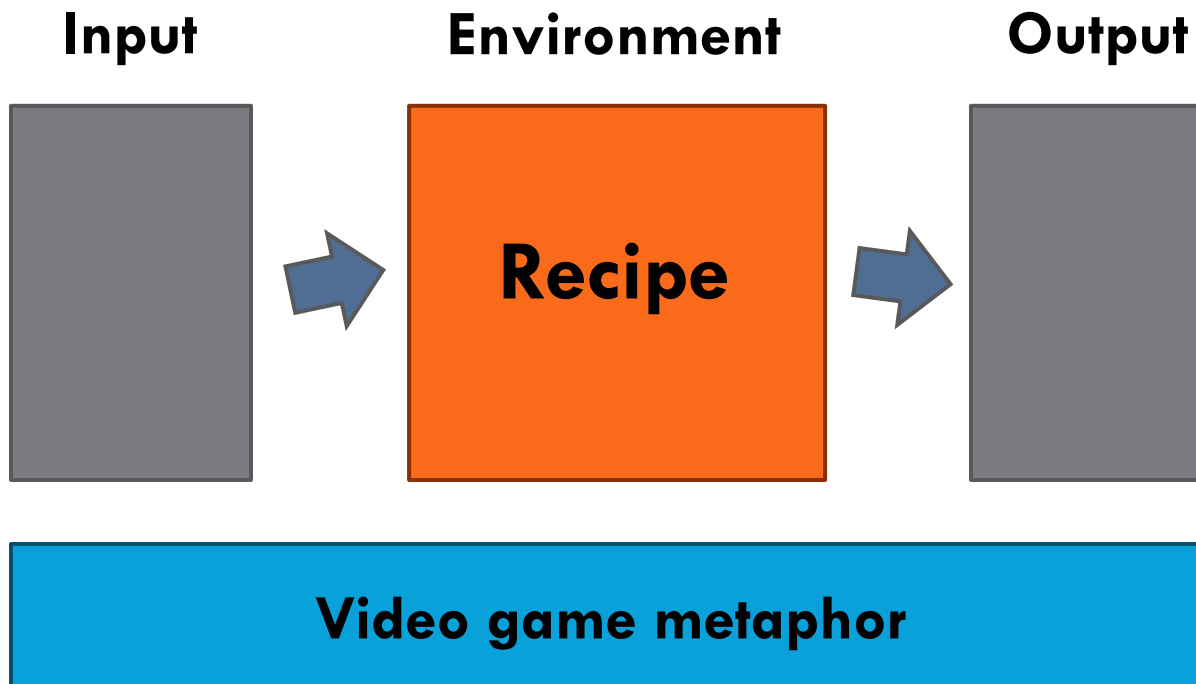
- And then we need to use videogame controllers?
  - No, we can use everything that is useful for us for getting information from the user

- But we need to use computer programming?
  - Yes, a little bit ;)

Interactive Multimedia Design

☐ It's important to separate the **inputs** and **outputs**

Input	Environment	Output
	Recipe	

Video game metaphor
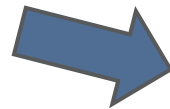
Interactive Multimedia Design

- **Input**
  - Game-like controllers for user interaction
- **Environment**
  - Game-like system
- **Output**
  - Game-like experience through visuals and audio

- **Recipes**
  - Computer programming that specify how controllers affect the environment and the intended user experience
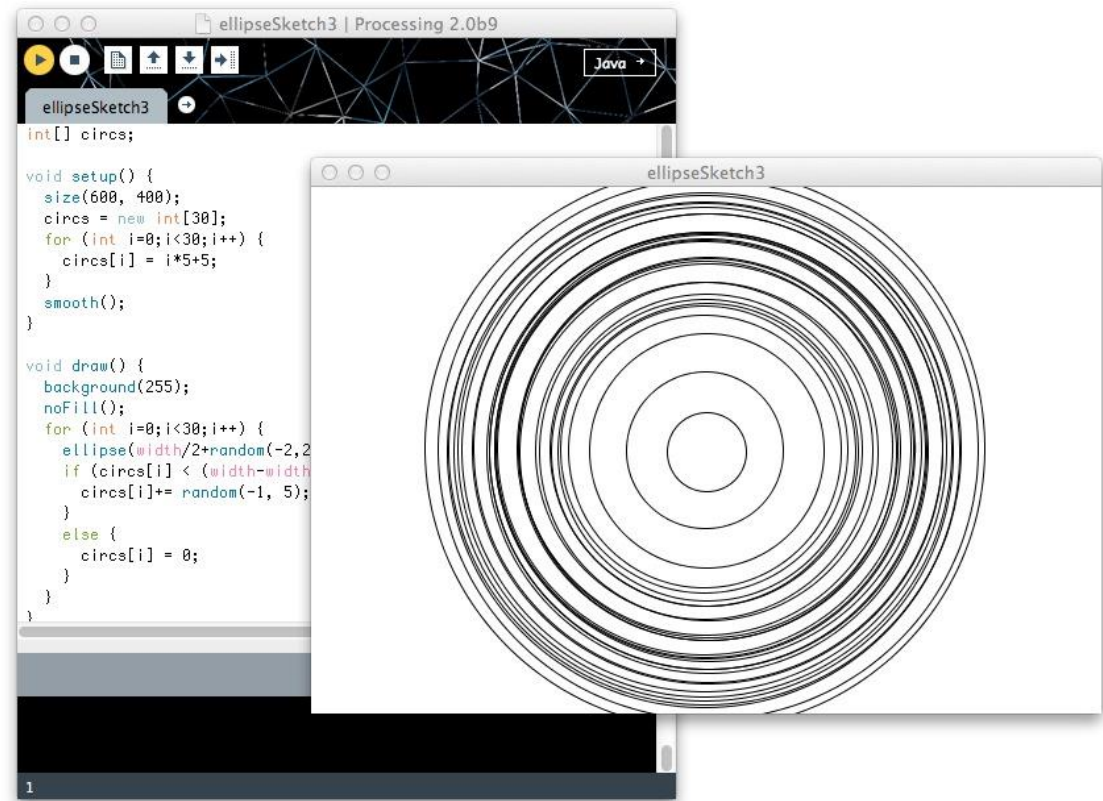
Interactive Multimedia Design

- **Environment**
  - Processing

  - Unity

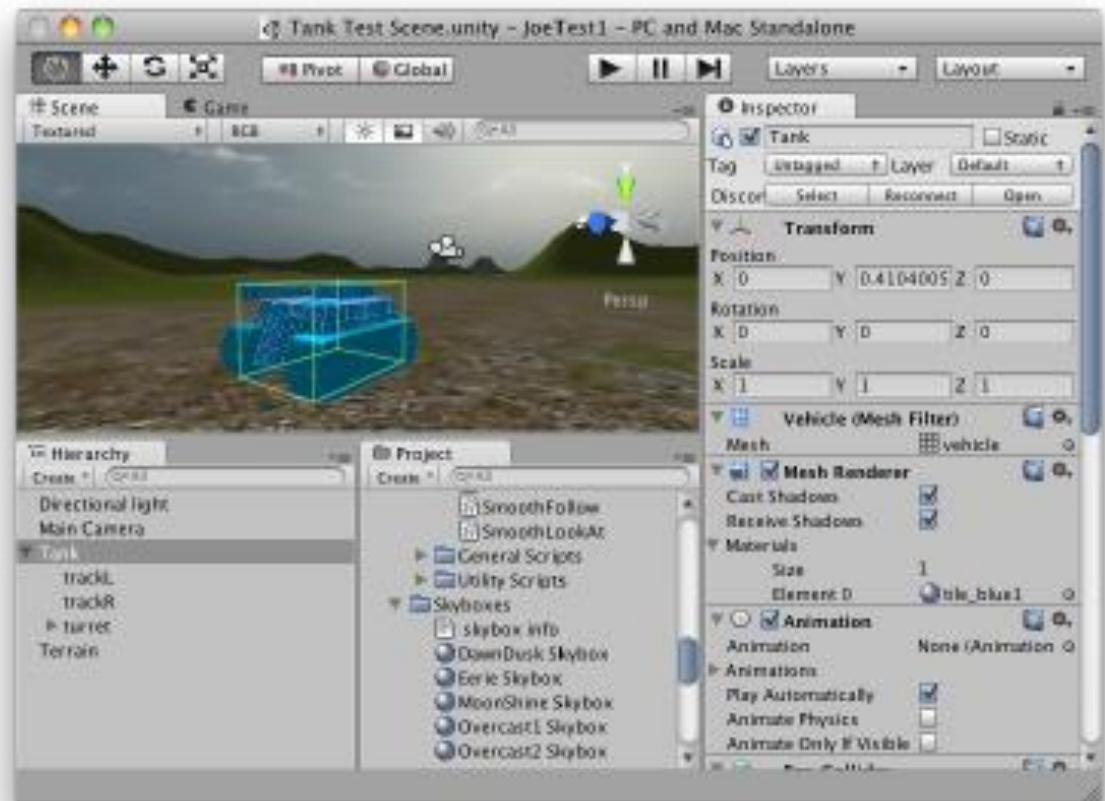# Interactive Multimedia Design

□ **Environment**

■ Processing

■ Unity

Interactive Multimedia Design

□ **Environment**

  ◘ Also other commercial video game engines recently introduced free use, offering advanced functionalities

  ◘ Cryengine

  ◘ Unreal Engine

  ◘ Source

Interactive Multimedia Design

- **Input**
  - Cameras
  - Microphones
  - Normal interfaces such as mouse and keyboard
  - All kinds of sensors such as motion, temperature, light
  - Natural User Interfaces (NUIs) such as Microsoft Kinect and Intel RealSense

Interactive Multimedia Design

□ **Input**

　　□ Cameras

　　□ Microphones

　　□ Normal interfaces such as mouse and keyboard

　　□ All kinds of sensors such as motion, temperature, light

　　□ **Natural User Interfaces (NUIs)** such as Microsoft Kinect and Intel RealSense

Interactive Multimedia Design

- ☐ Microsoft Kinect, Intel RealSense
  - ◼ www.youtube.com/watch?v=bdviGrPaQDQ
  - ◼ www.youtube.com/watch?v=Edkw6QhklVs
  - ◼ www.youtube.com/watch?v=Vuyd8AQQ9Mw

① **Infrared optics**
A projector and sensor map over 48 points on the human body.

② **RGB camera**
The camera combines with the 3D map to create the image you see on screen.

③ **Motorized tilt**
Mechanical gears at the base let the game follow you.

④ **Multi-array microphone**
Four microphones cancel out ambient noise and pinpoint where you are in the room.

Interactive Multimedia Design

Output

- Screens

- Projection on "flat" surfaces

- Video/Projection mapping

Interactive Multimedia Design

□ **Output**

   ◻ Screens

   ◻ Projection on "flat" surfaces

   ◻ Video/Projection mapping

□ ..but also

   ◻ Augmented reality

   ◻ Virtual reality

Interactive Multimedia Design

- Oculus Rift virtual reality headset
  - https://www.oculus.com/
  - https://www.youtube.com/watch?v=BvpOQDpDo30

Interactive Multimedia Design

□ Google Cardboard virtual reality headset

 ▪ http://www.google.com/get/cardboard/

 ▪ https://www.youtube.com/watch?v=HFdaagINam0

Interactive Multimedia Design

- Microsoft Hololens augmented reality headset
  - http://www.microsoft.com/microsoft-hololens/en-us/get-ready

Interactive Multimedia Design

- Magic Leap advanced augmented reality
  - http://techcrunch.com/2014/10/21/magic-leap-tech/

Interactive Multimedia Design

- It's important to separate the inputs and outputs

Input   **Environment**   **Output**

Recipe

Video game metaphor
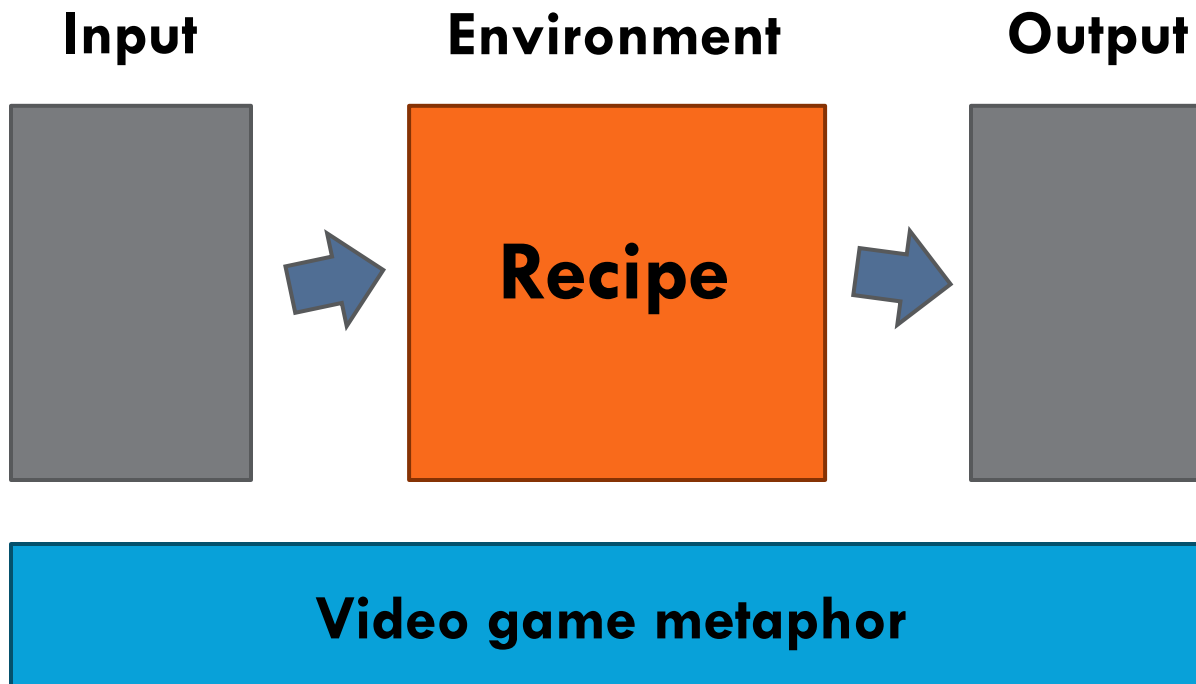
Interactive Multimedia Design

- **Input / Output**
  - **Information** that is **sent** and **received** through the **web** can also be part of the experience! E.g., Twitter and Facebook posts as well as **push notifications**
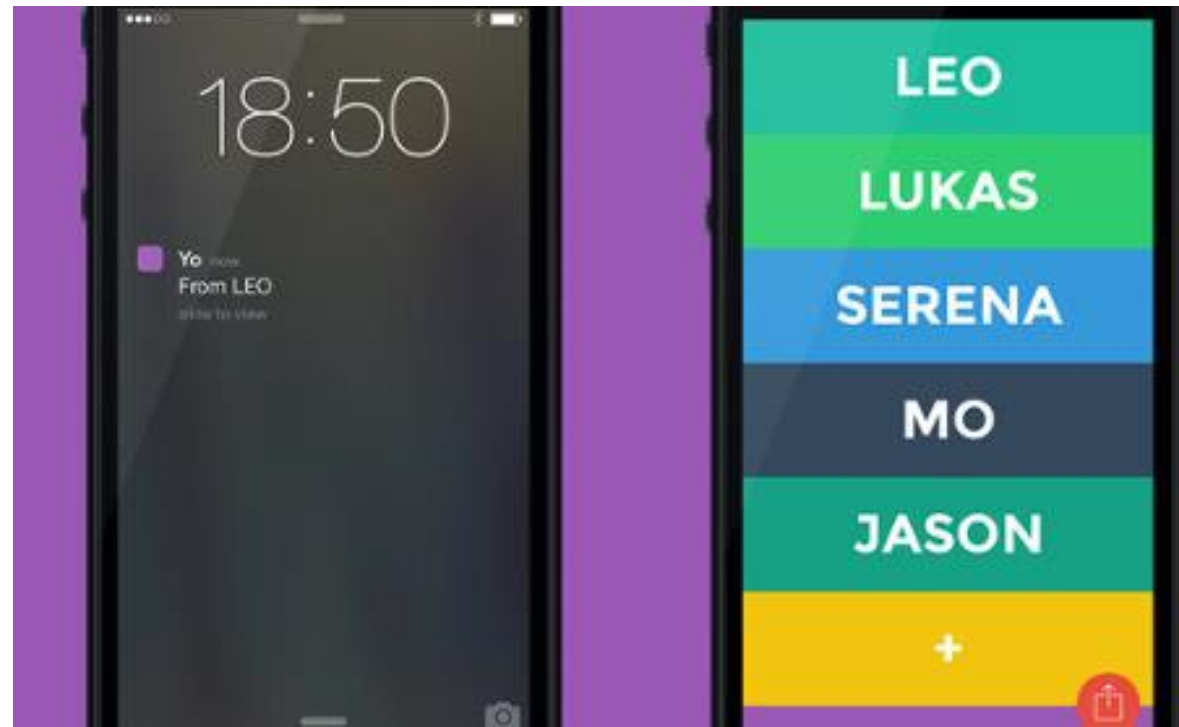
Interactive Multimedia Design

□ "Just landed infographic" video (uses twitter input)

  ■ https://vimeo.com/4583713

Interactive Multimedia Design

□ "Yo" zero-character messaging application

■ http://www.wired.com/2015/02/ive-seen-future-phones-looks-lot-like-yo/

Interactive Multimedia Design

□ **Recipes** (with computer programming)

  ◻ Don't be scared! We will do everything step by step :)

  ◻ We will look into the fundamental concepts of computer programming that apply to many tools

Processing programming language

- Download the Processing language and programming environment from the following link
  - https://processing.org/download/