

*Corso di Laurea Magistrale in Design, Comunicazione  
Visiva e Multimediale - Sapienza Università di Roma*

# ***Interaction Design***

## ***A.A. 2017/2018***

### **1 – Introduction**

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# Interaction Design

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- ▶ Interaction Design defines the **structure** and **behavior** of interactive systems.
  - ▶ Interaction designers strive to create **meaningful relationships** between people and the products and services that they use, from computers to mobile devices to appliances and beyond.
  - ▶ Web page of the *Interaction Design Association*: <http://ixda.org/>
- ▶ Interaction design fall under the umbrella of Human-Computer Interaction (HCI), and focuses on **creating engaging interfaces with well thought out behaviors**.
  - ▶ Understanding **how users and technology communicate with each other** is fundamental to anticipate how someone might interact with the system, fix problems early, as well as invent new ways of doing things.

# Interaction Design Today

- ▶ The advent of Internet of Things (IoT) has led to the creation of several **smart immersive spaces**.
  - ▶ *smart homes, offices, museums, hospitals, factories, etc.*
  - ▶ Many *interconnected objects, sensors* and *actuators*, are used together with mobile devices to implement **seamless interaction** with the surrounding physical environment.



# Interaction Paradigms

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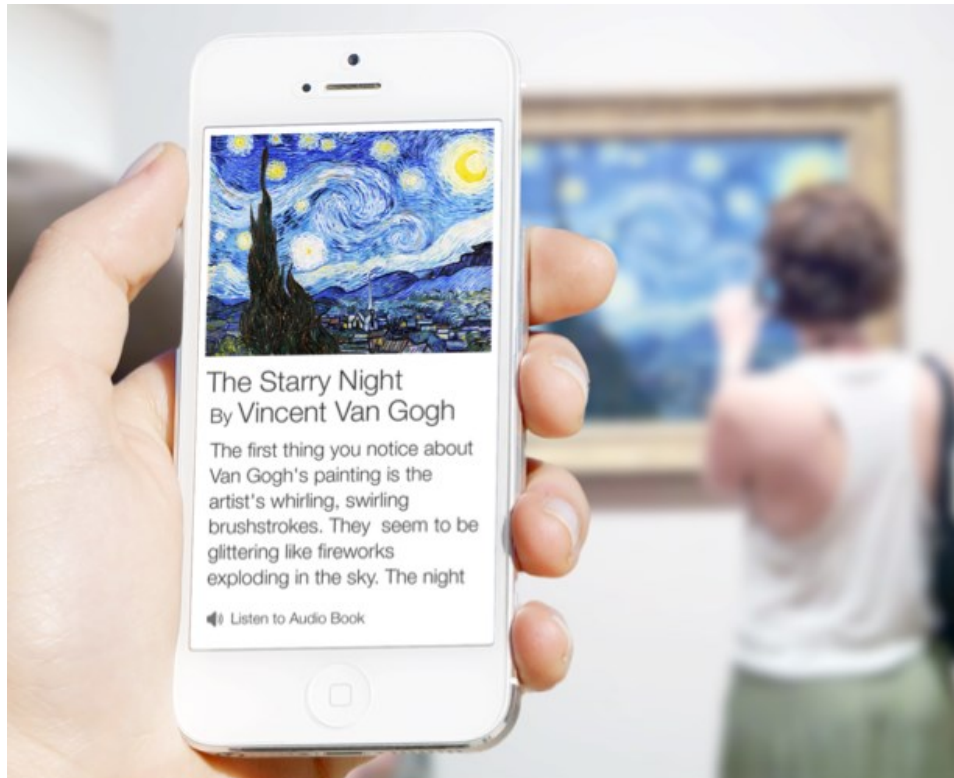
- ▶ An example of smart museum:
  - ▶ <https://www.youtube.com/watch?v=mAT26h5G-Fg>
- ▶ The involvement of smart objects as active actors in the interaction process may facilitate the development of highly **personalized** and **contextualized user experiences**.
- ▶ **Challenge:**
  - ❖ the emergence of non-traditional interaction paradigms (vocal, touchless motion based, etc.) has made the design of the interaction as a **complex** and **multisensory activity**.

# Touch-based interaction

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- ▶ Mobile device interface:

- ❖ <https://www.youtube.com/watch?v=YuBPKfBQUKk>



# Touch-based interaction

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▶ Multi-touch table interface:

- ❖ <https://www.youtube.com/watch?v=4APoqTbM9ck>

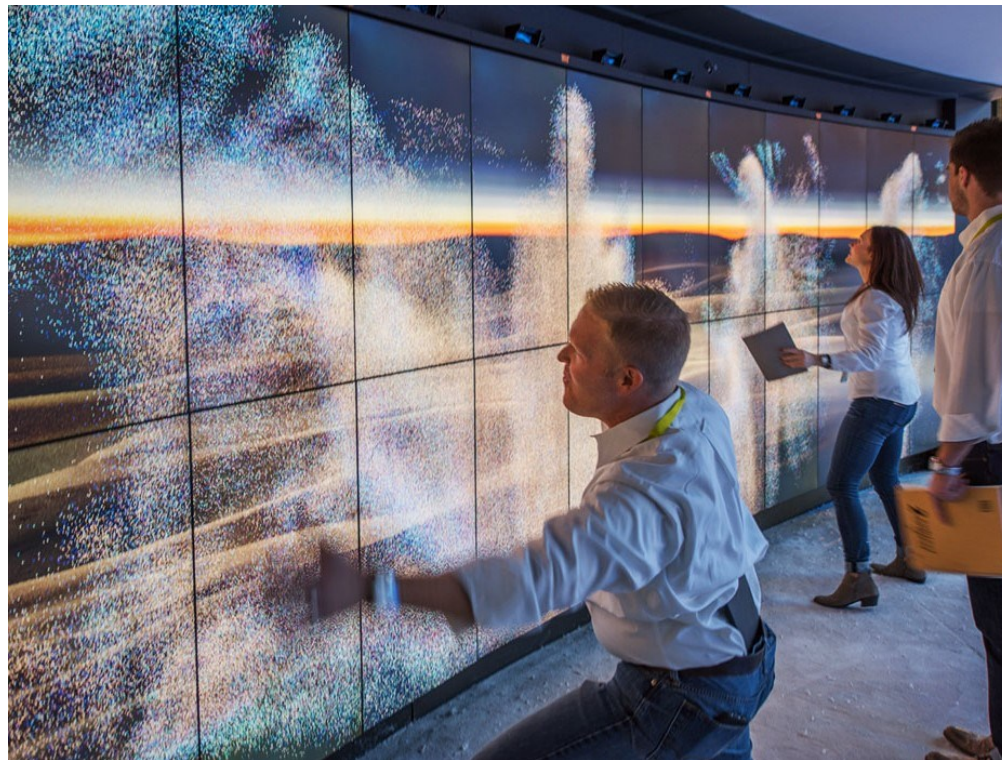


# Touchless motion-based interaction

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- ▶ Interactive wall art projection:

- ❖ <https://www.youtube.com/watch?v=OGozktCzMS4>



# Touchless motion-based interaction

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▶ Interactive scene with physics:

❖ <https://www.youtube.com/watch?v=KLOB-T1mgdY>

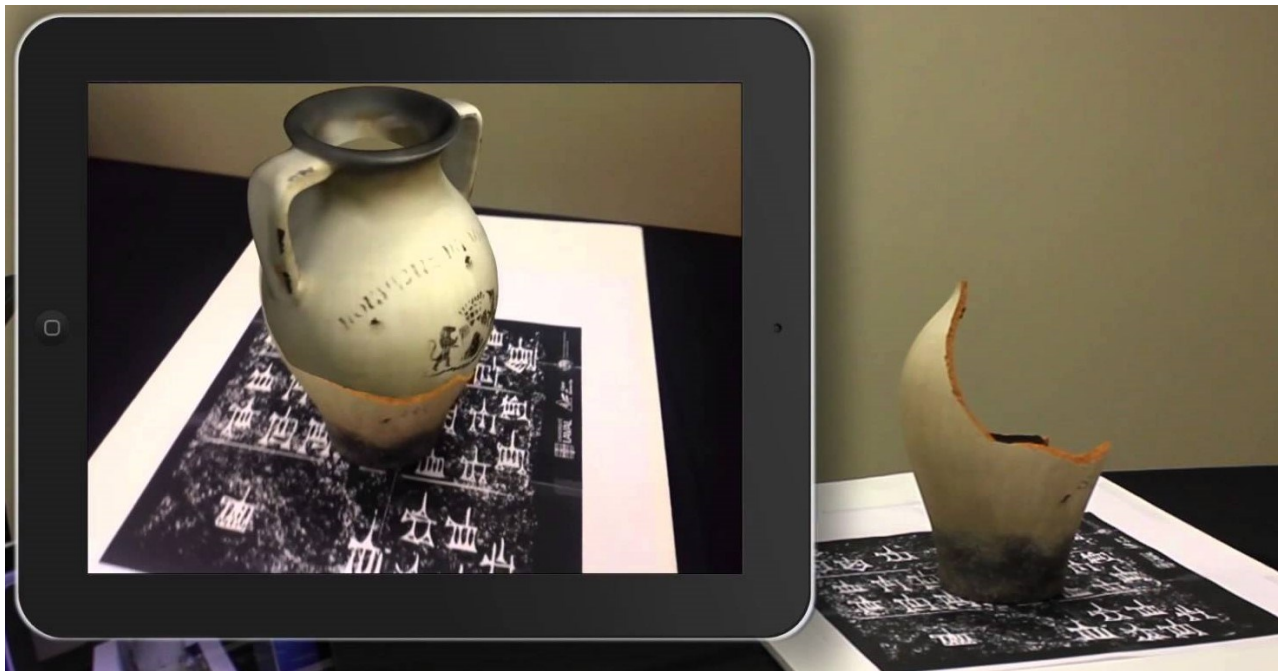




# Touchless motion-based interaction

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- ▶ Augmented/Mixed reality experience:
  - ❖ [https://www.youtube.com/watch?v=v\\_cvAGUItU0](https://www.youtube.com/watch?v=v_cvAGUItU0)



# Putting all together

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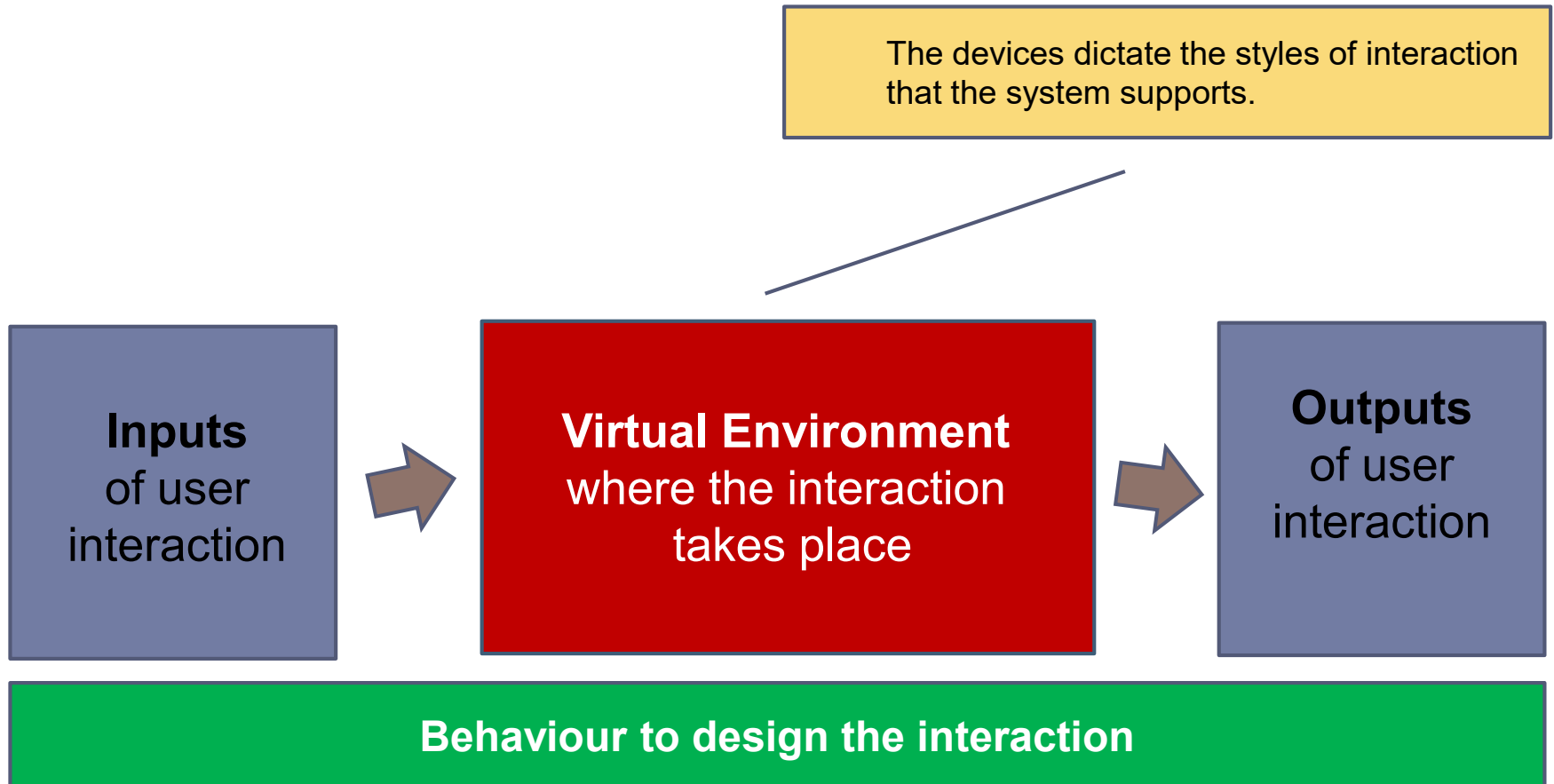
- ▶ Cleveland Museum of Arts:

- ❖ <https://www.youtube.com/watch?v=qWJqd6lyJ-E>



# Ingredients for an interaction

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# Inputs

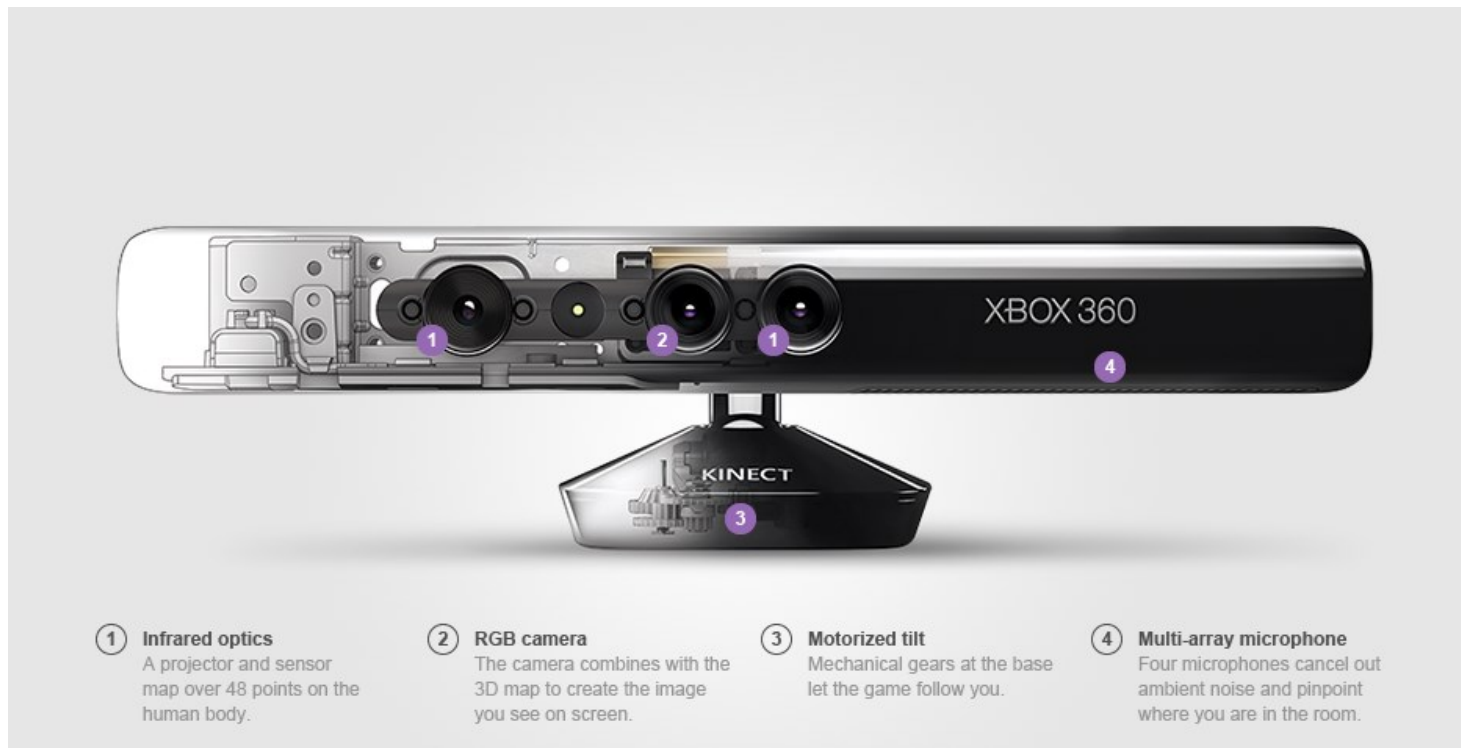
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- ▶ Cameras
- ▶ Microphones
- ▶ Traditional interfaces such as mouse and keyboard
- ▶ Touch screens
- ▶ All kinds of sensors such as motion, temperature, light
- ▶ Natural User Interfaces (NUIs) such as Microsoft Kinect.

# Capturing human movements

## ▶ Microsoft Kinect

▶ [www.youtube.com/watch?v=bdviGrPaQDQ](http://www.youtube.com/watch?v=bdviGrPaQDQ)



# Outputs

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- ▶ Screens
- ▶ Projection on “flat” surfaces
- ▶ Video/Projection mapping
  
- ▶ ..but also
  - ▶ Augmented reality
  - ▶ Virtual reality

# Technology for Virtual Reality

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- ▶ **Oculus Rift virtual reality headset**

- ▶ <https://www.oculus.com/>

- ▶ <https://www.youtube.com/watch?v=i4S5fvZI-aQ>



# Technology for Augmented Reality

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- ▶ **Microsoft HoloLens augmented reality headset**
  - ▶ <http://www.microsoft.com/microsoft-hololens/en-us/get-ready>
  - ▶ <https://www.youtube.com/watch?v=ihKUoZxNCIA>





# (Cheap) Technology for Augmented Reality

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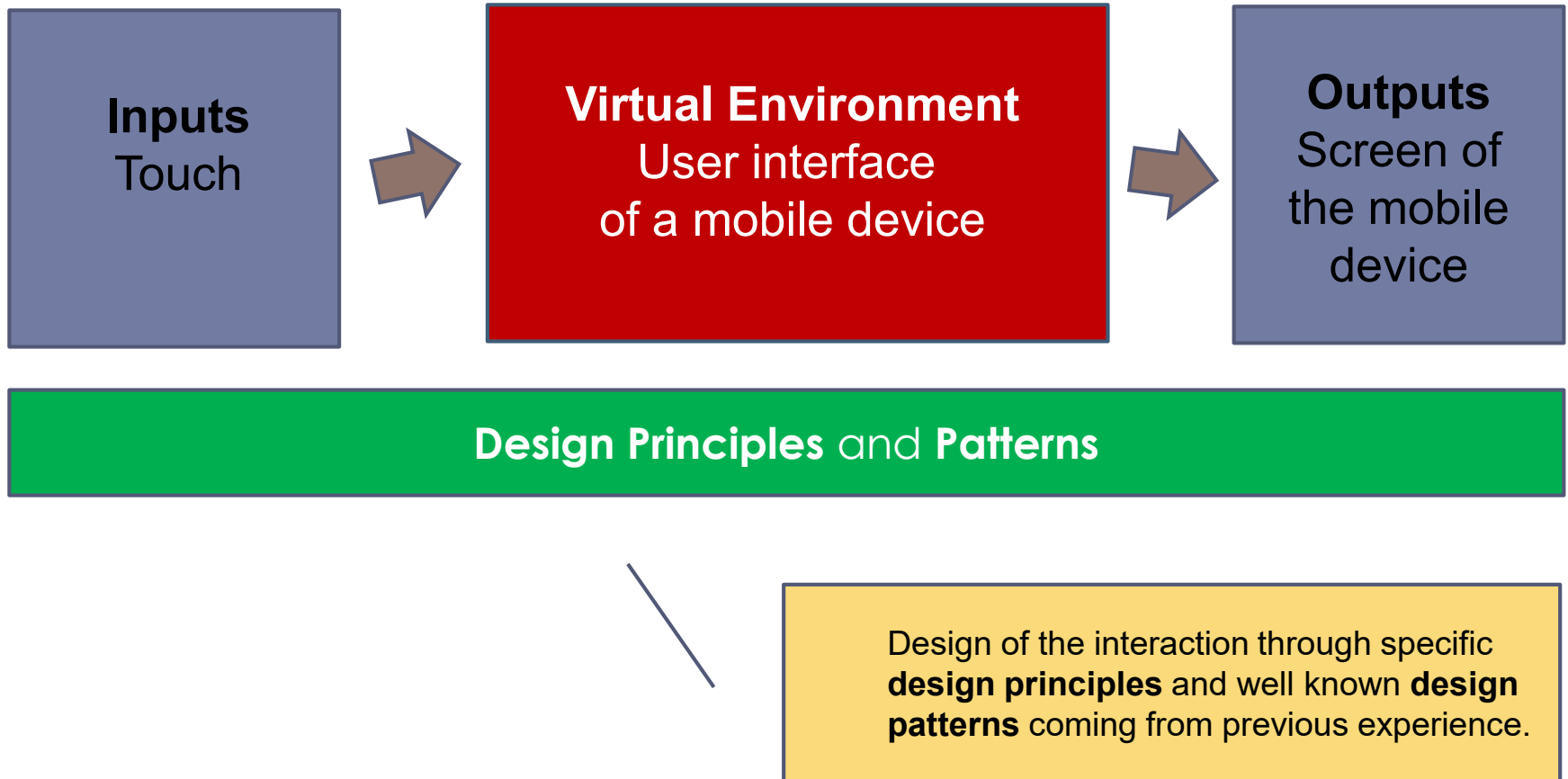
- ▶ **Google Cardboard virtual reality headset**

- ▶ <http://www.google.com/get/cardboard/>
- ▶ <https://www.youtube.com/watch?v=HFdaagINam0>
- ▶ <https://www.youtube.com/watch?v=8qNmRi-gNqE>



# Ingredients for interacting with a mobile device

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# Ingredients for interacting with a smart environment

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## Videogame Metaphor

Design of the interaction similar to a **videogame**: a computer is projecting an interactive “game” and the user interaction acts similar to a controller.

# Definition of the environment

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1. Advanced tools for designing mockups of user interfaces for mobile devices.
2. Computer programming that specify how controllers affect the physical environment and the intended user experience.

and....don't be scared!

We will do everything step by step :)

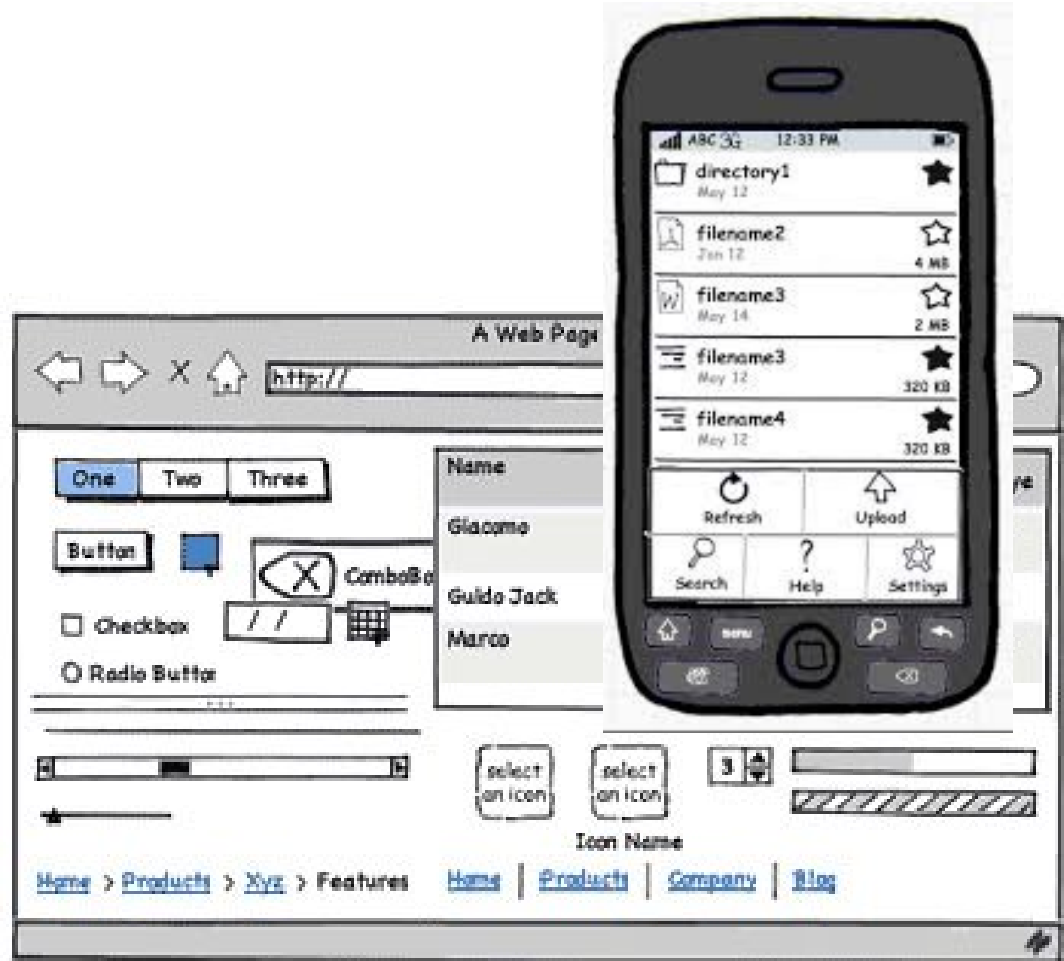


# Designing and programming the environment

Balsamiq  
Mockups



Processing

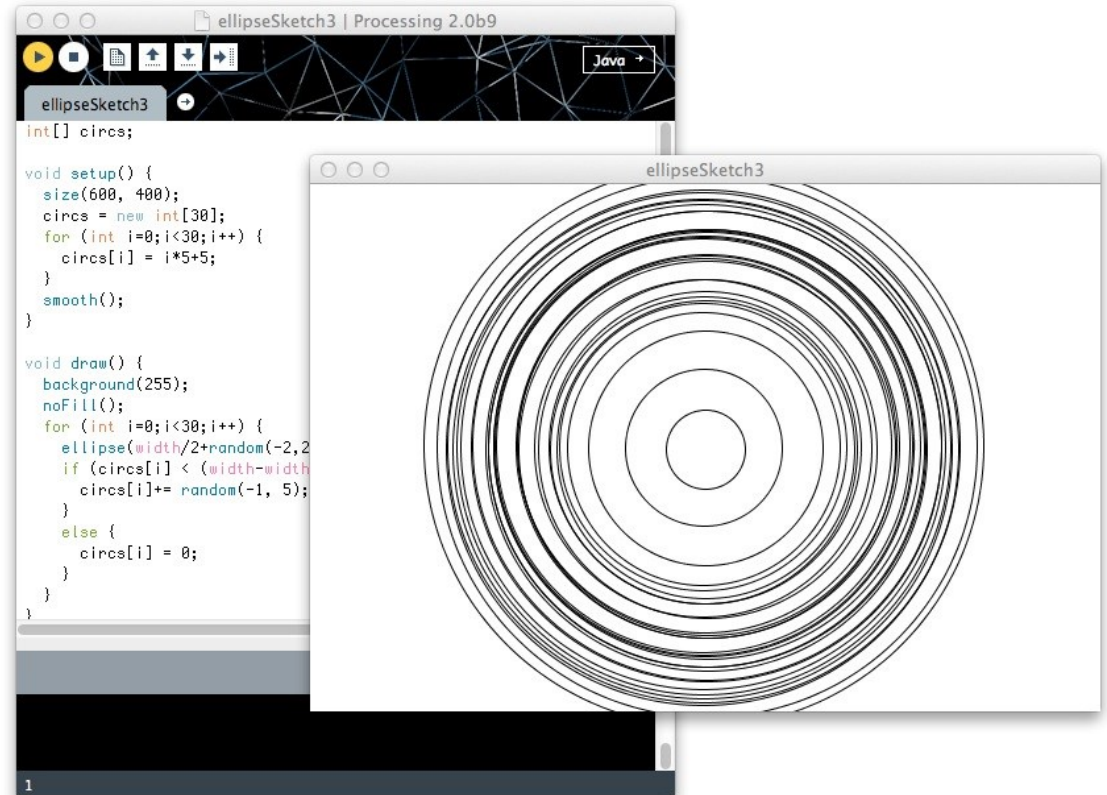
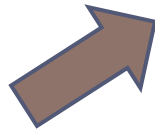


# Designing and programming the environment

Balsamiq  
Mockups



Processing



# Balsamiq Mockups (wireframing tool)

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- ▶ Download Balsamiq Mockups from the following link:
  - ▶ <https://balsamiq.com/download/>
  - ▶ Install the “trial” version of the software.



balsamiq®

# Processing programming language

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

