

# Mixed Reality and Tangible interfaces

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## Project Goal:

Combine

Mixed Reality and

Tangible and/or Touch interaction

to create an AR game/help/something like it ☺



AsteRoids – AR Shooter (on appleStore)



AR magazine



ARCraft

# Your Task (project)

## Option 1: Treasure hunt

- Use AR markers at different locations or objects in a room.
- As you reach each marker, you look through your device for clues to where to find the next marker in the hunt.
- To get each new clue you need to solve a puzzle (using touch & tangibles)
  - manipulate the size and orientation of a 3D object attached to the marker using gestures until it reaches a predefined goal,
  - solve a 2D puzzle by dragging and rotating pieces,
  - physical puzzles (e.g. need to move a specific physical item close to another to unlock the clue),
  - etc.
- Then give the clue in relation to the current marker (e.g. using arrows to indicate you need to move to the left and by how much)
- Don't let your users cheat by jumping to markers out of sequence.

Lots of AR treasure/scavenger hunts ...



# Your Task (project)

## Option 2: User instructions

We are surrounded by complex machinery (e.g., laser cutters and 3D printers in the FabLab), why not use AR and HCI to help people?

- Use markers on different parts of complex machines with instructions on how to use them and what to do next.
- If machinery is too hard to bring in class (!), how about using markers to teach someone how to create a paper boat or other origami?
- Instructions should be visual (e.g., arrows for how to fold the paper or open the hatch in the laser cutter) and adapt to what your camera sees in the physical world (e.g. if the paper is folded, show arrows for how to make the next fold, or if the hatch of the laser cutter is open, give instructions to close it) .
- Combine with interactions on your mobile device
  - e.g. swipe to see prev/next step, request with buttons more info on existing components, load virtual enhancements (e.g. possible 3D attached accessories, a 3D boat) and use touch to scale/rotate them, etc.
- Try to deal with errors (e.g., if no markers are seen give option to go back).

Lots of work on AR+hci for construction, fabrication, instruction ...



# Your Task (project)

## Option 3: Come up with our idea

- Should have AR + touch/tangible components (see next)
- Check topic with Anastasia or Jean-Marc  
(depending on complexity we may reduce/relax requirements)



# Your Task (project)

## **Real time Augment Reality:**

- ✓ Track physical/real world objects (e.g., using markers) and attach virtual information to them (e.g., projector, through a device)

## **Interaction with Physical Objects:**

- ✓ Adapt virtual info based on user interaction with the physical objects (e.g., relative position/orientation of objects)

## **Interaction with Virtual objects:**

- ✓ Adapt virtual information based on user interactions that go beyond the physical (e.g., provide widgets; touch or mid-air gestures for common virtual object manipulation like scale, rotate, translate; combine the above with physical object interaction)

## **And any other extensions you can think of !!!**

To get a good grade you should be creative,  
BUT you also need to have a demo that runs

# Technical/ Practical

Example code will be provided

You can visit FabLab to cut/print pieces if needed

## **On your own:**

- ✓ Install Unity tons of tutorials on the web
- ✓ Try out the example code from the website on your device
- ✓ If you run into problems let us know and bring your laptop and device in class

If you don't have a device we will find one for you (talk to us)

# Project Presentation (Exam)

The “exam” will be in pairs and will include:

a Demo of the project (~**10** min)

The presentation time should be made around the demo (no slides needed)

Discuss your design decisions, challenges, and features

Set up and test everything before presentations start

The day before the exam

Send us:

the code and

a summary doc (1-2 pages) describing your application with *images* !!!

