

# Virtual Reality

**2018/2019 - Fall Semester**  
**MEIC-A / MEIC-T**

## Project 2

### VR Interaction

#### Important dates

**10/Out** Project 2 assignment released

**23/Out** Project 2 assignment submission  
(short report via moodle + code via github/bitbucket + MD5 hash dos ficheiros do projecto)

**24/Out** Project 2 class demonstration

**Grade:** Project 2 corresponds to 15% of the laboratorial component: **1.8** grade / 20 (for the course)

**Work effort:** The work effort of Project 2 has an estimated effort of 15 hours per group member, distributed by two weeks.

#### Requirements

- VR glasses
- Smartphone running Android 4.1 / iOS 8 or higher
- Smartphone compatible with VR glasses (gyroscope commonly required)
- PC or Mac capable of running Unity
- **Optional:** Wireless/Bluetooth Controller

#### What you are expected to learn

By the end of Project 2, each group member is expected to understand basic interaction techniques for mobile VR. Furthermore, Project 2 has the following additional goals:

- to understand basic concepts related to Virtual Reality interaction through camera control and gaze-input

- to write basic C# code, even with no prior experience
- to implement simple VR interaction techniques in Unity

## Tasks + Evaluation grid

Several tasks are required to complete Project 2:

**You are welcome to use the scene from the first project**

**Task 1 [0.2 + 0.2 grade]:** Add a HUD containing the labyrinth map, the location of the “Minotaur” and the first person character’s position. The character’s position is the only element that needs to be updated every frame.

**Task 2 [0.2 + 0.6 grade]: Option A:** Implement the following camera controls using head movements: flexion-extension angle measured relatively to the horizon as forward-backward parameter (angle theta); neck rotation (angle phi) and lateral bend (angle psi) are measured relative to the heads’ neutral position to input camera orientation. The first person character walks forward in whatever direction your head is facing. Forward movement:  $\theta \geq 30^\circ$ ; Backward movement:  $\theta \leq -30^\circ$ . Stationary:  $-30^\circ < \theta < 30^\circ$ .

**Option B:** camera control performed with a bluetooth controller.

**Task 3 [0.4 grade]:** Implement a head cursor for Gaze-Input. This can be represented as a simple reticle (e.g, crosshair, circumference, etc) that needs to be added to the virtual camera. Additionally, insert a spear to the scene and place it next to the exit. **Option A:** To grab the spear, the character must stare at the object during 2 seconds. Once it is selected, reposition and reorient the spear to be placed at the character’s forehead. **Option B:** Select the spear by staring at the object and press the trigger button.

**Task 4 [0.2 grade]:** At last, the first person character must charge towards the “Minotaur” to defeat it. Add several blazing flames to build some drama. Use a particle system to simulate the flames. Mind the limitations of the cellphone graphics card re: the complexity of the scenes

*Suggestions of 3D repositories:*

<https://www.yobi3d.com/>

<https://3dwarehouse.sketchup.com/?hl=en>

<https://sketchfab.com/tags/free>

<https://grabcad.com/library>

<https://free3d.com/3d-models/>

<https://www.turbosquid.com/Search/3D-Models/free>

<https://clara.io/library>

<https://www.cgtrader.com/free-3d-models>

<https://archive3d.net/>

<http://www.free-3d-models.com/>