

Virtual Reality (2018-19)

Final project assignment

General:

One of the tasks of the Virtual Reality course is to implement a real-time 3D interactive program. You can re-use material provided for the [hands-on TP](#) if appropriate, including the directional teleportation code provided for Oculus (please ask if you need access or details on class materials).

You are free to define your group, at the latest on **Monday April 15th 23h55**. The max group size is 3. Please note that, if you use Unity (with physics already integrated and scene editing tools), we expect richer interactions than if you exploit a less complete tool (e.g. Ogre3d, OpenGL, Irrlicht).

The program must (requirements):

- 1) track the head/face of the user to determine the location of the viewpoint in a virtual scene.
- 2) control the 3D movement of a virtual 3D object in the scene.
- 3) use physics for modeling interactions between the object(s) controlled by the user and other objects from the scene.
- 4) contain a virtual 3D scene.
- 5) Implement a locomotion system adapted to your application.

The group is required to implement and present the project on their own computers and/or mobile devices. Although EPFL does not guarantee the availability of VR hardware for your project, you are free to use any hardware you wish, as long as you can bring it for the demo, such as Kinect and cellphones. We do have some devices available for loan. (Please contact Thibault.Porssut@epfl.ch and Neal.hartman@epfl.ch for more details or specific requests. Note that if you borrow hardware from the lab, you may have to share with another group, and may therefore not have access to the equipment 100% of the time. In addition, as all demos will take place simultaneously, please consider that shared equipment may not be available for the demo session, during which you will be required to show your project.)

Libraries:

The group can choose the libraries that are used for each element freely. Here are some suggested libraries; let us know in case a library is no longer freely available:

Interactions/Locomotion:

-VRTK Unity plugin

3D assets:

-Unity store

Kinect/Depth sensors:

-Kinect for Windows SDK (<http://www.microsoft.com/en-us/kinectforwindows/>)

Samples:

The following videos demonstrate past projects; they illustrate the expected outcome of the assignment in terms of performance, usability and, in some case, fun:

- Bird flight simulator with Kinect :
<https://youtu.be/zi5aT8LMvx0?list=PLbrox1hcL-N7dq9XbAkAAMd09IOAZ1VIT>
- Air Hockey game with 2 Leap Motion devices :
https://youtu.be/oi_HMYvEalY?list=PLbrox1hcL-N7dq9XbAkAAMd09IOAZ1VIT
- Building/simulating a 3D structure :
<https://youtu.be/ny1llEITEHw?list=PLbrox1hcL-N7dq9XbAkAAMd09IOAZ1VIT>

Schedule:

The deadline for submitting **short project proposals** is **April 17th 23h55** (middle of week 8). Your proposal should briefly describe the idea you have and list the libraries you will be using (a sample will be published in the forum). In the introduction, you must assess the potential of the interaction technique (advantages/drawbacks). The teaching assistants may ask for clarifications, and suggest modifications in order to approve your project. **You can contact Thibault.Porssut@epfl.ch and Neal.Hartman@epfl.ch for reviewing for proposal before April 17th, as soon as you have uploaded it on moodle.** In this way you will get a quicker feedback and potentially have time to make changes.

The deadline for submitting the **final version** of the program is on **May 20th 23h55**. Each group should submit a compressed file containing the code, a report with brief explanations about the program and some conclusions regarding the coding and user experience. Your **demo** will be presented on **May 20th** during the public demos session that will take place in INF 211/213 during class hours after Quiz 2.

Each group should schedule a time for an **oral presentation**, which will be held from **May 21 to 24**. In the defense, each member of the group should be able to explain the flow of the program and its different components. The live demo should be working and all the source code should be available. The **video** deadline is on **the date of the oral presentation agreed with the TA and the lecturer**. The video is a maximum 2 minutes long and must not contain copyrighted material unless you own the copyright and allow the VR course to display the video on the VR course Youtube channel.

Grading:

This assignment is 30% of the total course grade and it will be graded as follows:
20% report, 10% video, 40% working demo, 30% oral presentation.

The maximum grade will be reduced by 25% for each requirement that it doesn't address. If you are in doubt about your project meeting the requirements, please contact the TAs.

Contact: Thibault.Porssut@epfl.ch / Neal.Hartman@epfl.ch (Please use the subject line "VR Project 2019")