TIA - Project Description – 2024/2025

This document contains the description of the noted project that which will be delivered at the end of the course. The tools used to develop this project are the same as the ones used during the previous TPs: Unity 3D and Vuforia. The goal of the project is to create an augmented reality application using a number of different input modalities.

Tower Defense game: the goal is to defend a player's territories by obstructing the enemy attackers, achieved by placing defensive structures along their path. The user will be able to build different structures that will serve to automatically block and attack enemies.

The following features must be implemented:

1. Display the virtual playground using an image target.
2. Provide an interface enabling the user to place different structures in the virtual playground.
3. Provide selection and manipulation techniques to enable the manipulation of virtual structures. The user should be able to move structures from one location to another.
4. The augmented reality content has to be integrated with the real environment and must enable physical interactions with real objects. Suggestion, AR markers can be used to identify which real objects can interact with virtual objects.
5. At least one object has to be controlled using an AR marker. For example, the controlled object can be a blocking element (e.g., wall, trench) which will delay the enemies.
6. Once the game is finished, the application will provide information regarding the session, number of enemies destroyed, amount of damage received, etc.
7. The application must integrate all the components in a single application and it has to run in an android device (tablet / smartphone).

Optional features:

1. Provide a schematic visualization of the enemies outside the AR field of view (e.g., radar).
2. A number of power ups which the user can enable using UI buttons. The power ups can trigger specific events, such a storm to slow attackers or an area damage effect.

As a first step, **sketch** the different interface elements and decide the best interaction modalities for each task before implementing your application. The different interactive elements can be extended in order to provide **additional functionalities**. When designing your interaction techniques be imaginative, use and try different interaction modalities when possible.

The **grading** of the project will be based on the quality of the implemented features and the diversity/originality of the interaction modalities.

By the 31/01/2025 each group will have to deliver ****all**** the following items:

1. The entire **Unity project** in a zip file (delete the Library and obj folders to reduce the file size)
2. The android **apk**, which should run on the tablet/phone.
3. A **report** describing the developed application. First, the report has to describe the design rationale and the different functionalities that were envisioned during the design phase. Second, it has to detail the developed application, detailing the implemented functionalities. Finally, it has to include and a user manual, detailing how to use the application. We recommend you to provide screenshots of your application in order to better illustrate the interface and its workflow.
4. **Short video** showing the gameplay