SGRAI Report

January, 2025

Rute Ferreira, 1220994

Mateus Cabral, 1220704

Rui Soares, 1221283

Sandro Luís, 1221121

Index

Introduction

This document aims to report on the main aspects of the work developed by our team for the Graphic Systems and Interaction curricular unit in the context of the integrative project, throughout the two iterations.

A brief description of the project is given, as well as the identification of the technologies used, the adopted interaction and other peculiarities.

Description of the project

The project aims to create a 3D representation of the hospital floor. This contains several operation rooms, and each room is limited by walls, has a door and a surgical table.

If an operation is taking place, a model of a human body is represented lying on the surgical table and the operation room is illuminated with a spotlight. The remaining ambient and directional lighting are controlled by the user. For greater realism, appropriate textures were used on the walls and floor. The project was developed with modularity, facilitating future expansions, such as the inclusion of more objects or functionalities.

Used technologies

- **Framework 3D**: Use of **Three.js** to render and control the three-dimensional environment.
- **Data Import: JSON** files to describe the hospital structure, including rooms, doors and surgical tables, and to easily expand/restrict the hospital layout.
- **Camera Controls:** Use of **Three.js' OrbitControls** for camera movements and integration with Tween.js for smooth animations.
- **Programming Language: JavaScript/TypeScript**, due to compatibility with Three.js and flexibility for manipulating **JSON** data.

Adopted interaction

For the interaction the mouse and keyboard were used.

- **Mouse:**
  - o **Left Button:** Selects a room by selecting the corresponding operating table.
  - o **Right Button:** Orbits the camera around a point of interest.
  - o **Wheel:** Zoom or zoom in.
- **Keyboard:**
  - o **"i" key:** Shows/hides an information panel about the selected operation room.

Other peculiarities

A nurse was added to the operation room, with the doctor, to make the project more interesting and realistic.

The operation room doors are functional, that is, for an operation to occur the door closes, otherwise it is open.

Display of data such as the status of the room, whether it is occupied or available, the person responsible and its occupation schedule.

The implemented 3D component can also receive external data through events, which slightly modifies its behaviour. When the component receives an event with information, it disables the graphical user interface (GUI) responsible for starting and ending surgeries, because these actions are now controlled by the data received in the event. Furthermore, it adds additional information to the *overlay* displayed on the interface, with details about the operation room. This additional information will also be provided by the incoming event.