Fullstack Engineer Home Assignment - LeanCon

# Goal

Build a web application that processes an IFC (Industry Foundation Classes) file to display a 3D model of a building and provide a breakdown table of element types and their quantities by building levels. This task aims to simulate real work scenarios at LeanCon, combining 3D model visualization with data extraction and frontend/backend coordination.

# Task Description

You are provided with **two IFC files**:

* **Base structure** – the main building skeleton (**mandatory**).
* **System model** – representing building systems (**optional, for bonus**).

Your task is to build the application based on the base structure file only.  
You may also process the system model file as a **bonus**, using the same functionality and structure described below.

You are required to develop a web application with the following functionalities:

* **3D Model Visualization:**
  + Given a provided IFC file, the application should display a 3D interactive model of the building.
  + Users should be able to navigate and interact with the 3D model (e.g., pan, zoom, rotate).
* **Element Quantity Table:**
  + Below the 3D model, a table should display information about different building element types.
  + **Table Rows:** Each row in the table represents a unique element type, defined by its name and size.
  + **Table Columns:**
    - **Unit of Measure:** The unit of measure for the element type (e.g., meters, square meters, inch).
    - **Total Amount in Project:** The total quantity of elements of that type across the entire project.
    - **Total Amount in Level (per level):** For each level in the building, display the total quantity of elements of that type within that specific level. Elements are considered "in a level" if they are located between the floor and ceiling of that level.
* **Interactive Highlighting:**
  + **Highlight by Element Type:** When a user clicks on a specific element type (header of a row) in the table, all elements of that type should be highlighted in the 3D model.
  + **Highlight by Level:** When a user clicks on a specific level (header of a column) in the table, all elements within that level should be highlighted in the 3D model.

# Technical Stack

* **Backend:** Python
* **Frontend:** React

You are encouraged to use any additional libraries or frameworks within these technologies that you believe will aid this assignment.

# Submission Guidelines

* Please provide a PDF file explaining your approach and choices, along with your source code and clear instructions on how to set up and run your application.
* We encourage you to ask any questions you may have throughout the assignment.