**Documentation for Hospitality Process Digitalization Web Application**

**Overview**

This web application is designed to digitalize the hospitality process for group accommodation. Users can upload CSV files containing group information and hostel information, and the application will allocate rooms efficiently while ensuring group members with the same ID stay together and adhere to hostel capacities and gender-specific accommodations.

**Features**

1. Upload Group Information CSV: Allows users to upload a CSV file containing information about groups, including group ID, number of members, and gender.

2. Upload Hostel Information CSV: Allows users to upload a CSV file containing information about hostels, including hostel name, room number, capacity, and gender.

3. Room Allocation: Allocates rooms based on the uploaded CSV files while ensuring group members with the same ID stay together, boys and girls stay in their respective hostels, and room capacities are not exceeded.

4. Download Allocation Results: Provides a downloadable CSV file with the allocation details.

**Usage Instructions**

**Backend Setup:**

1. Navigate to the project directory and set up a virtual environment:

cd hospitality-app

python -m venv venv

source venv/bin/activate # On Windows use `venv\Scripts\activate`

2. Install necessary dependencies:

pip install Flask pandas

3. Run the Flask application:

python app.py

**Frontend Setup:**

1. Open a new terminal and navigate to the `client` directory:

cd client

2. Install dependencies:

npm install

3. Start the React application:

npm start

4. Open your browser and go to `http://localhost:3000`.

**Application Workflow**

1. Upload Group Information CSV:

- Use the "Upload Group Info" button to upload a CSV file containing group information.

- The CSV file should have the following columns: `Group ID`, `Members`, `Gender`.

2. Upload Hostel Information CSV:

- Use the "Upload Hostel Info" button to upload a CSV file containing hostel information.

- The CSV file should have the following columns: `Hostel Name`, `Room Number`, `Capacity`, `Gender`.

3. Allocate Rooms:

- Click the "Allocate Rooms" button to run the room allocation algorithm.

- The application will process the uploaded CSV files and allocate rooms based on the specified criteria.

4. Download Allocation Results:

- Click the "Download Allocation" button to download a CSV file containing the allocation results.

- The allocation results will include columns: `Group ID`, `Hostel Name`, `Room Number`, `Members Allocated`.

**Room Allocation Logic**

1. Initialization:

- Load and parse the uploaded CSV files for group and hostel information.

2. Allocation Algorithm:

- For each group in the group information:

- Retrieve the group ID, number of members, and gender.

- Find suitable rooms from the hostel information that can accommodate the group and match the gender.

- If suitable rooms are found:

- Allocate the group to the first suitable room.

- Update the room capacity to reflect the allocation.

- Store the allocation result.

3. Result Storage:

- Save the allocation results to a CSV file and return the results for display and download.

**Example CSV File Formats**

Group Information CSV:

Group ID,Members,Gender

101,3,Boys

102,4,Girls

103,2,Boys

104,5,Girls

105,8,5 Boys & 3 Girls

Hostel Information CSV:

Hostel Name,Room Number,Capacity,Gender

Boys Hostel A,101,3,Boys

Boys Hostel A,102,4,Boys

Girls Hostel B,201,2,Girls

Girls Hostel B,202,5,Girls