The Doors

High Level Design

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Abstract

A system for managing access control to rooms in a factory.

The system consists of three modules:

- Manager interface – includes managing, editing and adding factory employees' entrance permissions into rooms, as well as adding, removing and editing employees' details.
- Employee interface – Showing rea time data to the employee.
- Simulation engine – Checking the system in real life-like situations.

1. Introduction

1.1 General Project Description

This project deals with advanced managing of access permissions to rooms in a factory which holds several rooms with different access permissions.
We are focusing in three different modules:

i. Managing interface that contains database which holds information about rooms in the factory, employees and theirs access permissions to the different rooms. With this interface one can add, delete or edit the database and get stats on the different activities in the factory.
ii. Employees' interface that enables the employees in the factory to get information in real time about rooms, their capacity and the location of their friends.
iii. Simulation interface possible to configure that enables the manager to change the length of the simulation, add probabilistic parameters for getting realistic scenarios on the arrangement of the factory and displaying results according to times cuts.

1.2 Programming Environment

- Java
- Bootstrap
- Heroku + MongoDB
- Python (Django)

2. Basic System Functionalities

Manager interface:

- Login to the system using a user name and password.
- Add employee, delete employee and edit employee details.
- Editing, adding and deleting rooms in the factory.
- Add, modify and edit employees' access to the rooms.
- Access to the simulation engine.

Employee interface:

- Add friends and delete friends
- Receive a friend's location in the factory.
- Privacy management option (location sharing, temporarily or permanently)
- Receive room recommendations in real time based on room occupancy to balance factory loads (e.g., dining room).

Simulation Interface: (depend on the employee interface)

- Running a simulation on a factory structure which simulates the activity of the factory over a time, which was determined by the user.
- Changing the length of the simulation
- Displaying results over a time slice
- Opportunity to enter probabilities factors. For example: split of the arrival time of the workers, split of the room occupancy etc.

3. Software Implementation

3.1 Modules

- DB: input: CSV files which contain the data about employees and rooms. Output: updated data according to the manager's actions.
  Include details of the employees: id, name, role, permissions and list of friends. In addition, we have table of rooms: id, capacity, floor, permissions and schedule (array with 24X7 cells for every hour). Each room will be described in the following parameters: room id (the name of the room), maximum capacity of the room, the floor the room is in, the minimum permission needed to enter the room (for example: if the room has permission of an engineer, any person who has permission higher than engineer will be able to enter the room) and room schedule in the next week (the amount of people who wants to use this room in a specific hour).

- GUI:
    - Input: commands/files/simulation's parameters. Output: show the final result of the whole procedure/ update DB/ simulation's result.
      Manager interface which includes: login page, editing and managing the DB, a simulation engine interface.
    - Input: user commands. Output: show the final result of the whole procedure
      User interface: adding and removing friends, sharing location, data and schedule of the user. The GUI is adaptable according to the screen size and aspect ratio (tablet, computer screen, mobile).
- Backend: input: data from the GUI module. Output: side effect – update data.
  Manage the interactions between the users' actions and the database.

Dependencies between the above modules: the GUI module gets the commands from a user or the manager and sends them to the backend module. The Backend module executes the commands and afterwards sends the DB module data that needs to be updated. The DB module updates the data in the DB.

3.2 Main Menu

Web page that consists of a login page (user ID + password).

After a successful login the appropriate page would be displayed according to the type of the user (employee or manager).

- Employee case: options of adding and removing friends from their friends list. In addition employee can ask for a friend's location and schedule and set their privacy policy. Moreover, employee can choose to receive room recommendations in real time based on room occupancy.
- Manager case: options of adding, removing and editing employees' details. In addition data manipulations on the rooms in the factory. Moreover, the manager can access the simulation engine.

3.2.1 Features

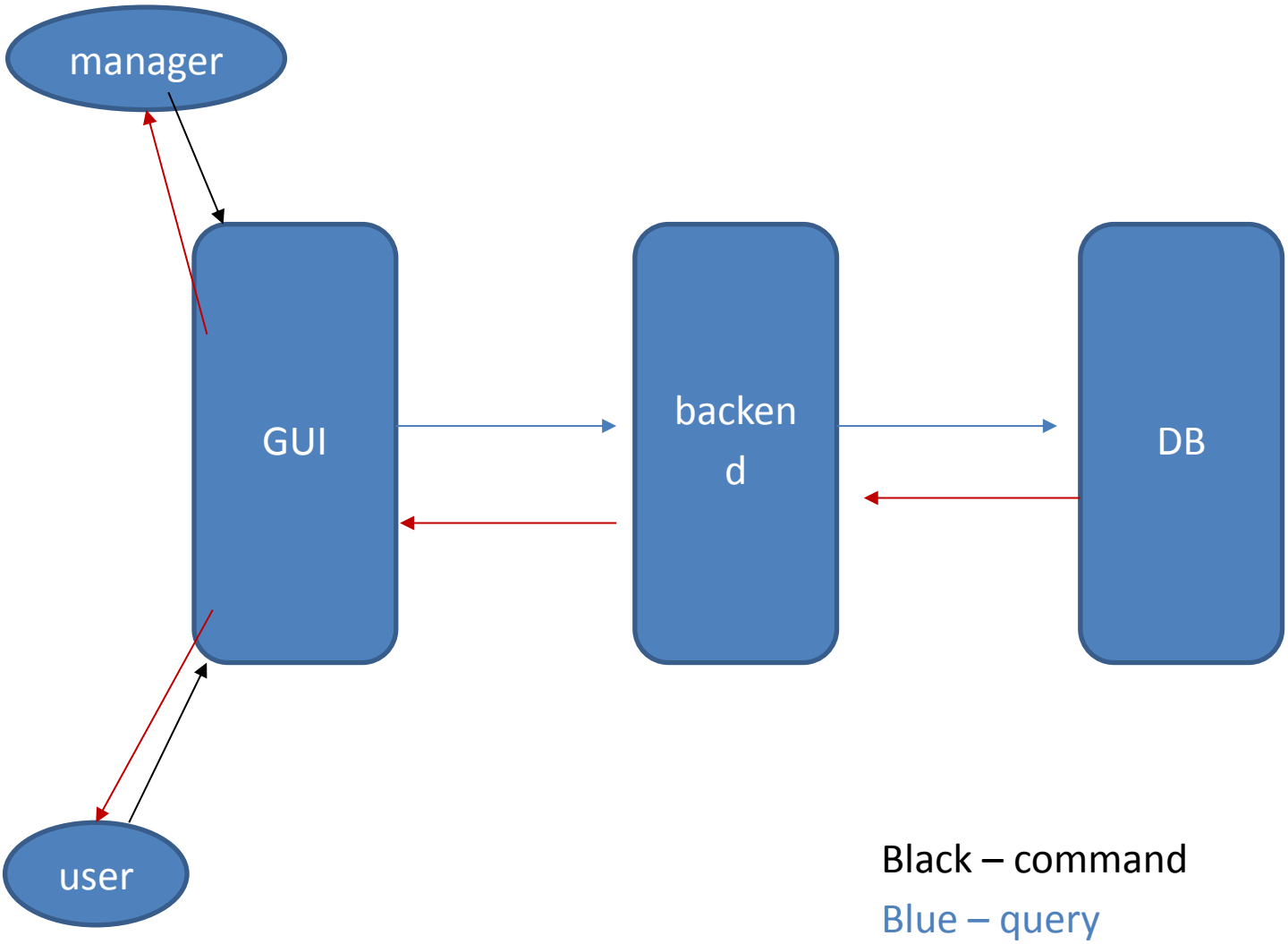
- Social networking – employees can add and remove friends, share their location and schedule with friends.
- Add weekly schedule – employees can add their weekly schedule and by doing so the system will know to balance the load according to these information.

- Request rooms according to employee's constraint – employees can request rooms and add constraint that fit their requests. Examples for these constraints are: number of people in this room, capacity of the room and minimum of permission entrance.
- Receiving list of rooms available in specific hour and select a room from this list. The system will inform the employee in case the room is full or almost full.
- Load balancing of high capacity rooms – for example dining rooms, for high load hours the system will suggest alternative dining times in real time.
- Simulation engine – provides the manager of the factory with a simulation of a work day in the factory considering loads on rooms, the simulation can have probabilistic and statistical parameters to provide a more realistic simulation of reality.
- Import/Export of Permissions – The manager can import a CSV file of the employees' information and export the database's table of employees to a CSV file.

3.2.2 User Interface

There are 2 users interfaces possible in the system. The first one: manager interface which enable the manager to edit and manage the DB, run simulations and export/import data files. The second one: Employee interface enables to add friends and share with them their location and schedule. In addition, the employee can get recommendation in real time based on room occupancy to balance factory loads.

4. Diagram:


manager
GUI
backend
DB
user
Black – command
Blue – query
Red - response