ADINT 2023/2024
Project – Part1

assign a qr code to every entity in the school:

- rooms
- restautant and canteen
- people

The user will use his smartphone to read the qr codes and depending on the entity different options will appear on the application.

1 Final project general description

IN the final version of the project students will implement a mobile application that allows users of an organization (for instance IST) access information about physical resources through Qr-codes.

IST students will use one application that reads QRcodes scatter in the environment (Services, restaurants, rooms, people 🤔 , …). After reading the widely available QRcodes, the applications allows the students to perform some context dependent actions.

QR code can be affixed to the following places:

- restaurants and canteens
- class rooms
- study rooms
- other users can also show a QRcode in his own application.

When a user with his application accesses a QRcode he is able to perform the following tasks

- restaurants and canteens
  - (F 1) see the current menu (Food admin App)
  - (F 2) reserve a meal (Food admin App)
  - (F 3) evaluate the meal he just reserved (Food admin App)
- Class rooms
  - (F 4) see schedule (Room admin App)
  - (F 5) verify the next class on the room if from one enrolled course
  - (F 6) check-in a class that is taking place in the room (Check-in app)
  - (F 7) check-out a class (Check-in app)
- study room
  - (F 8) Check-in and assign a enrolled class to a study period (Check-in app)

- (F 9)Check-out a study period (Check-in app)

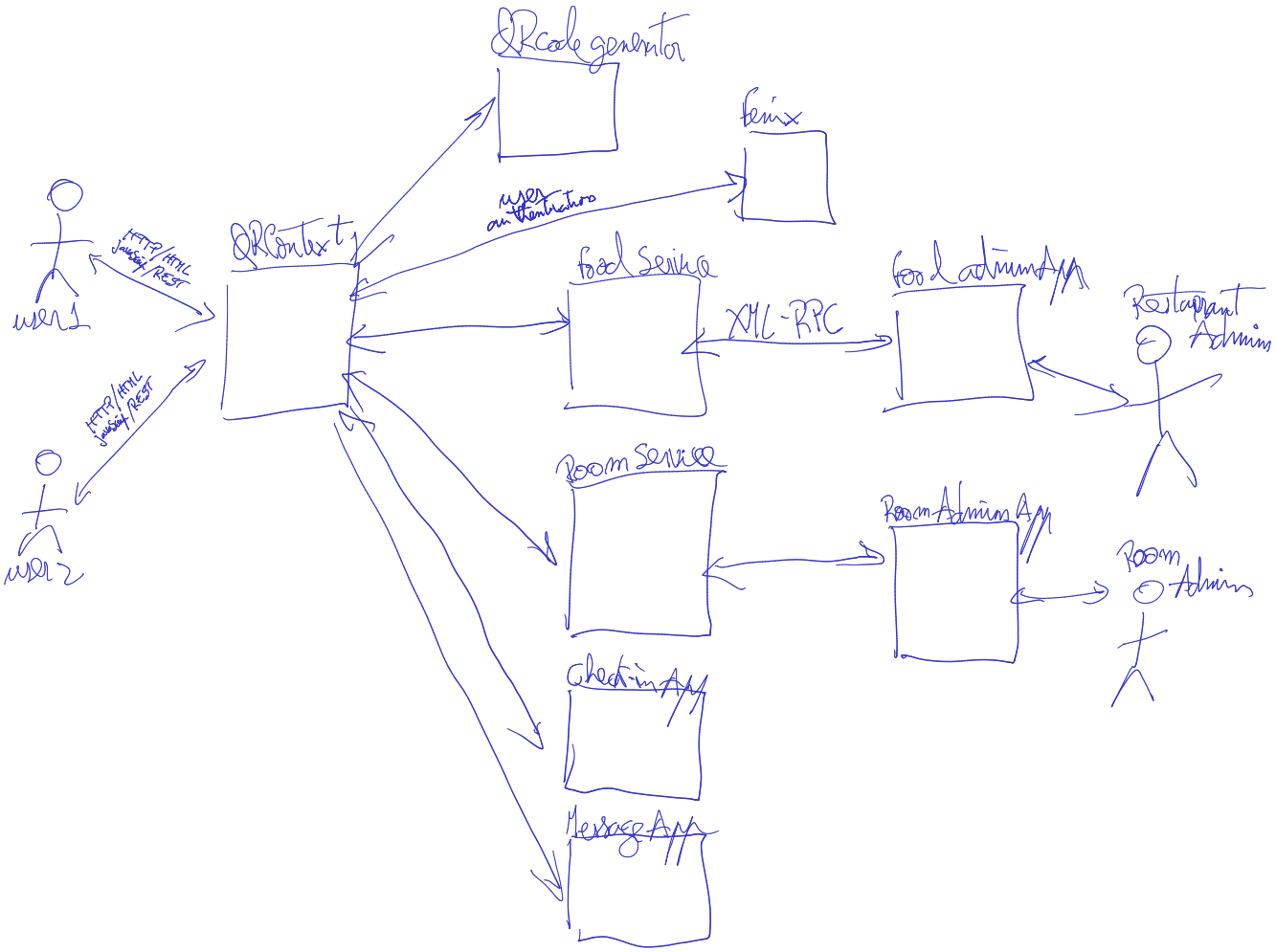
- other users:
  - (F 10) show a personal QRCode
  - (F 11) Send messages to users that are on the same room
  - (F 12) Send messages to users that presented their their QRCode

1.1 General operation

The description of the way users interact with application and executes the previous operations will be described in the second part of the project, but from the simple description of the functionalities (F 1 to F 12) it is easy to image how the mobile application will operate.

1.2 Overall architecture

The system to be implemented will be composed of various distributed components, as presented in the next figure:



The main components are:

- **QRContext** – web application that will be accessed from a smartphone to read Qr-codes and execute the user requests. This will simulate a Android/IOS mobile application. This component will only be developed in the final version of the project
- **QRCodeGenerator** – This service will generate PNG files that contains a Qr-code.
- **FENIX** – this component is external and is hosted at IST s and will provide user authentication, courses enrollment information and, on the final version of the project, rooms schedules.
- **FoodService** – this component is a web application that will store, for every registered restaurant or canteen, the menu of the day, and the user menu evaluations.
- **FoodAdminApp** – this application is a python desktop application that will allow the restaurants' administrator to create restaurants, update their menu, and see their evaluations.
- **RoomService** – this component is a web application that will store every room information and their weekly schedules.
- **RoomAdminApp** – this components is a python desktop application that will allow one administrator to insert rooms into the system and assign them a schedule.
- **Check-inApp** - this component is a web application that will store all check-in and check-out performed by the users on rooms or restaurants
- **MessageApp** - this component will store the messages that users exchange between them.

2 1st part

In the first part of the project students will only design and develop a set of independent services that will later be used to implement the overall system.

Each one the these services/components should be a separated python application, developed in different directories and , if necessary , using different ports.

2.1 QRCodegenerator

This component is a web application (implemented with flash) composed of a HTML page with a form and a endpoint that creates and shows on the browser a qrcode.

The text too appear on the QR code is inserted by the user on the form.

2.2 FoodService / FoodAdminApp

The FoodService is a web application that also exports a set of XML-RPC functions to be called by the FoodAdminApp.
The FoodAdminApp will allow an administrator to create a new restaurant/canteen, and update the corresponding menu. This application should have the following menus:

- Create Restaurant

- List restaurants
- Update menu
- Show evaluations

The FoodService, besides receiving the requests from the FoodAdminApp, will present on the browser:

- a list of restaurants
- ~~for each restaurant provide a page with the Qr-code~~
- for each restaurant provide a page with the menu.
- For each restaurant provide a form for the user to evaluate the restaurant

Not to be done on Part1

2.3 RoomService / RoomAdminApp

The RoomService is a web application that also exports a set of XML-RPC functions to be called by the RoomAdminApp.
The RoomAdminApp will allow an administrator to create a new room, and update the corresponding schedule. This application can have the following menus:

- Create Room
- List Rooms
- Update schedule

The RoomService, besides receiving the requests from the RoomAdminApp, will present on the browser:

- a list of rooms
- ~~for each room, provide a page with the Qr-code~~
- for each room, provide page with the schedule.

Not to be done on Part1

2.4 Check-inApp

The Check-inApp will present the following pages:

- a page for a user to register a check-in in a Room or restaurant
- a page for a user to register the check-out
- a page to list the check-(in/outs) performed by a user

2.5 MessageApp

The MessageApp will provide a set of web pages that implement the following functionalities:

- send a message to a specific user

- list messages sent by a specific user
- list messages sent by specific users

3 Technologies

In order to implement the requested functionalities and services, students should use Python, Flask, SQLAlchemy and FLASK-XML-RPC as already exercised in the laboratories.

4 Development guidelines

In order to ease the development of the project the students should follow implemented the components in the following order:

1. Develop the QRCodeGenerator
2. Develop the FoodService and FoodAdminApp
3. Develop the RoomService and Room admin App
4. Develop the Check-inApp
5. Develop the MessageApp

For each of the components, beside the definitions of the pages, forms and endpoints students will also need to define the Database structure, i.e. the data that will persist.

One of the information that students should define before starting to program is how users, rooms, courses or restaurants are identified in the system (e.g, strings or sequential number, or random number, …)

Students should consult the following REST web-services to understand how FENIX identifies those entities:

- https://fenix.tecnico.ulisboa.pt/api/fenix/v1/courses/283085589466130/students
- https://fenix.tecnico.ulisboa.pt/api/fenix/v1/spaces/2448131362722

In the RoomAdminApp, for the administrator to insert with the schedule of the room, JSON can be used. Its format should be the same as presented in the events element of the room FENIX API:

https://fenix.tecnico.ulisboa.pt/api/fenix/v1/spaces/2448131362722


```
[
   {
      "type": "GENERIC",
      "start": "11:30",
      "end": "12:30",
      "weekday": "quinta",
      "day": "28/09/2023",
      "period": {
         "start": "28/09/2023 11:30",
         "end": "28/09/2023 12:30"
```

```
      },
      "description": "..",
      "title": " aula de substituição"
   },
   {
      "type": "LESSON",
      "start": "10:00",
      "end": "12:00",
      "weekday": "quarta",
      "day": "27/09/2023",
      "period": {
         "start": "27/09/2023 10:00",
         "end": "27/09/2023 12:00"
      },
      "info": "T",
      "course": {
         "id": "283085589466130",
         "acronym": "ADInt",
         "name": "Aplicações Distribuídas sobre a Internet",
         "academicTerm": "1º semestre 2023/2024",
         "url": "https://fenix.tecnico.ulisboa.pt/disciplinas/ADInt/2023-2024/1-
semestre"
      }
   }
]
```


5 Intermediate delivery

Student should submit on FENIX a zip file with the code of the various implemented components along with a simple report stating the implemented functionalities, the endpoints of the various services/components and the SQLAlchemy classes.

Deadline: 8th october 2023 - 20h00