**Faculdade de** **Engenharia** **da**​  **Universidade** **do** **Porto**​

​ ​ 

​ **Sistemas de Informação e Base de Dados**

# MIEEC

# **Project Report**

COVID-19 Management System

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# Topic description:

In a hypothetical circumstance, the University of Porto intends to implement a tracking system designed to identify possible COVID-19 infection chains between students, professors, and other staff workers. The system consists in tracking every member of the community who has attended each class in person and isolate everyone who recently encountered a sick person.

        • The system works across the entire University, being separated by different faculties such as the faculty of engineering or the faculty of arts and humanities.

        • Every person that studies or works on the college is stored in the database. Their home address is also stored so that it is possible to control possible specific outbreak locations. (to provide the authorities with information on where the positive cases reside? yeah, kinda. ---- Mas se calhar também é melhor deixarmos isto um pouco mais para o fim visto que podemos não conseguir implementar um google maps API)

        • Every student has a unique student number (ID), a name, an institutional e-mail, tax identity number and a phone number. Each student is enrolled or not in a certain number of courses during each semester. They are also enrolled in a specific class of each of the courses they attend to in that semester. Each student is also associated to one degree (e.g. a major, master or doctorate program, which is itself also associated to one faculty of the University).

        • Every professor in the university also has a unique ID number, a name, an institutional e-mail, and a possible classification (in case they work as researchers as well). Professors can also enroll in courses as students, in which case they use that same ID number. A professor that also acts as a student is possibly associated to two different faculties (one as a student, one as a professor).

        • Each classroom has a designated janitor as the cleaning responsible for it. Each janitor has an ID number, a name, and a phone number.

        • It is important to keep track of which course each student attends. Each course has at least one professor associated to it.

        • Each course can have different classes taken in different schedules and can be taught by different professors or by the same one. Each class group is taught in one assigned classroom on every occasion.

        • Each class of each course has a list of students enrolled to it and a recurrence (the days and times it happens). For every occurrence of a class, a list of people who attended in person is to be generated (through the reading of the student/staff card) to keep track of who has been in contact with whom.

        • To be computed as being present in a class, every person must have swiped their cards within the time period of the class they're attending.

        • Whenever there is a confirmed case of COVID-19 within the community, every person who has attended the same classes as them in the last two weeks is to be contacted and remain in isolation. The janitor responsible for that classroom is to quarantine as well. In this case it is attributed a red warning to these people.

        • If a student receives a red warning (direct contact with a sick person) then every other student in other classes with this same student receives a yellow warning so they can be more careful and attentive to possible symptoms.

        • In case a janitor tests positive, everyone who attended a lesson in any of the classrooms under their responsibility should also receive a yellow warning.

# UML diagram:

# Relational model:

Person(id, name, tax\_id, address, phone\_number, tag)

NOT NULL(id, name)

UNIQUE(id, tax\_id)

Student(id -> Person, institutional\_email, degree -> Degree, faculty -> Faculty, course -> Course, occurrence -> Ocurrence) // não sei se é preciso colocar depois das outras classes tipo: Faculty -> DegreeType -> Degree -> … -> Student

Professor(id -> Person, institutional\_email, classification)

Janitor(id -> Person)

Faculty(id, name, address)

NOT NULL(id, name, address)

UNIQUE(id, name)

DegreeType(code, name)

NOT NULL(code, name)

UNIQUE(code)

Degree(acronym, name, faculty -> Faculty)

NOT NULL(acronym, name, faculty -> Faculty)

UNIQUE(acronym)

Course(acronym, name, degree -> Degree)

NOT NULL(acronym, name, degree -> Degree)

UNIQUE(acronym, name)

Class(course\_acronym, number, course -> Course, occurrence -> Occurence)

NOT NULL(course\_acronym, number)

UNIQUE(course\_acronym + number) // será que está certo assim?

// Aqui na ligação n-ária não sei bem como fazer o modelo relacional, não temos nenhum exemplo nos exercícios

Classroom(number, janitor -> Janitor, occurence -> Ocurrence, class -> Class, faculty -> Faculty) //como disse, não sei fazer bem n-ária, sublinhei para estarmos atentos

NOT NULL(number, faculty -> Faculty)

Occurrence(id, start\_time, end\_time)

NOT NULL(id)

UNIQUE(id)

CHECK(end\_time > start\_time)

Enrolled(student -> Student, course -> Course, classnumber)

Attendance(student -> Student, occurrence -> Occurrence, present)