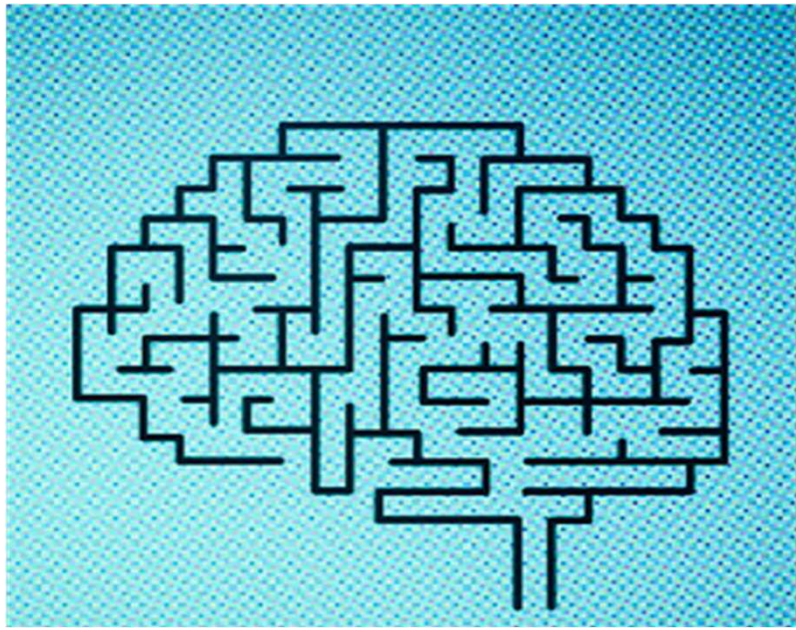
Project Guide 01

Artificial Intelligence (AI), 2023-24

Degree on Computer Systems Engineering

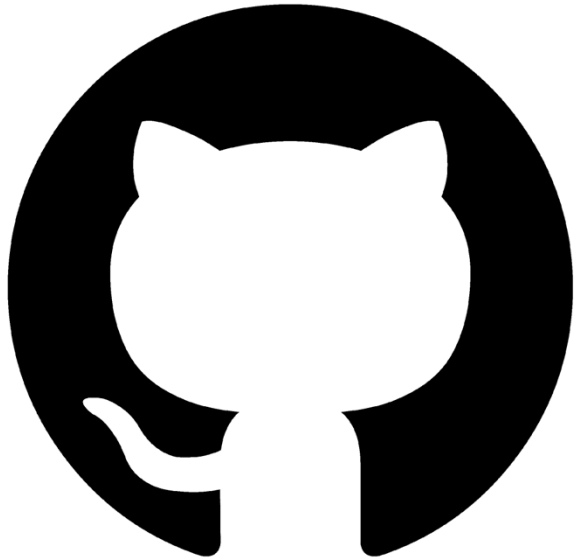
Introduction

- The goal of the project is to develop an intelligent agent, documenting the design and implementation steps
- Each team must consist of **3 students**
- The project must be available in a Github repository
  - The code and documentation must be merged into a Jupyter Notebook
  - The repository must contain all files required to run the solution
- A ZIP file of the repository must be submitted on Moodle before the deadline



GitHub Platform

- Each student must create an account on the GitHub platform
  - One of the members of the group must create a private repository
  - Use the nomenclature "IA_G##", where G## corresponds to the group
  - Add the other members of the group as collaborators
- The lecturer should also be added to the repository and the project



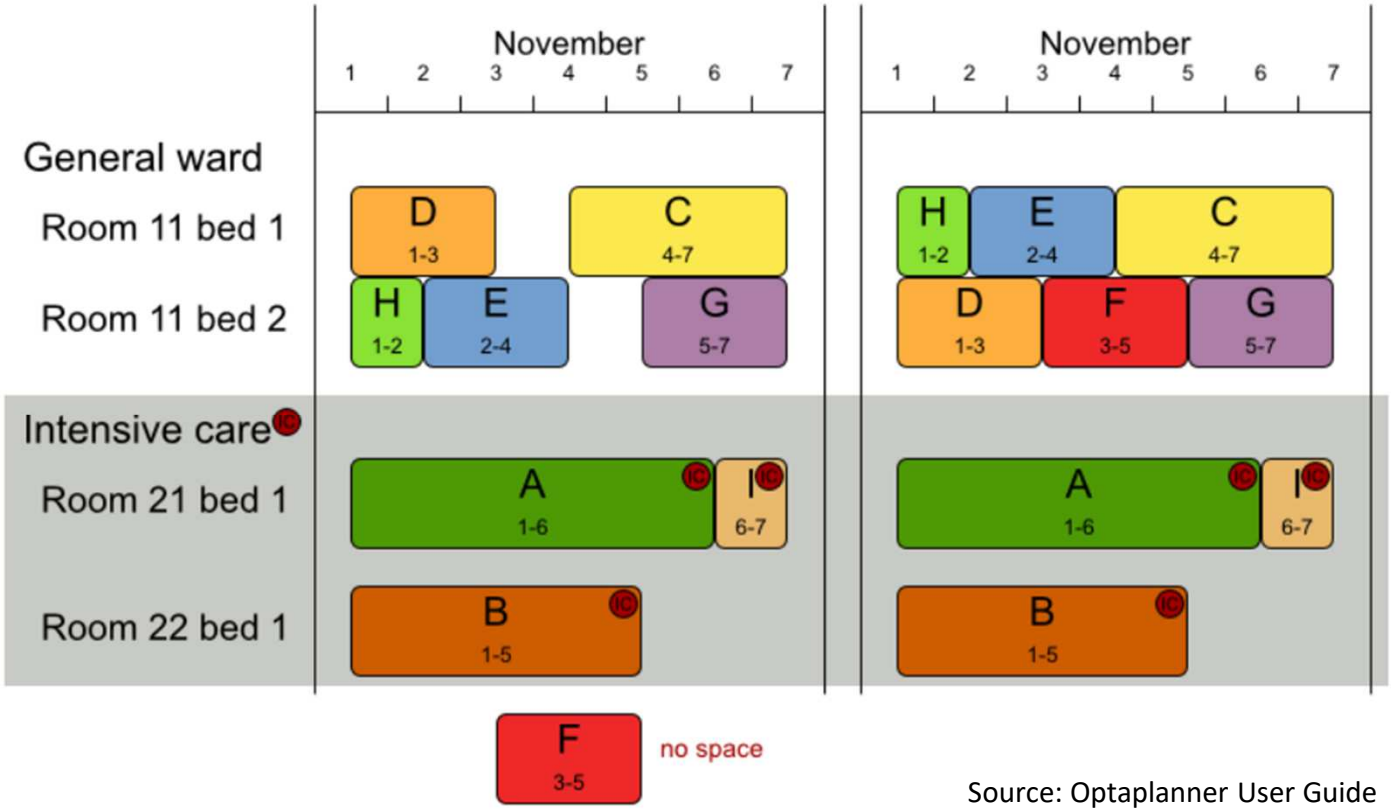
Theme: Patient Admission Scheduling

Patient Admission Scheduling

- Assign each patient (that will come to the hospital) into a bed for each night that the patient will stay in the hospital.
- Each bed belongs to a room and each room belongs to a department, e.g., cardiology.
- The arrival and departure dates of the patients is fixed: only a bed needs to be assigned for each night.

Example

- In the left, it was applied the largest admission first strategy in the scheduling.
- In the right, the scheduling was done using a CSP strategy.



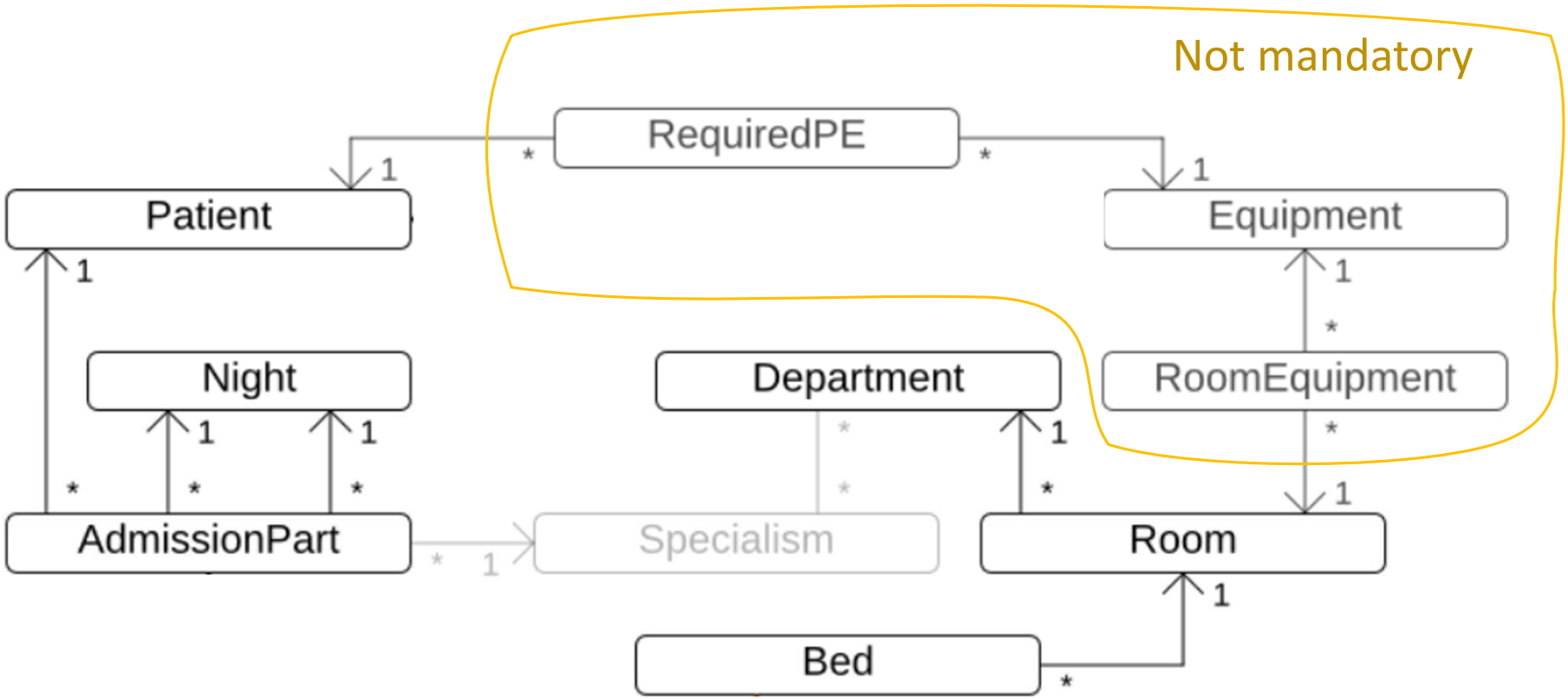
Source: Optaplanner User Guide

Constraints

- Strong constraints
  - 2 patients must not be assigned to the same bed in the same night
  - Room gender limitation: only females, only males, the same gender in the same night, or no gender limitation
  - A patient can require a room with specific equipment(s)

- Other constraints can be added to make this problem more realistic
  - A patient is best assigned to a department that specializes in his/her problem
  - A department can have a minimum or maximum age.

Class diagram



Source: Optaplanner User Guide

Jupyter Notebook

Notebook structure

- Introduction
  - Establish here the context and the purpose of project
  - Identify the teammates: student name and number

- Goal formulation
  - Definition of the goal, possible limitations, and actions to be taken

- Plan and design an appropriate agent
  - Describe the agent (PEAS) and the characteristics of the task environment
  - Formulate the problem as a search problem
  - Present the algorithm used (pseudo-code)
  - Highlighting the heuristics applied

Notebook structure (2)

- Agent running
  - Provide a solution for one or more initial states
  - Carry out a critical analysis of the results and identify some future improvements for the agent
- Conclusion
  - Draw up a conclusion about the outcomes achieved, the development process and the tools used.
- The structure of the notebook should be adapted according to each project characteristics.

Thank you!