Data Structures and Algorithms

XMUT-COMP 103 - 2025 T1

Medical Office Simulation

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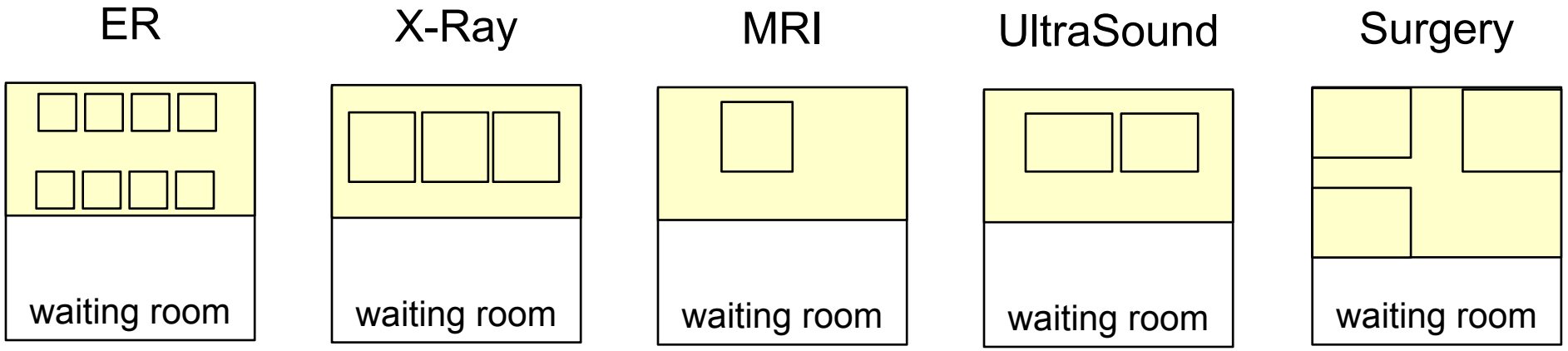
Simulation

- Event-based simulation
  - Keep a (priority) queue of all the events that are going to happen
  - Each iteration of the main loop
    - takes the first event off the queue,
    - updates all entities affected by the event,
    - adds new events to the queue for each future consequence/effect of this event.
  - More efficient if most entities don't change most of the time
    but conceptually more complicated

Assignment: Hospital Simulation

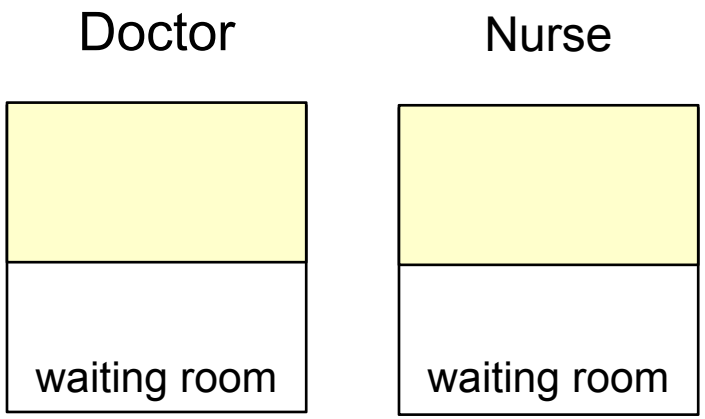
- simulation of system with complex set of queues and processes.



- Each time tick:
  - new patients may arrive at the hospital and are allocated a list of departments they need to go to
  - patients in the treatment rooms get another time tick of treatment.
  - patients who have finished treatment go to the waiting room of the next department on their list.
  - if there is space, patients in the waiting room go in for treatment

Assignment: Medical Office Simulation

- simulation of system with just two queues



- [*Go through the program*]

Doctor's office: A simulation

- At the beginning of the day start the clock
- Loop until the end of the day: Each minute
  - Advance time by a minute
  - If there is a patient in the office
    - Treat the patient
- If the patient is ended treatment, ask the patient to leave the office
- Update the waiting room
  - If the office is empty get a new person from the waiting room
  - Increase the wating time for everyone who is still in the waiting room
- Randomly patients arrive to the waiting room

Assignment 3

- Hospital simulation
  - Tick based simulation
  - Queues, priorityqueues, sets, lists of queues, maps,….
- MineSweeper
  - recursion!
- MedicalCenter