

# Planning the rooms and the nurses for patients. (Hospital management)

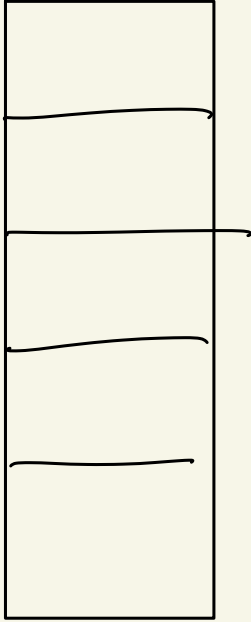
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List of patients : mandatory      earliest date      latest date  
   optional      earliest date

↳ 1st question: when/if do we schedule the surgery of these patients

time horizon: 1      - - - - - 28  
(up to 4 weeks schedule horizon)

A certain number of rooms:



Capacity: max # of patients they can host.

Some rooms cannot be assigned to some patients.

In a room:  
you cannot host 2 people of different gender.

Hard constraints

Soft constraints: participate to the objective

Allocate one nurse to each room

Skill level  
of the nurses

$n_1 : 3$

$n_4 : 1$

$n_5 : 2$

(penalty of 2  
for room  
with  $p_7$ )

$p_1$ 1	$p_2$ 1
1	$n_1$ 3
$p_7$ 2	$p_9$ 3
3	$n_4$ 4
1	$p_{13}$ 2
	$n_1$
$p_3$ 1	$p_4$ 1
	$p_8$ 2
	$n_5$ 2

workload

$$n_1: 1+1+2 : 4$$

$$n_4: 2+3 : 5$$

$$n_5: 1+1+2 : 4$$

max  
workload

3

3

3

Here penalty of  $(1+2+1)=4$   
for being above the workload

nurses have days in which they work

## Additional soft constraints:

Continuity of care : # of different nurses a patient sees contributes to the obj.

Age mix : each patient has an age group. If there is a mix of ages in a room: penalty

Unscheduled patient : penalty  
Admission delay : the later after the earliest date, the more the penalty.

## Groups of 2 :

- Mixed - binary (or integer) formulation  
(not a problem if it does not finish on large instances)

(it should run  
for at most ←  
10 minutes)

Heuristic (present next week)  
that can rely partly on the MIP formul.  
or not  
to propose the best possible solution.

$\frac{1}{3}$  of the final mark | written in julia

1st group in the contest: +2 points at the end  
2nd group +1 point

(unless there are too few groups)

May 5 : submit the code

May 7 : oral presentation of the codes

Submit the members of your group by March 19