

Patient - Room allocation in a Hospital Station

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Bed spaces and nursing staff are two of the most important and scarcest resources in hospitals. Due to a shortage of personnel, hospitals are currently having to reduce the number of beds in individual wards or even close entire wards. The most efficient utilization of the remaining bed spaces is therefore becoming increasingly important to ensure good care for the care of the population.

Up to now, patient-bed allocation has been carried out manually by experienced nursing staff. Since several factors have to be taken into account in the allocation process, this involves a high level of high administrative effort.

Your task is to create the best possible patient-room assignment for a hospital ward for the next four weeks. For this purpose, each patient has to be assigned to a bed in a room on each day of his stay. It is not possible to place patients in additional beds in the corridor.

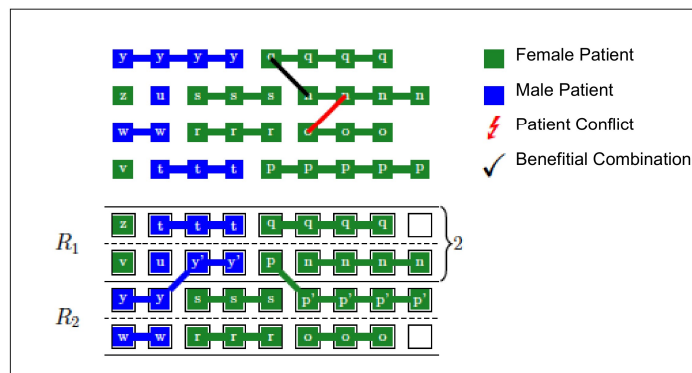


Figure 1: Patient-Bed allocation in a Station consisting of Double Rooms

However, there are restrictions on which patients can be accommodated together in one room. For example, a man and a woman may not be housed in the same room at the same time. Additionally, there are other conflicts between individuals of the same gender that must be avoided.

Furthermore, there are also advantageous patient combinations that can relieve the can reduce the workload of the staff: For example, a patient who only has a broken arm can provide drinks to a patient who is not allowed to stand up, so that a nurse does not have to be called each time for this purpose. For this reason, it is also always advantageous to place patients whose surgery appointments are two days apart in the same room.

There are also patients who are entitled to a single room for medical or insurance reasons. However, this entitlement can be waived in individual cases if there is an acute shortage of bed space.

In order to maintain an allowable occupancy, it may be necessary for patients to change rooms during their stay. However, a change of room always means a burden for the patient and additional work for the staff. Therefore, it should be noted that each patient should not be transferred more than once, and that not too many transfers should be carried out.

Figure 1 shows an example patient-bed assignment over a period of nine days on a ward consisting of two double rooms. Due to the incoming patients there is a conflict and an advantageous patient combination.

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