

COL333 ASSIGNMENT-2

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In this assignment we must arrange the nurses in the shifts by satisfying the requirements of both the nurse and the hospital.

Conditions are:

- 1) At least 1 rest per week per nurse
- 2) No M->M and E->M for any Nurse
- 3) Senior nurses prefer E&M ahead of A&R

We have defined some functions like,

- 1) Allocrest(d) – allocates rests on the day “d”
- 2) Allocmor(d) – allocates mornings on the day “d”
- 3) Allocnoon(d) – allocates afternoons on the day “d”
- 4) Allocrest(d) – allocates evenings on the day “d”

Each day we will fill the mornings, rests, afternoons, and evenings respectively.

Morning shifts:

As we have condition that M->M and E->M is not valid. So, mornings on day “d” should come from either A of “d-1” or R of “d-1” or from both A and R. So, R->M, A->M are only possibilities. So first we will assign the M as R->M, because to give chance of rest to the nurses with A on a particular week. And if any we will move to the non-rest taken nurses with A and assign A->M and then go to the remaining A.

Rest shifts:

As every week we should have at least one rest for the nurse, we will first prefer the nurses who haven't got the rest in that week. And then A->R, E->R, M->R respectively.

Afternoon shifts:

As we have to obtain max 1's and 3's together, so the preference goes in this way, A->A, R->A, M->A, E->A.

Evening shifts: Remaining are evenings.

And for checking no solution case we have give some constraints,

- 1) If $D \geq 7$ (i) $(N+6)/7 > r_shift$ or (ii) $a_shift + r_shift < m_shift$
- 2) If $D < 7$ (i) $r_shift < 0$

In these cases we didn't have any solution. (As $(N+6)/7$ is the min_rests in a complete week day).

And in remaining cases there will be a solution, as we are greedily arranging a day with the day-1 slots.(new rests are allocated for those who haven't rested in that week && mornings are coming from only after noons and rests,so all conditions will be satisfied).