

1. Decision Variables:

+) $X[i,j,k] = 1$ if staff i work on phase k of day j , 0 otherwise

Such that: $1 \leq i \leq N$, $1 \leq j \leq D$, $1 \leq k \leq 4$

+) $Y[i,j] = 1$ if staff i have a day off on day j , 0 otherwise

2. Constraints:

+) Each day, an employee can only work one shift at most:

$$\sum_{1 \leq k \leq 4} X[i,j,k] \leq 1, \text{ với } 1 \leq i \leq N, 1 \leq j \leq D$$

+) If you work the night shift the day before, you can rest the next day:

$$X[i,j,4] + \sum_{1 \leq k' \leq 4} X[i,j,k'] \leq 1, \text{ với } 1 \leq i \leq N, 1 \leq j \leq D$$

+) List of employee leave days i :

$$F[i] = \sum_{1 \leq j \leq 4} X[i,j,4], \text{ với } 1 \leq i \leq N, 1 \leq j \leq D$$

+) Each shift in each day has at least α employees and at most β employees:

$$\alpha \leq \sum_{1 \leq i \leq N} X[i,j,k] \leq \beta, \text{ với } 1 \leq j \leq D, 1 \leq k \leq 4$$

3. Objective function:

N min with $N \geq F[i]$