
Question 2

(a) Constraints to add:

For every employee i and every day k from $[1, 6]$:

$$x_{i,3,k} + x_{i,1,k+1} \leq 1.$$

$$x_{i,3,7} + x_{i,1,1} \leq 1$$

(b) One other rule that could be enforced is that no worker can work more than one full day's worth of work during the entire weekend (both Saturday and Sunday).

Constraints to add:

For every employee i and every shift j from $[1, 3]$:

$$x_{i,j,6} + x_{i,j,7} \leq 3.$$

$$x_{i,3,7} + x_{i,1,1} \leq 3$$

(c) One possible policy that could not be coded into the program are workers cannot have holidays off because our program uses the basis of Monday through Sunday and not dates. For example, Christmas is December 25, but we have no way of knowing which day that correlates to this date as we only keep track of Monday... Sunday. We would need several more variables and constraints to make this possible and it would be difficult to efficiently account for.

Another possible policy that could not be coded would be established work from home time. This is hard to account for because the store requires that there be some employees in the store, but we don't know which employees can do their jobs from home vs at work. If every staff member does the exact same job then it is possible, but that is unrealistic in an actual job setting as each person will have a different job. This means that this can't be defined as a linear program since we cannot define accurate constraints.

Question 3

(a) Before, we minimized

$$\sum_{i=1, j=1, k=1}^{i=n, j=3, k=7} x_{ijk}$$

. This was the total sum of all employees shifts from Monday to Sunday. Now, we can minimize

$$\sum_{i=1}^{i=n} \|x_{ijk_x} - y_{ijk_y}\|$$

where j represents the shift that worker i is on and k represents the day they are working for schedules x and y respectively. In other words, we take the difference in schedules for every workers i... n and see how we can minimize this difference. We only need to minimize the difference between x_{ijk} and y_{ijk} because this will give us the total change in sum from Tuesday to Sunday (the schedules will always be the same on Monday). This will minimize the total change because we are taking the absolute value of the difference.

Question 4

I would personally agree with this statement because I think the system in place in America needs to hybridize a mix between profits and workforce health/safety. This legislation allows for early, flexible schedules for all employees which can be key in ensuring future health. As O'Neal says repeatedly, the ramifications of not accounting for ethical workplace rules are massive and can greatly impact both the company and the individual. *Since this legislation emphasizes putting forward schedules early on, this helps make our linear programming optimization more efficient. We reduce the chance of having to modify schedules frequently if stable schedules are made and are made earlier on, making our optimization more efficient. While there is an argument to be made that businesses lose money because they cannot dictate the employees to work at the most profitable hours, money made through unethical means should not be money earned at all. Businesses having the ultimate flexibility in time at the cost of employees' stability is an example of this unethical practice and should be removed.