New Model

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Let e be the number of evening spots. $e \in [1, ..., 21]$

Let i be the course which have evening prelims; S,P, and T represents 1,2 and 3 prelims respectively. So, we would have $i \in S \cup P \cup T$.

For each $i \in S$, $S_i = \{S_j : S_j = \{e_j^1\}\}$ where $j = 1, ..., S_i$

For each $i \in P$, $P_i = \{P_j : P_j = \{e_j^1, e_j^2\}\}$ where $j = 1, ..., P_i$

For each $i \in T$, $T_i = \{T_j : T_j = \{e_j^1, e_j^2, e_j^3\}\}$ where $j = 1, ..., S_i$

Let X_{ik} be the course i has the k legal configuration of prelims. And we have $\sum_{k=1}^{K_i} X_{ik} = 1$ for $i = 1, ..., C$

$$y_{ii'e} = \begin{cases} 1, & i \ selects \ e \in k \\ 0, & i' \ selects \ e \in k' \end{cases}$$

So, we would have $X_{ik} + X_{i'k'} \leq 1 + y_{ii'e}$ for each e and each $k \in K_i$, and $k' \in K_{i'}$ where e is in both k and k'. To generate conflicts, we would have $X_{ik} = 1$, $X_{i'k'} = 1$ and $e \in k \cap k'$. We denote it the number of conflicts as $n_{ii'}$.

Then, we would have $\sum_i \sum_{e \in k} n_i X_{ik} \leq L$. And the objective function would be $\sum_e \sum_i \sum_{i'} n_{ii'} y_{ii'e}$