What a complete traffic light “cycle” consists of?

- Main St Red
- Main St Yellow
- Main St Flash No walk
- Main St Walk
- Cross St Red
- Cross St Yellow
- Cross St Flash No Walk
- Cross St Walk

Period that vehicles can pass

Period that pedestrians can pass
Current Light Patterns

Main Street Walk Time for Weekdays

Main Street Walk Time for Weekends

Cross Street Walk Time for Weekdays

Cross Street Walk Time for Weekends

Fixed all the time
Build the new traffic light patterns

Use scipy.optimize

Constraints/Assumptions:
1. Total Cycle is 60-110s (adjust according to different intersections)
2. The differences between main st & crs st cycle is less than a constant C (adjust C according to different intersections)

What if pedestrians and vehicles follow different directions on State St?

- 80% peds & vehicles go main st, 20% peds & vehicles go crs st
- 80% peds & 40% vehicles go main st, 20% peds & 60% vehicles go crs st

Traffic congestions may arouse
The rate of vehicles/peds matters

light patterns if trf & peds follow same direction

light patterns if trf & peds follow different direction
Vehicles oriented → more pedestrians oriented

Optimization result for traffic on Mon-Thurs

<table>
<thead>
<tr>
<th></th>
<th>Main ST cars</th>
<th>Crs ST cars</th>
<th>Main ST peds</th>
<th>Crs St Peds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg waiting</td>
<td>12.4</td>
<td>4</td>
<td>20.6</td>
<td>9.2</td>
</tr>
<tr>
<td>Avg waiting after optimization</td>
<td>9.3</td>
<td>8.7</td>
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