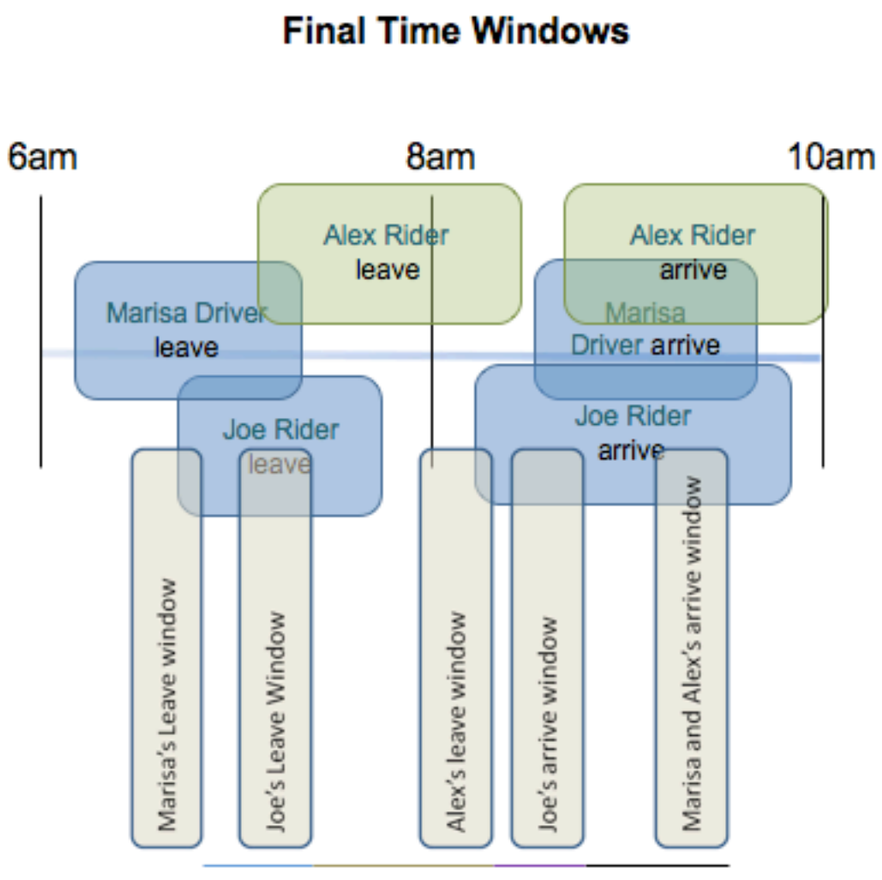
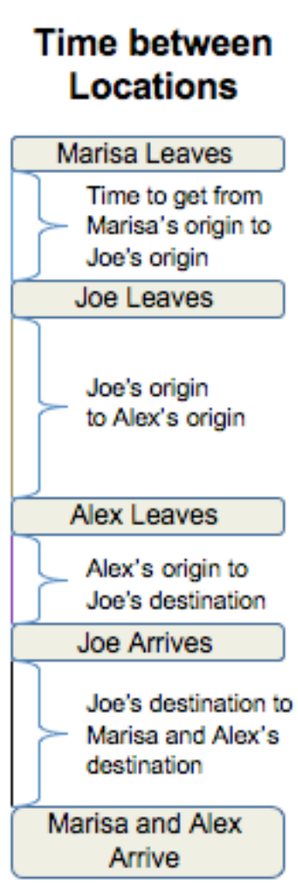
Compatibility - Can I Add This Rider?

How to take a Rideshare and rider and ascertain whether they are compatible. This might sound like a simple enough task, but it involves much more than meets the eye.

Of course, checking for age and gender preferences is simple enough. But schedule and route compatibility are a different story. It turns out that the first can be done if we apply a clever observation about the Driver's worst case leave window, and the second is yet another instance of our good friend the Vehicle Routing Problem.

Suppose we have Marisa Driver and Joe Rider in a match, and we would like to see if adding a Alex Rider would create an incompatible ride schedule or route length.





To do this we need to find out the best way of ordering the riders, so as to minimize route length. Since the capacity of a vehicle is fairly small, we find the best route by simplytrying all combinations.

Once we have an optimal route for this group, we verify that the itiner ary doesn't conflict with anyone's schedule. We do this by narrowing the leave and arrive windows until we reach a worst case leave window for the driver.

We then add to this leave window the time necessary to get from point to point, each time verifying that the users' time windows do not conflict with the arrival window for that point.