Consider a city network where we need to route a set of electric vehicles

which may require to be charged during its journey from some source to some destination. Let us assume that we have n cities $(v_1, v_2, \ldots, v_n)$ and the distance between cities v_i and v_j be e_{ij} (if two cities are not connected directly then $e_{ij} = \infty$ and $e_{ij} = e_{ji}$). Assume that each city has a single charging station which can charge one EV at a time. Consider a set of k EVs namely $P_1, P_2, \ldots, P_k$. For each EV the following information is provided -

(a) S_r - source node

(b) D_r - destination node

(c) B_r - battery charge status initially

(d) c_r - charging rate for battery at a charging station (energy per unit time)

(e) d_r - discharging rate of battery while traveling (distance travel per unit charge)

(f) M_r - maximum battery capacity

(g) s_r - average traveling speed (distance per unit time).

Assume that all vehicles start their journey at $t = 0$ and P_r reaches it destination at $t = T_r$. We need to route all the vehicles from their respective sources to destinations such that $\max\{T_r\}$ is minimized. You need to develop both optimal as well as heuristic algorithms.