Optimal Path for data transfer in a network

Heuristic function choice:

- I have chosen Manhatten distance as my heuristic based on the constraints on my network
- Manhatten's distance = |x1 - x2| + |y1 - y2|
    - Where (x1,y1) and (x2,y2) are coordinates of our node in a network graph model

Proof for consistency of our heuristic based on conditions on our network:

The range of Abscissa of our coordinates is 0 to 100
The range of ordinates of our coordinates is 0 t0 100

The max value of h(n) is |0 - 100|+|0 - 100| = 200

The min-cost between any two nodes is 200 (based on constraints imposed on our network by the designer (Please check code we generated costs from 200 to 10000 for our network graph model)

So,

h(n) <= h(n`) + c(n,a,n`)

Max(h(n)) = 200
Min(c(n,a,n`) = 200 and h(n`) >=0

So h(n`)+c(n,a,n`) >= h(n) holds for every node .

= > Our Heuristic is Consistent and admissible

Therefore by theorem, We always get the optimal path if use this heuristic in our A* algorithm for our network graph model.

Github Link : optimal_path_github_repo