CENTER SELECTION PROBLEM

Greedy center selection algorithm

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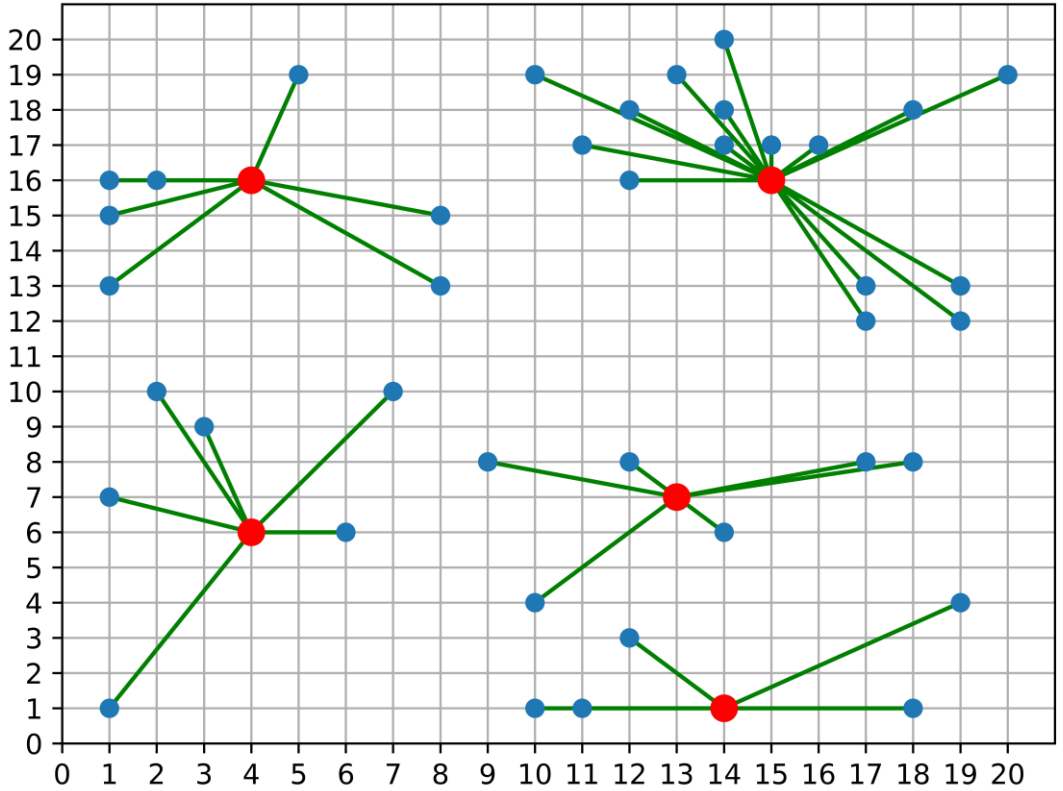
CENTER SELECTION PROBLEM

This problem's objective is to minimize the maximum distance from each site to the nearest center.



GREEDY CENTER SELECTION ALGORITHM

This algorithm use a greedy strategy to choice the sites as the center.

Firstly, it will choice an initial center randomly.

Then, choice the farthest site from the centers as the next center iteratively until we get enough centers.

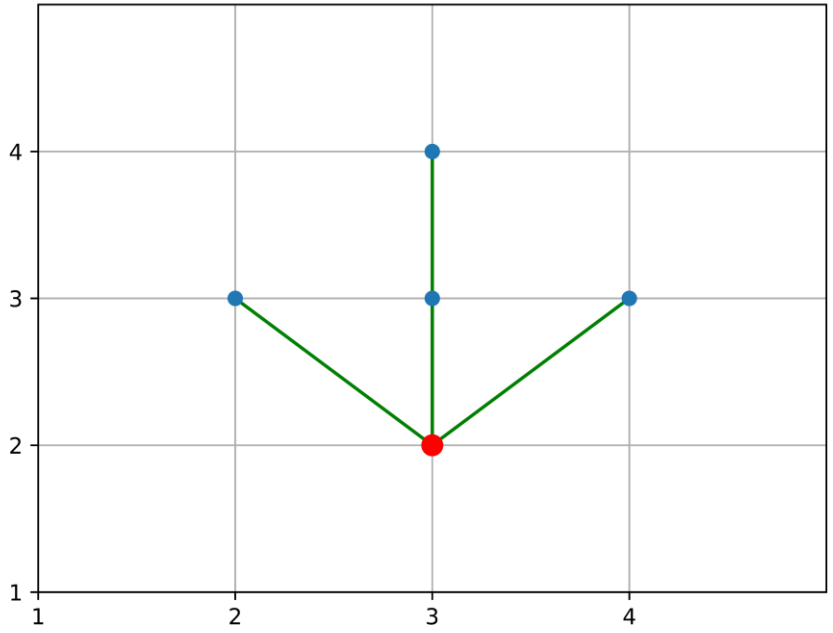
Algorithm 5 Greedy center selection algorithm

Require: S : all sites, k : The number of the center

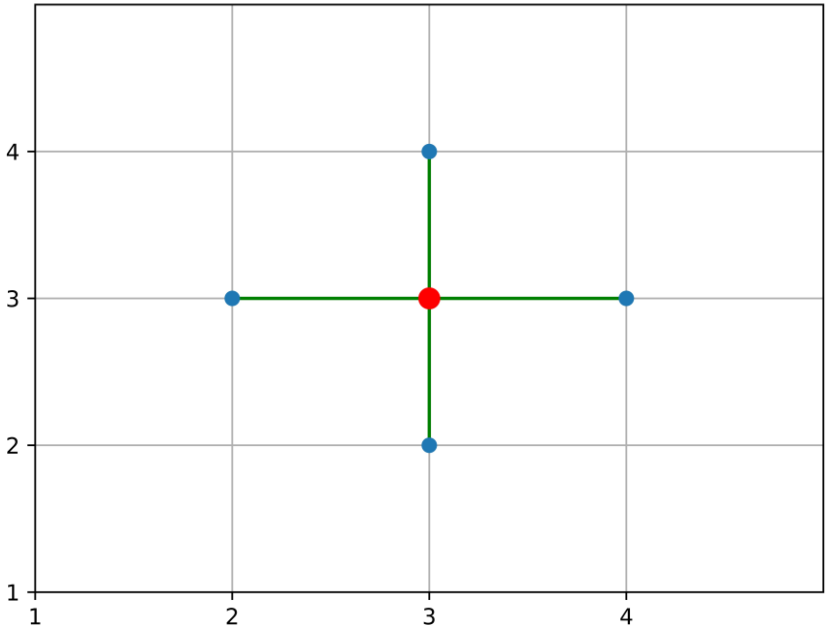
Ensure:

```
function greedy_center_selection_algorithm(S, k)
    C← []
    C.add(S.index(random_int()))
    while C.size<k do
        C.append(argmax_s Distance(s, C))
    end while
     return C
end function
```

THE EXAMPLE FOR GREEDY SELECTION

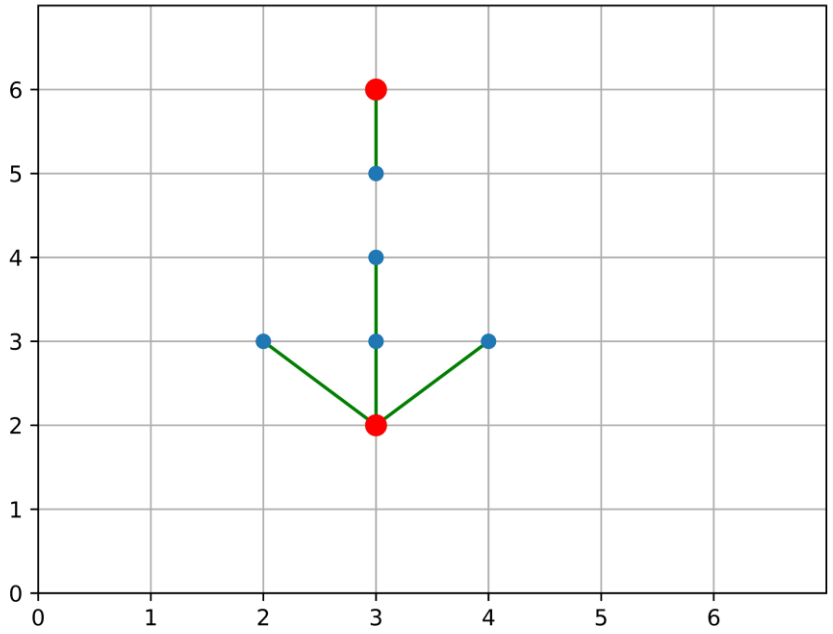


Choice (3,2) as initial center

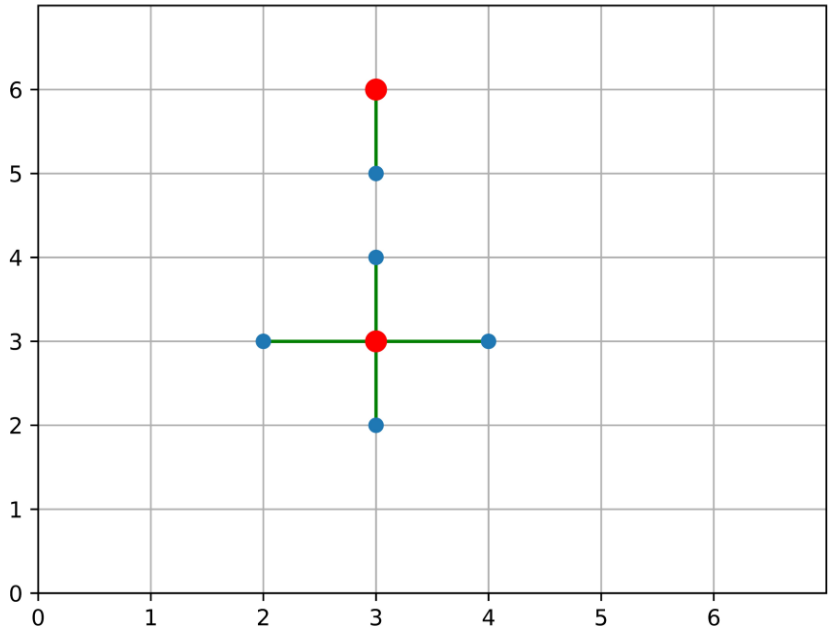


Choice (3,3) as initial center

THE EXAMPLE FOR GREEDY SELECTION



Choice (3,2) as initial center
r(C) = 2r(C*)



Choice (3,3) as initial center
r(C) = r(C*)

THE ALGORITHM TO SELECT THE INITIAL CENTER FOR THE GREEDY CENTER SELECTION

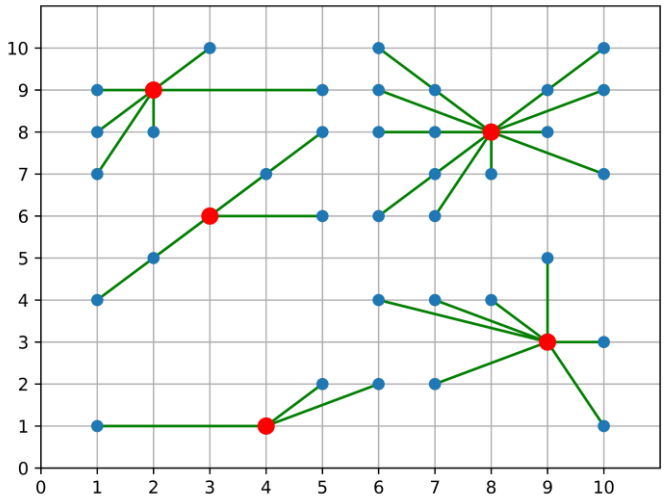
For each site s_i, select the first $\frac{1}{3}$ closest sites and let the maximum value of the distance be d_i, we will choice the site s_i which can minimize the d_i.

Algorithm 6 Initial center selection algorithm

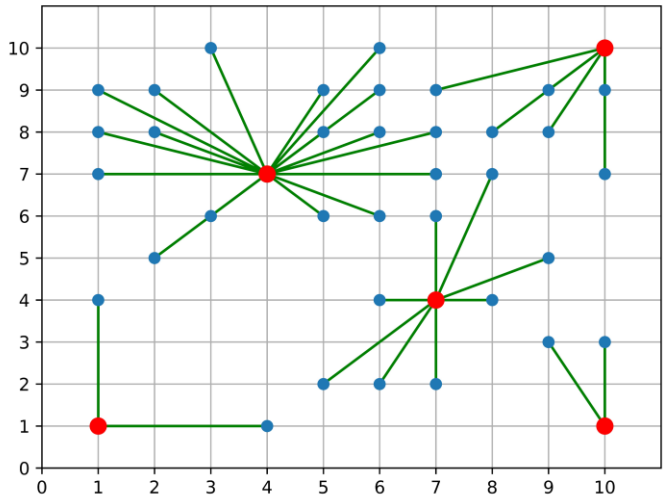
Require: S : all sites, k : The number of the center
Ensure:

```
function initial_center_selection_algorithm(S, k)
    min_s, min_value = -1, infinite
    for s in S do
        s_closed = [sites first 1/3 closest to s]
        current_max = max([dist(s, s_c) for s_c in s_closed])
        if min_value > current_max then min_s = s
        end if
    end for
     return min_s
end function
```

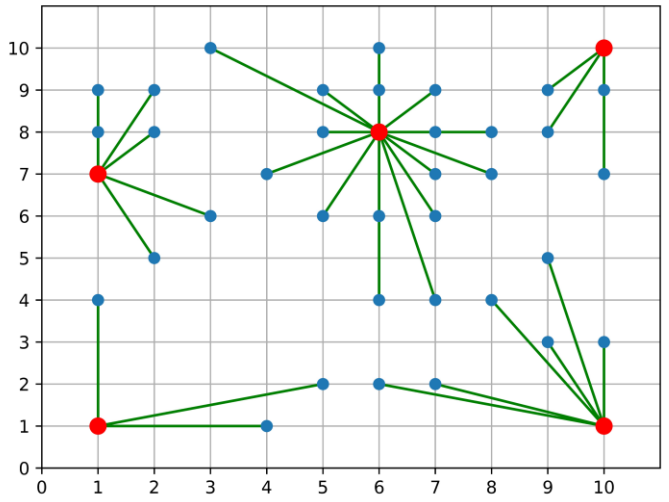
THE ALGORITHM TO SELECT THE INITIAL CENTER FOR THE GREEDY CENTER SELECTION



Global Optimal



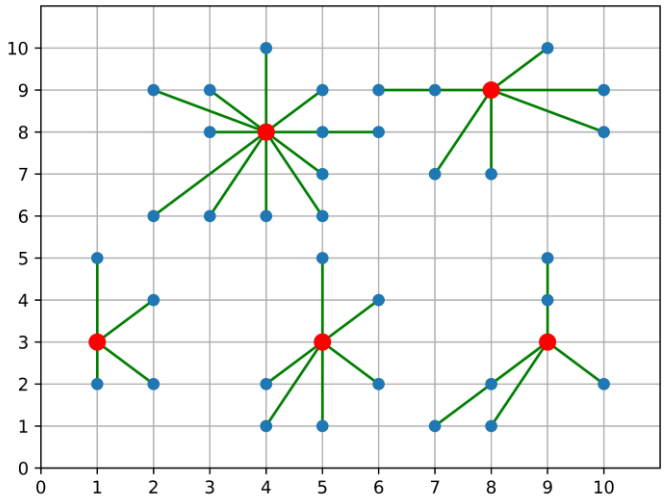
Greedy Optimal
Quality is 1.14



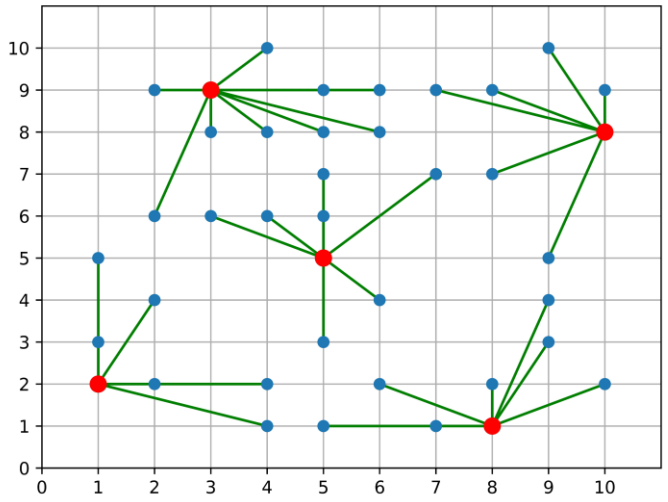
Greedy from the site 1 choice
Quality is 1.30

There are 40 sites in the map, and the num of center is 5

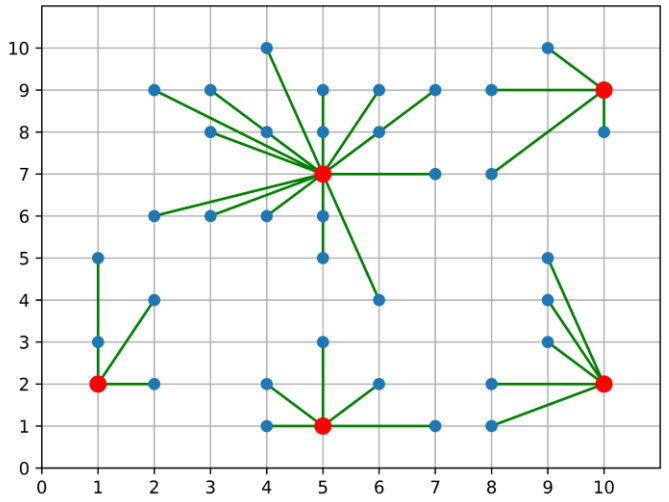
THE ALGORITHM TO SELECT THE INITIAL CENTER FOR THE GREEDY CENTER SELECTION



Global Optimal



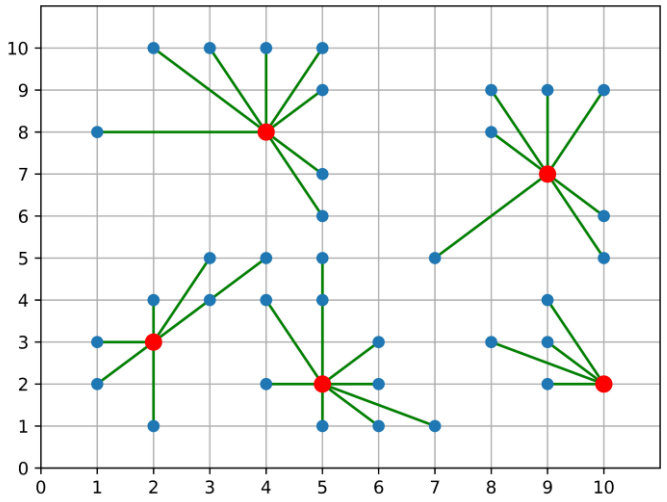
Greedy Optimal
Quality is 1.12



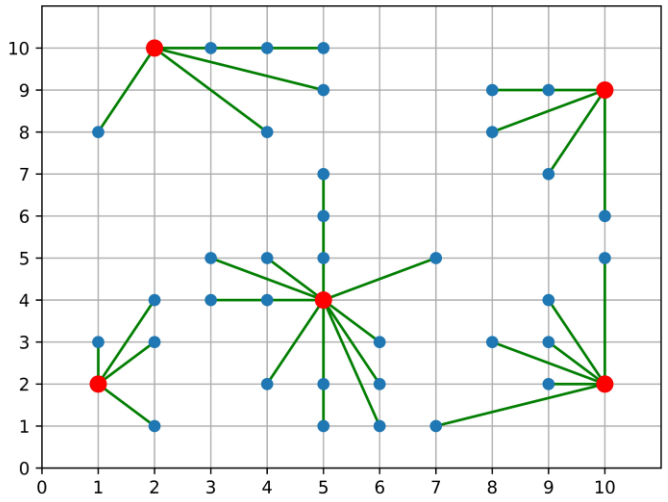
Greedy from the site 1 choice
Quality is 1.27

There are 40 sites in the map, and the num of center is 5

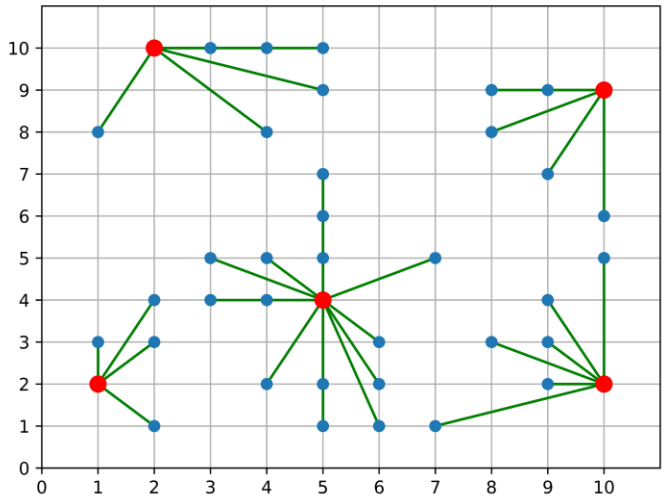
THE ALGORITHM TO SELECT THE INITIAL CENTER FOR THE GREEDY CENTER SELECTION



Global Optimal



Greedy Optimal
Quality is 1.05

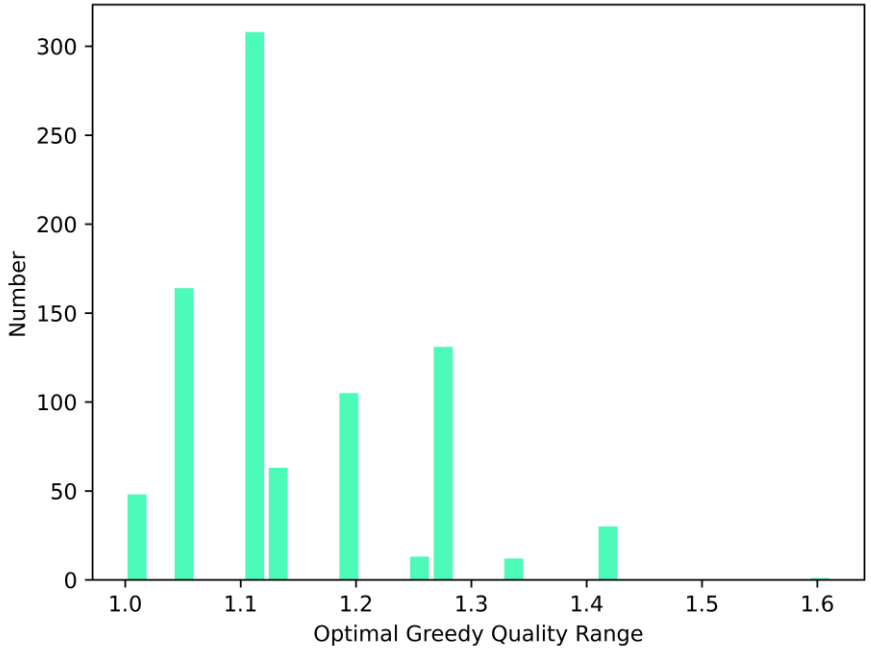


Greedy from the site 1 choice
Quality is 1.05

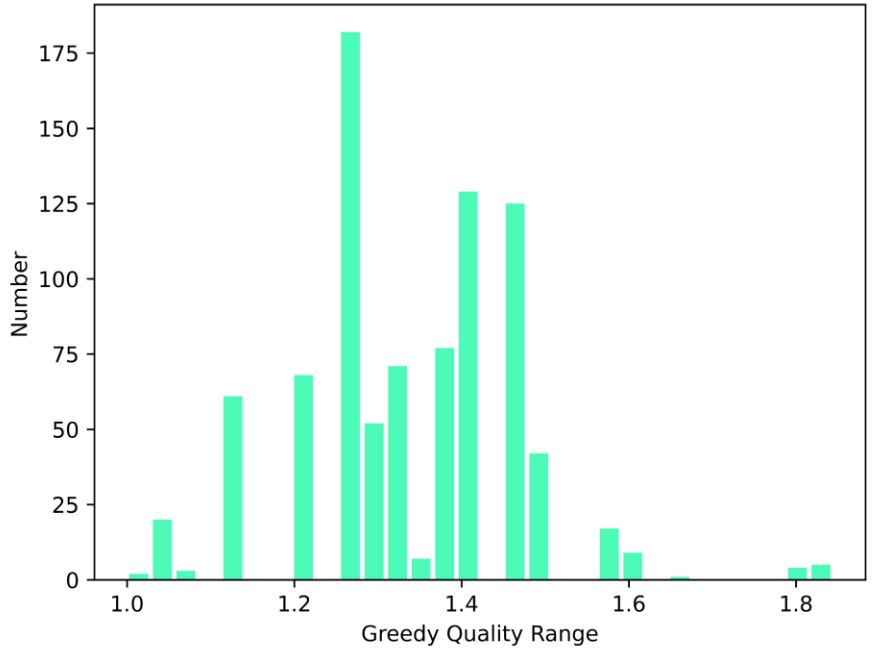
There are 40 sites in the map, and the num of center is 5

THE ALGORITHM TO SELECT THE INITIAL CENTER FOR THE GREEDY CENTER SELECTION

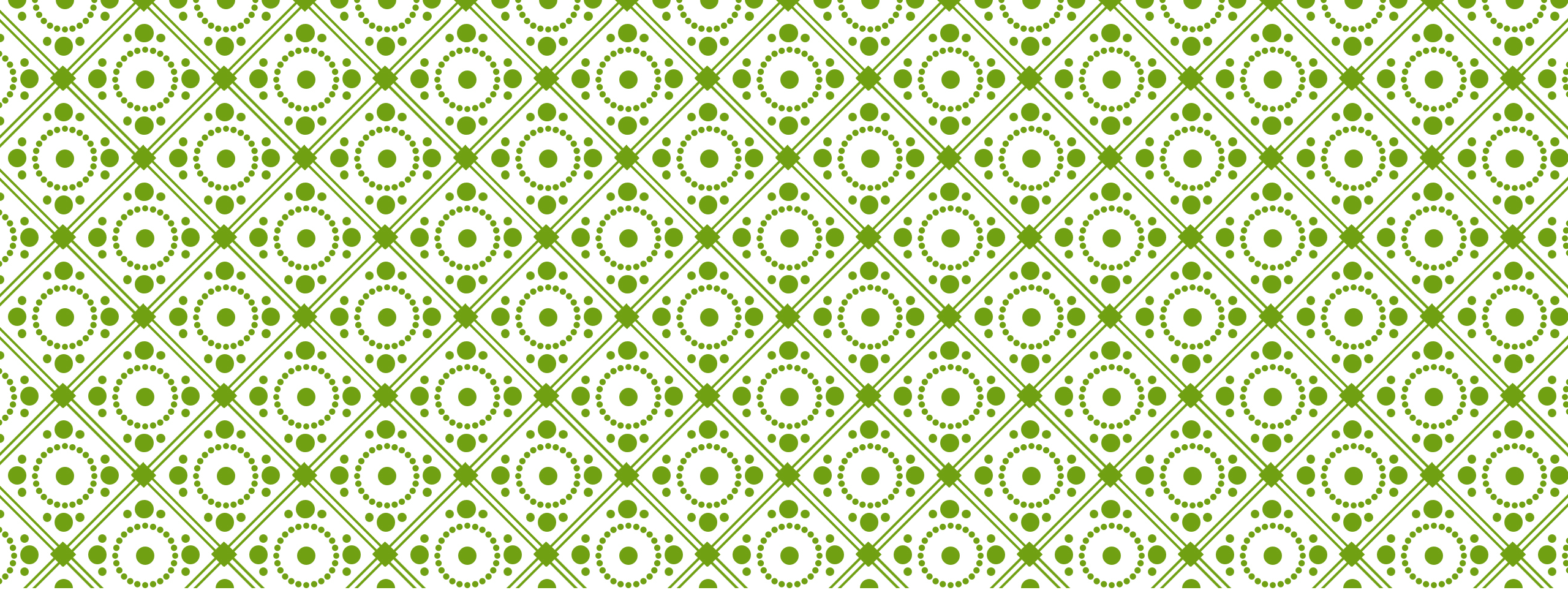
Statistic 875 samples and get the result.



Traverse all the site as the start center and get the best one



Use the algorithm to get the start center



THANK YOU !

Q&A

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