EE360C Algorithms
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Programming Assignment #3

Report Section: UT Network

a) Pseudocode of DP Optimal Run Time

```
For t = 0 to n-1:
   R[t][1] = ceil ((x[t] – x[0]) /2)
For j = 2 to k:
   For t = 0 to n-1:
      Best = positive infinity
      For I = 0 to t:
         Prev = (I > 0) ? R[i-1][j—1] : 0
         Block = ceil ( (x[t]  - x[i]) / 2)
         Best = min(best, cand)
      R[t][j] = best
   Return R[n-1][k]
```

b) Pseudocode Set of Status

```
For t = 0 to n-1
   R[t][1] = ceil ((c[t] – x[0]) / 2)
   CUT[t][1] = 0

For j = 2 to k:
   For t = 0 to n-1:
      Best =  positive infinity
      For I = 0 to t:
           Prev = ( I > 0) ? R[i-1][j-1] : 0
           Block = ceil (( x[t] – x[i]) / 2)
           Cand = max (prev, block)
           If cand < best or (cand == best && I > best index):
               Best = cand
               Best Index = i
     R[t][j] = best
     CUT[t][j] = best index

T = n – 1
J = k
C = empty list
While j >= 1:
      i = CUT[t][j]
      c = (x[i] + x[t]) /2
      Append c to C
      T = I - 1
      J = j – 1

Reverse C to ascending order
Return C
```

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c) Runtime and Space

DP has 3 nested for loops and the split

- **Each inner step does o(1) work (ceil and max), so the total time is o(n^2 * k)**
- **Store two n * k tables, so the space is o(nk)**

For example:

- **For houses 2,4,6,8 with k = 2**
- **The optimal response time is 2 achieved by stations 3 and 10**