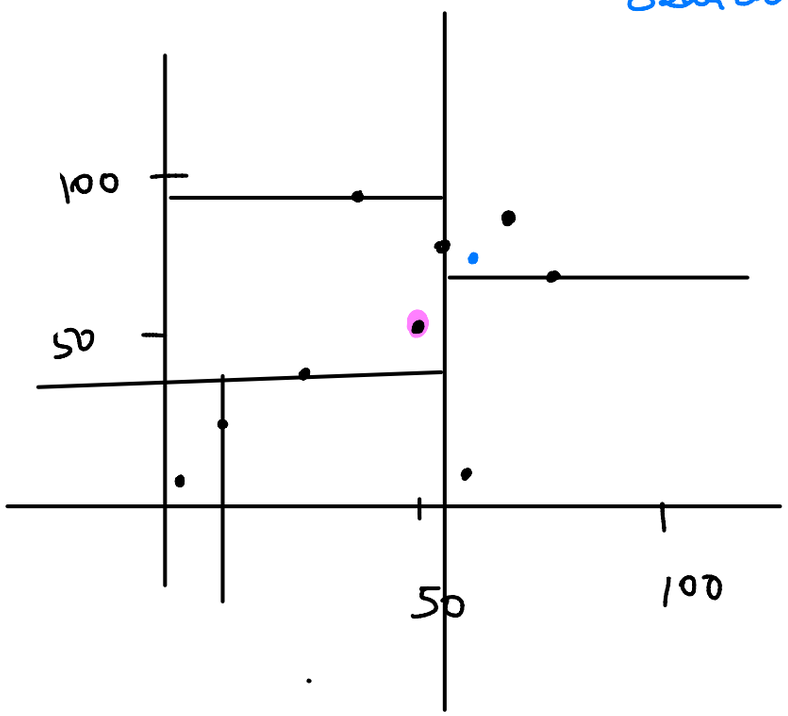
delete (x, node t, cut-dim)

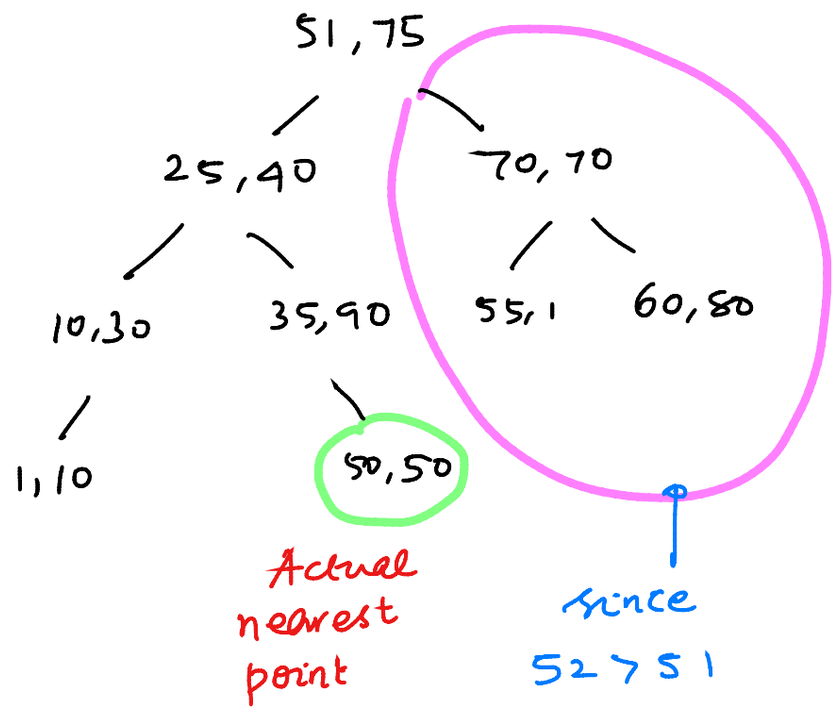
root node and its cut-dimension

```
if  x = t.data
    if  t.right != NULL
        t.data = FINDMIN ( t.right, cut-dim, (cut-dim+1) % total-dim)
        delete ( t.data , t.right, (cut-dim+1) % total-dim)

    else if  t.left != NULL
        t.data = FINDMIN ( t.left, cut-dim, (cut-dim+1) % total-dim)
        t.right = t.left
        t.left = NULL
        delete ( t.data, t.right, (cut-dim+1) % total-dim)

else  if  x[cut-dim] < t.data[cut.dim]
    delete ( x, t.left, (cut-dim+1) % total-dim)

else
    delete ( x, t.right, (cut-dim+1) % total-dim)
```

Search the data in the tree nearest to (52, 52)



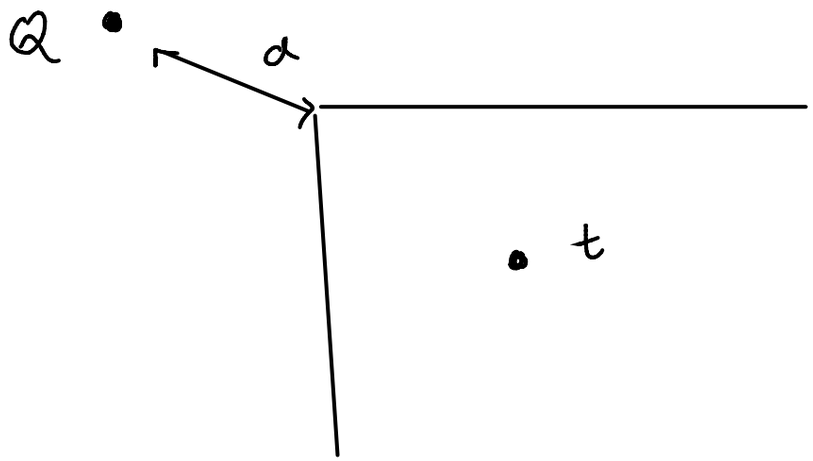
Query : (52, 52)

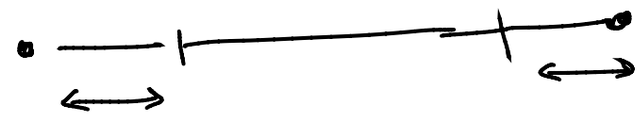


why does this happen : 51 is nearer to 52 than 50 but other coordinates will make a difference

Idea: Maintain

- ★ closest point found till now C
- ★ Bounding box for each sub-tree





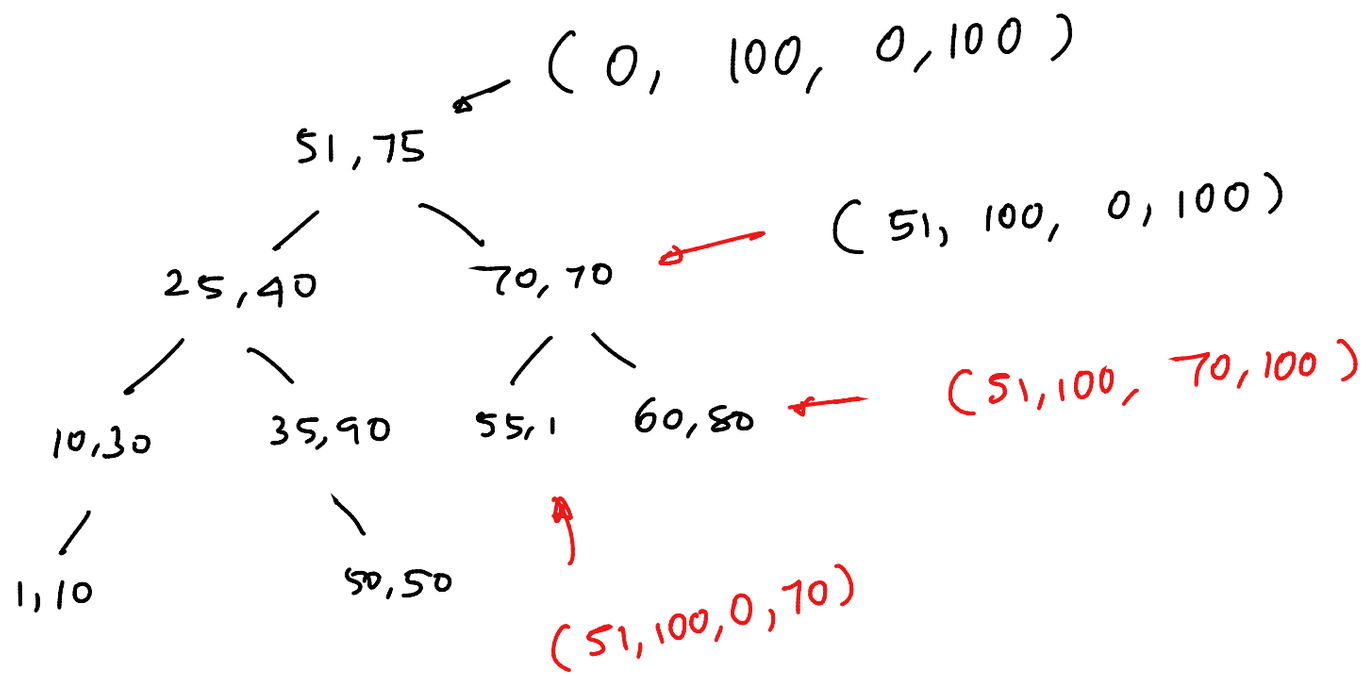
dist (Q, BB(t)) > dist (Q, C) no need to search the sub-tree

$$dist(Q, BB) = (Q(1) - y(1))^2 + \cdots + (Q(d) - y(d))^2$$

$$dist(x, y) = (x(1) - y(1))^2 + \cdots + (x(d) - y(d))^2$$

Box

(start_dim_1, end_dim_1, start_dim_2, end_dim_2, ... , start_dim_d, end_dim_d)



maintain best point, best-dist as global variables.

```
NN ( Query Q, node t, cd, BB )

    if distance ( BB, Q ) > best.dist then return

    dist = distance (Q, t.data)

    if dist < best-dist :
        best = t.data
        best_dist = dist

    NN ( Q, t.left, (cd+1)%.d, BD.trimleft (cd, t.data) )
    NN ( Q, t.right, (cd+1)%.d, BD.trimleft (cd, t.data) )
```