

# Closest pair of points

Divide split into left half and a right half of  $\sim n/2$  points each

Recursively find closest pair on each of these two subproblems

Combine - Use subproblem sols to find closest pair in given point ~~set~~ set

yStrip



```
For (i=0; i < numInStrip - 1; i++) {  
  j = i + 1;
```

```
  while (j < numInStrip &&  
         yStrip(j).y - yStrip(i).y < d) {
```

```
    d = min(d, distance point  
            i & point j)
```

```
  }  
  j++
```

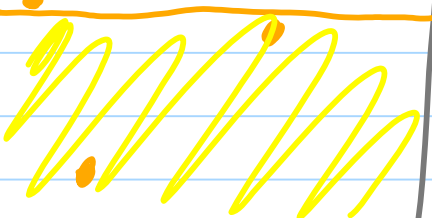
```
}
```

dist of  
closest pair  
found so  
far

d

P<sub>1</sub>

P<sub>2</sub>



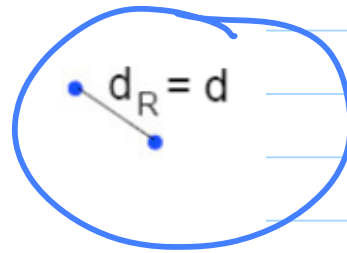
consider each point in yStrip  
looking upward



# Example Execution

pts By X

pts By Y



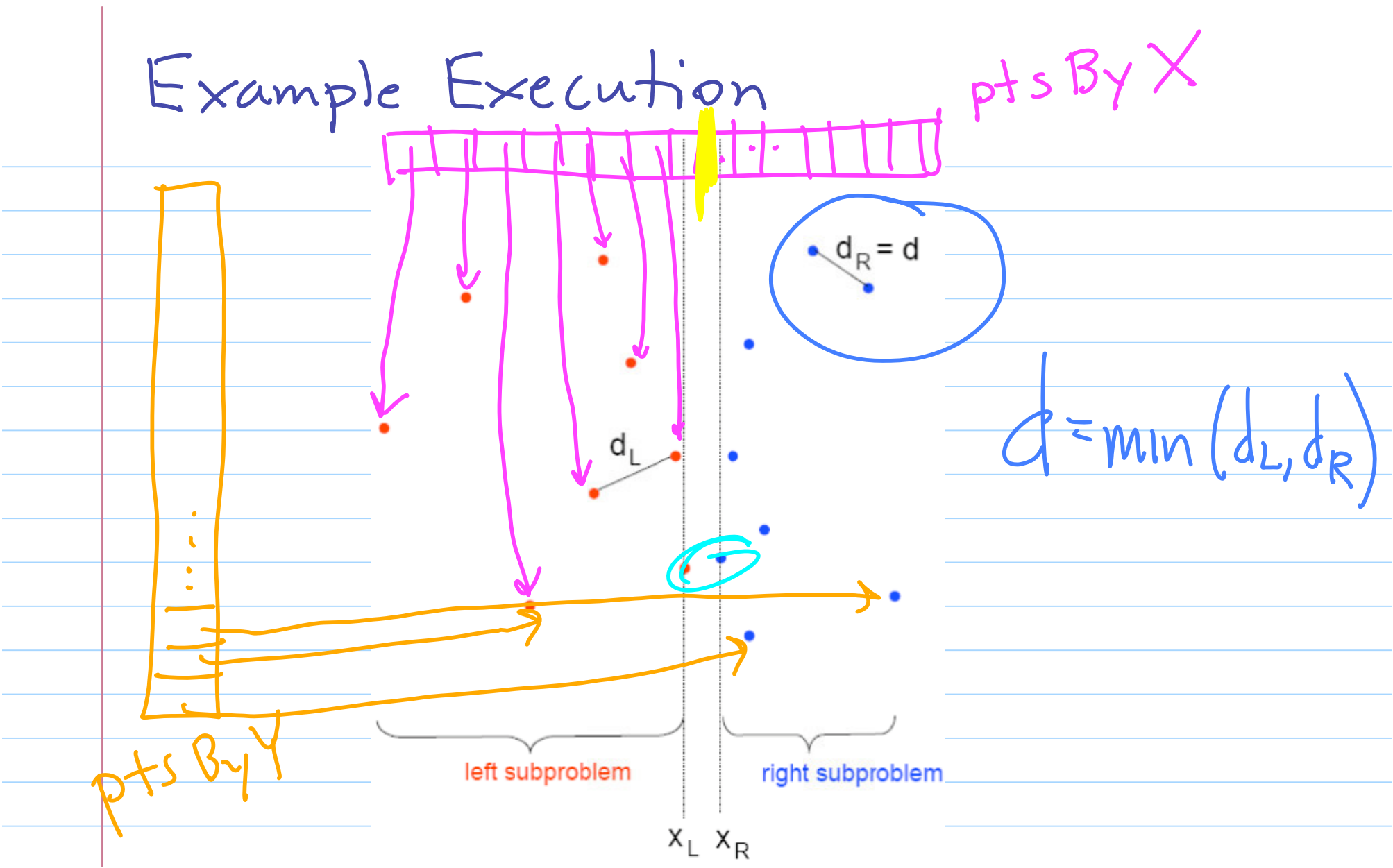
$d_L$

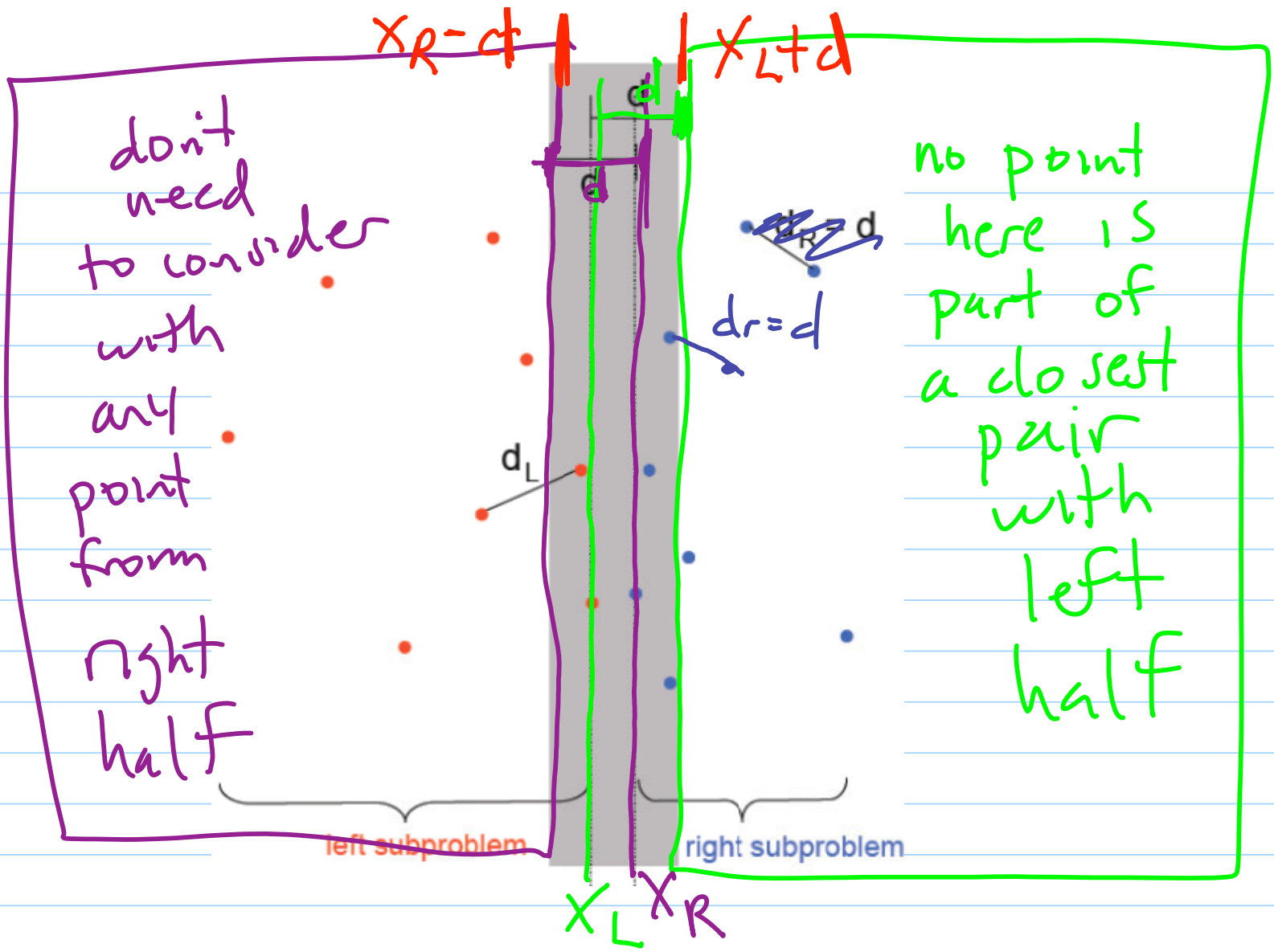
$$d = \min(d_L, d_R)$$

left subproblem

right subproblem

$x_L$   $x_R$





don't need to consider with any point from right half

no point here is part of a closest pair with left half

left subproblem

right subproblem

$X_R - d$

$X_L + d$

$X_L$   $X_R$

$d_L$

$d$

$d$

$d_r = d$