

Q1 Sort acc to distance. If same dist, smaller  $x$  should come first

pair<int, int> new-origin

Code

```
bool cmp (pair<int, int> a, pair<int, int> b) {
```

```
    long d1 = (long) a.first * a.first +  
              (long) a.second * a.second
```

```
    long d2 = (long) b.first * b.first +  
              (long) b.second * b.second
```

```
    if (d1 < d2)
```

```
        return
```

```
    else if (d1 > d2)
```

```
        return
```

```
    else {
```

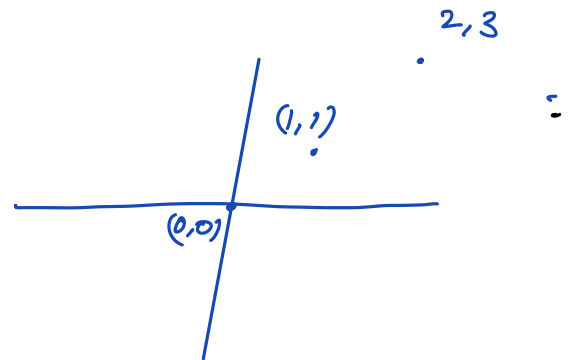
```
        if (a.first < b.first)
```

```
    }  
    else
```

Point  $\Rightarrow (x, y)$

origin  $\Rightarrow p_x, p_y$

$$\Rightarrow (x - p_x)^2 + (y - p_y)^2$$



$$A[0]^2 + A[1]^2$$

## Q2 Longest palindrome using letters

Eg1 banana  $\Rightarrow$  (5) anana

Eg2 abcabc  $\Rightarrow$  abcba (6) anbna

$\Rightarrow$  Obs: In a palindrome  $\Rightarrow$

even  $\rightarrow$  all letters appear even no of times

odd  $\rightarrow$  — — — — —  $\Rightarrow$  1 letter is odd

$\Rightarrow$  Palindrome  $\Rightarrow$  Max 1 letter odd freq

Hence create freq array.  $\text{freq}(s(i) - 97)++$

int freq[26]

Now at max one odd guy can be taken

	a	b	c	d	e	f
freq	10	20	15	11	3	24
ans $\Rightarrow$	+10	+20	+15	+10	+2	+24

**Code** ans = 0, odd-taken = false

for (i=0; i<26; i++) {

if (freq[i] % 2 == 0) ans += freq[i]

else if (odd-taken == false)

ans += freq[i], odd-taken = true

else ans += freq[i] - 1

}

return ans.

Q3 Find leftmost & rightmost idx of a number in sorted array

In class, we did leftmost

0	1	2	3	4	5	6	7	8	9	10
-5	-5	-3	0	0	1	1	5	5	5	5

$k = 5 \Rightarrow 7$

$k = 0 \Rightarrow 3$

$k = -3 \Rightarrow 2$

Use Binary Search

Case I  $ar[mid] == k$

$k \quad mid \quad k \quad k$

ans = mid

goto = left

Case II  $ar[mid] < k$

$mid \dots k$

goto right

Case III  $ar[mid] > k$

$mid$

goto left

For greatest idn

Case I

$ar[mid] == k$

$k \mid mid \mid k \mid k$

ans = mid

goto right

a a b b c c d e  
a b c d e  
2 2 2 1 1  
+2 +2 +2 +1 +0  
= 7

a a b b c c d  
a b c d  
2 2 2 1

$l == 1$   
return

idn      0      1      2      3  
         100    200    10    20

sort(0,1)  
sort(2,3)  
merge

sort(0,0)  
sort(1,1)  
merge(0,1)



sort (0,1)

$l, mid$   
 $0, 0$

$mid + 1$   
 $1$

$r$   
 $1$