Q5 Longest Palindromic substring

Example 1

babad

Example 2

cbbd

Example 3 : how to find out answer?

basic idea : $O(n^2)$ expands around each
possible center to find it

```
        b a b a d        length

NA  [b] a                  1

NA  [b ab] a               

        b[ab a]d           3          → output

            b[a]d          1
```

a[d] NA 1

Example 4

Q: constract the code loop

    null   '' ''

       1   S

    len = 2, 3, 4 ..

       $i = 1, 2, 3, 4$

       bab ad   len = 5
       0 1 2 3 4

       $i = 1$

       $j = 2$

    $i - (j - i) = i - j + i = 2i - j = 2 - 2 = 0$

Example 5   chatgpt $i = 0$

    $i = 0$ 1 2 3 4

    $i = 0$ len1 = ex (S , 0 , 0)   odd length

              len 2 = ex (S , 0 , 1)   even length

              len = max (len1, 2)   取 max 回文长度

```
if (len > end - start +1) { 比1大
        start = i - (len-1)/2    2/2=1
           end = i + len/2       3/2=1
    }
                s. substring
return        start , end +1   含头不含尾

ex function
                  -1<0-> output
    while ( 0 >=0 &&   0 < 5 && 0=0
        left --
           right ++              b a b a d
                                 ↑ ↑↑↑ ↑

    return right - left - 1

            1 - (-1)-1 = 1
```

Example 6 i=1

```
    b a b a d
  ↑ ↑ ↑↑ ↑ ↑
    0  1 2  3

left = -1   right = 3   3 - (-1) -1 = 3
```

$babad$
$0\ 1\ 2\ 3\ 4\ 5$

$$5 - 3 - 1 = 1$$

Example 7   even

$c\ bb\ d$
$0\ 1\ 2\ 3$

$$1 - 0 - 1 = 0$$

$c\ bb\ d$
$0\ 1\ 2\ 3$

$$2 - 1 + 1 = 2$$