Session 3 - September 13, 2022

Dutch National Flag Problem:-

Pb: arr →   0, 1 and 2 only

You need to sort this array (in place)

$$0\;0\;0\;{}^{0}{}^{0}\;1$$

arr: [0 0 0 1 1 1 1 ~~1~~ ~~0~~ 1 1 ~~2~~ ~~2~~ 1 ~~2~~ ~~2~~]

① $\quad$ arr.sort ( ) : $O(N \cdot \log N)$

② $\quad$ ones, zeros and twos :   count : $O(N)$

$\quad\quad$ ones = ~~0~~ ~~1~~ ~~2~~ ~~3~~ 4 ⑧
$\quad\quad$ zeros = ~~0~~ ~~1~~ ~~2~~ 3   ⑥
$\quad\quad$ twos = ~~0~~ 1   ②

(in-place)

ans: [0 0 0 0 0 0 1 1 1 1 1 1 1 1 2 2]

0	0	0	1	1	1	1	1	2	2	2

left ↓ (above column 4)

right ↓ (above column 9)

i ↑ (below column 9)

```
if arr[i] => 1 :
        i += 1
elif arr[i] => 0 :
        arr[i], arr[left] = arr[left], arr[i]
        left += 1
        i += 1
else :
        arr[i], arr[right] = arr[right], arr[i]
        right -= 1
```

Back Space String Compare :-

S :   abc#a#b   : abb
t :   abb#b ↑   ; abb

Are they equal / not equal ?

next valid Index:

                    VI 1
        S :   a b c # a # b
              ↑
              i

                    VI 2
        t :   a b b # b
              ↑
              i

backspace = 0

Next Valid character:

VI

S: a b c # a # b

i   i   i

a b c # a # b

↑

bS = x̶ φ̶ x̶ 0
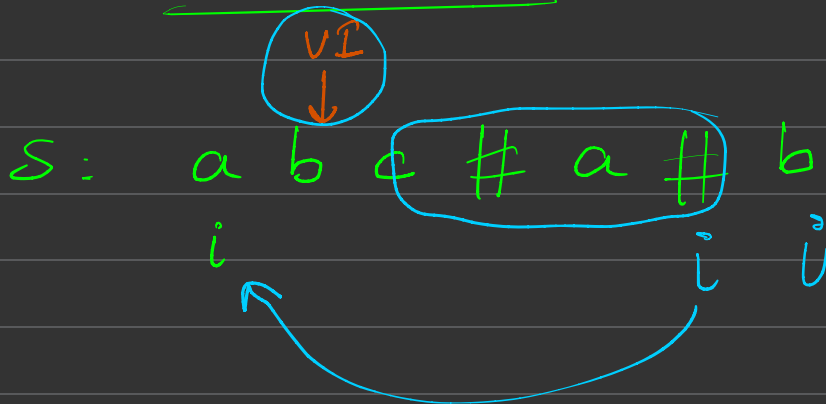
index

```python
def backspaceCompare(s,t):
    i,j = len(s)-1, len(t)-1

    while i>=0 or j>=0:
        vI1 = validIndex(s,i)
        vI2 = validIndex(t,j)

        if vI1<0 and vI2<0:
            return True

        if vI1<0 or vI2<0:
            return False

        if s[vI1] != t[vI2]:
            return False

        i = vI1-1
        j = vI2-1
```

```
def validIndex (string, index)
    backspace = 0

    while ( index >= 0 ):
        if  string[index] == '#':
            backspace += 1
        elif backspace > 0 :
            backspace -= 1
        else :
            break
        index -= 1
    return index
```