1) 012 - Sort

Brute force

- Count number of 0's, 1's, 2's in array
- Update the array with respective counts

I/p: 

cnt 0 = 2, cnt 1 = 1, cnt 2 = 2

↑ make first 2 elements 0

↑ make 3rd element 1

↑ make last elements 2

O/p: 

T.C → O(n)

S.C → O(1)

Optimised solution (Dutch National flag logic)

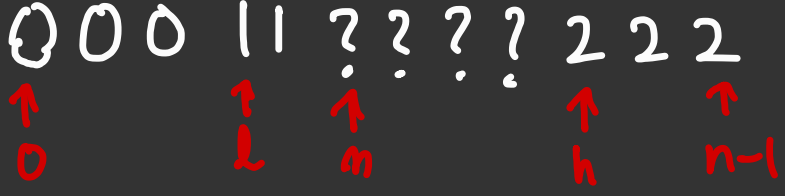
- Use 3 ptrs - l, m, h

elems b/w 0 to l-1 ⇒ 0

elems b/w l to m-1 ⇒ 1

elems b/w m to h-1 ⇒ ?

elems b/w h to n-1 ⇒ 2



~ Do operation in window m to h

if arr[m] == 0 → swap(arr[m], arr[l]);
l++;

if arr[m] == 1 → m++;

if arr[m] == 2 → swap(arr[m], arr[h]);
h--;

Dry run

0 2 1 2 0

l m h

0 2 1 2 0 — a[m] == 2, swap(a[m], a[h]), h--

l m h

0 0 1 2 2 — a[m] == 0, swap(a[m], a[l]), l++, m++

l m h

0 0 1 2 2 — a[m] == 1, m++

l m h

0 0 1 2 2 — a[m] == 2, swap(a[m], a[h]), h--

l m h

0 0 1 2 2 — m > h, break out

l h m

Optimised code

```
int l=0, h=n-1, m=0;
while (m <= h) {
  switch (a[m]) {
    case 0:
      swap(a[m], a[l]);
      m++; l++;
      break;

    case 1:
      m++;
      break;
    case 2:
      swap(a[m], a[h]);
      h--;
      break;
  }
}
```