1, one pass: This means that each element should be handled only once. The algorithm can traverse all elements at most once. Once an element is accessed, the same element shouldn't be accessed again.

In place: Everything we do to the element should be done in the given array itself. You shouldn't use extra or temporary space to work with any elements.

Linear-time: Linear time means that the time complexity of the algorithm should be linear, which actually means that it should take O(n) time for the n input.

2.

We have two pointers "left" and "right". Because there are n babies left pointer will be initialized and then traversed n-1 times. This will ensure that every piece of data is tested. There are two cases when the left value is either 1 or 0.

when left to 0, because all 0 should be followed by all 1, it's sorted and it get 0 on the leftmost unprocessed element. In this case, we increment the left value by 1.

when left to 1, we need to put it after all 0. We swap the values of the elements that appear at left and right, so that the element on the right is 1. We subtracted the value of the pointer to the right by 1 because the element on the right was already in the last sorted position. This will ensure that the value of A[left] does not change.

3.

```
1. input int A[] and n.
2.   int left ← 0
3.   ' ringht ← n - 1.
4.   while left < right
       1. if ( A[left] = 1)
       2. then swap (A[left], A[right]) ← right = right - 1.
       3. else left = left + 1
5. for ( i ← 0 to n)
   do print (A[i])
```

2. list=[P , B , K , K , B , P , P]

P= purple
B= Brown
K= Black.

Assume number =0.

```
1. if ( B )
   ① then swap( a[number], colour )
      ② number = number + 1.
   ③ else [ a[number] ]

2. if ( P )
   ① then swap ( a[number], colour )
   ② number = number +1
   ③ else [ a [number] ]
```

For this algorithm, we assume that the value is B. The algorithm fist gets the desired value and then traverses the entire list. The number value starts at 0, and if the fist value in the list is not B. then swap the desired colour to get it in the right place. The resulting should be

[B , B , K , K , P , P , P]

similarly, the position of purple can be

[B , B , P , P , P , K , K]. This is final list.