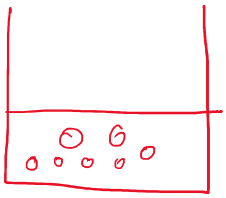
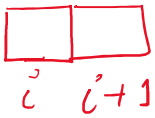
13 January 2025 12:05

Bubble Sort —





4 5 3 2 1

Pass 1 : 4 5 3 2 1

i = 0 arr(0) < arr(1) 4 5 3 2 1

j = 1 arr(1) > arr(2) 4 3 5 2 1

j = 2 arr(2) > arr(3) 4 3 2 5 1

j = 3 arr(3) > arr(4) 4 3 2 1 5

unsorted | sorted

pass 2 :

4 3 2 1 5

arr(0) > arr(1) 3 4 2 1 5 j = 0

arr(1) > arr(2) 3 2 4 1 5 j = 1

arr(2) > arr(3) 3 2 1 4 5 j = 2

unsorted | sorted

pass	j	pass + j
1	3	4
2	2	4
3	1	4
4	0	4

pass + j = n - 1

j = n - pass - 1

pass 3 : 3 2 1 4 5

arr(0) > arr(1) 2 3 1 4 5 j = 0

arr(1) > arr(2) 2 1 3 4 5 j = 1

unsorted | sorted

pass 4 : 2 1 3 4 5

arr(0) > arr(1) 1 2 3 4 5 j = 0

sorted

1st loop (Outer loop) — pass → 1 to N-1

2nd loop (Inner loop) — j → 0 to n-1-pass

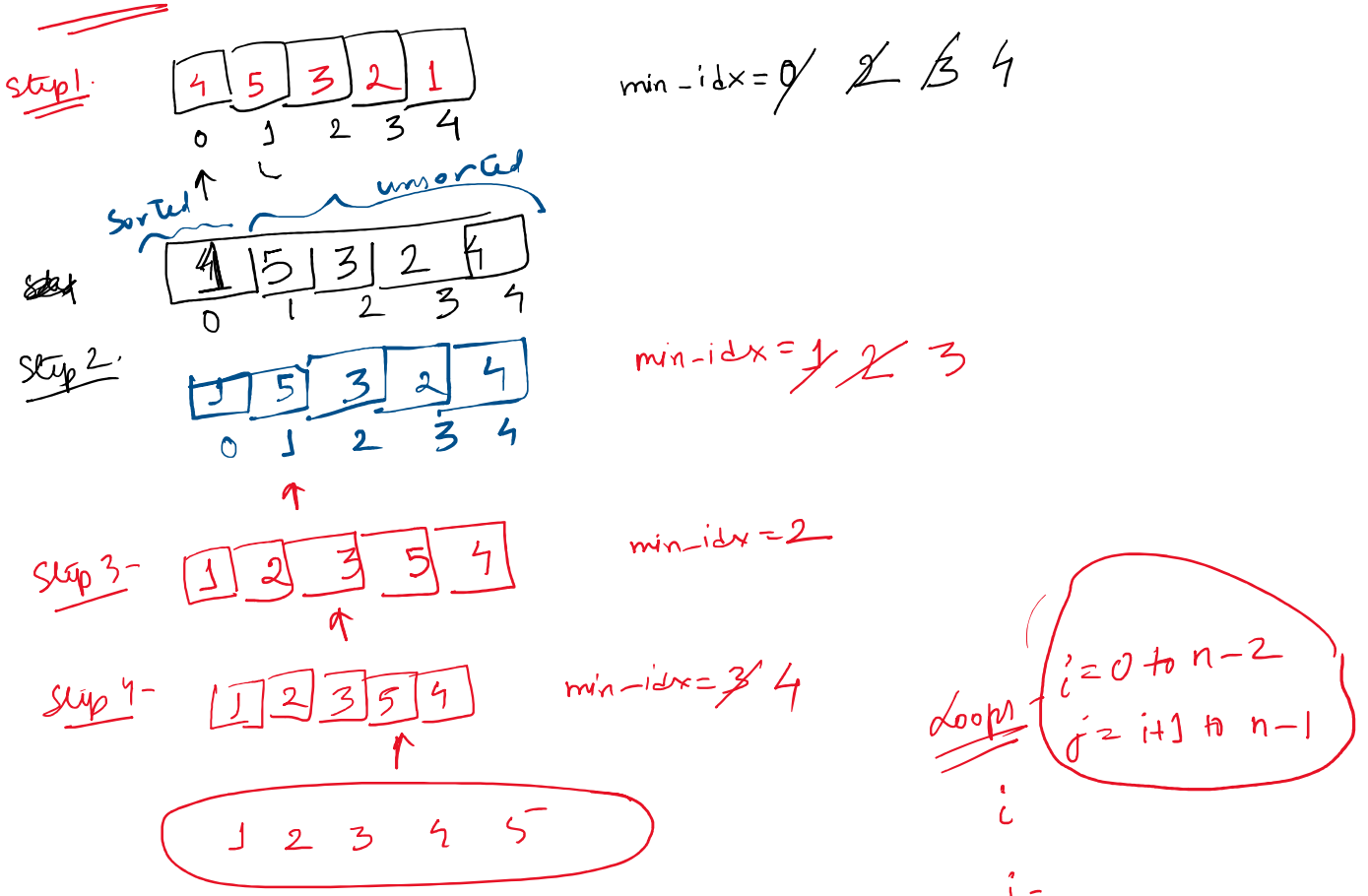
```
static void bubbleSort(int arr[], int
n){
        int pass, j, temp;
        for(pass=1;pass<=n-1;pass++){
            for(j= 0;j<=n-1-pass;j++){
                if(arr[j]>arr[j+1]){
                    //swapping
                    temp= arr[j];
                    arr[j]= arr[j+1];
                    arr[j+1]= temp;
                }
            }
        }
    }
```

(n-1) time ≈ n time

(n - 1 - pass + 1) = (n - pass) time ≈ n time

n x n = O(n²)

Selection sort :- 4 5 3 2 1 select minimum value.



loop i = 0 to n-2
j = i+1 to n-1

i

j =

```
static void selectionSort(int arr[], int n){
        int i ,j, temp, min_ind;
        for(i=0;i<=n-2;i++){ ----> ~n
            min_ind= i;
            for(j= i+1;j<=n-1;j++){ ----> n x n = n^2   O(n^2)
                if(arr[min_ind]>arr[j]){
                    min_ind= j;
                }
            }
            temp= arr[min_ind];
            arr[min_ind]= arr[i];
            arr[i]= temp;
        }
    }
```

Insertion Sort- Eg-