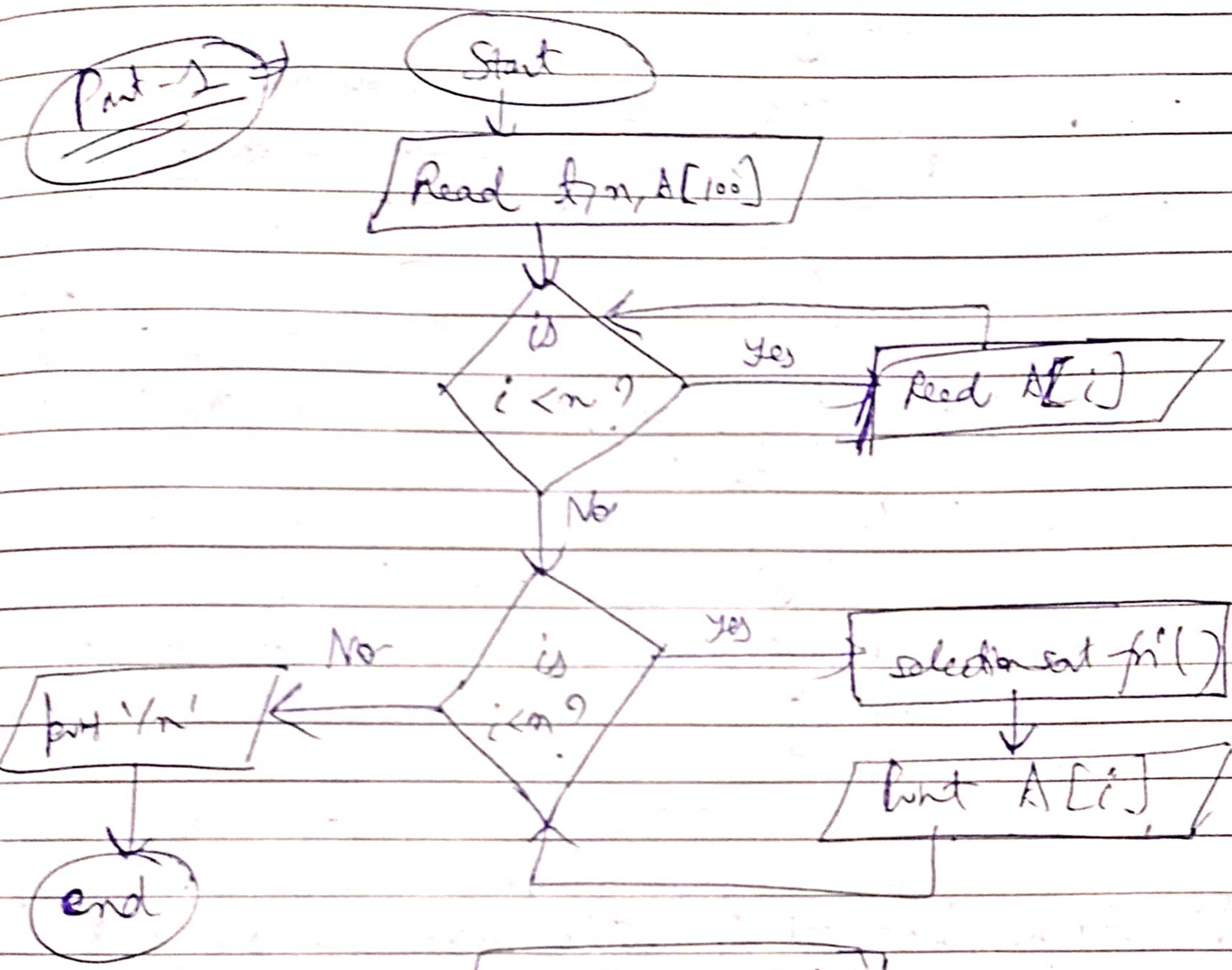
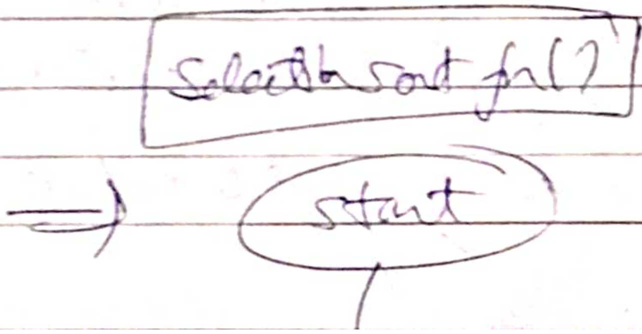
(H.W.)

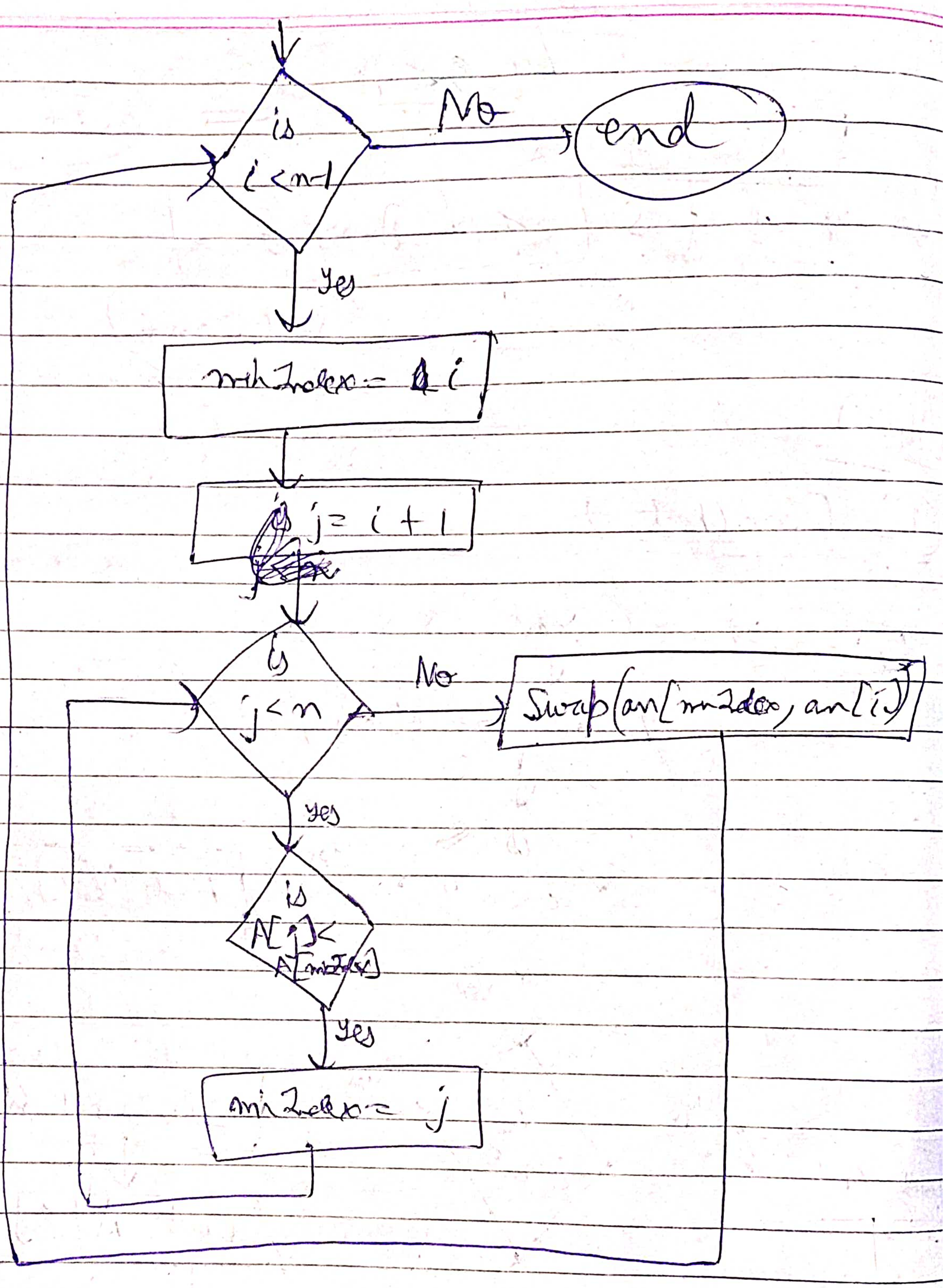
1.) Flow Chart →

Part-1 →



Part-2





(2.) Stable Algo ⇒ A sorting algorithm is said to b stable if two objects with equal keys appear in the same order in sorted output as they appear in the input array to be sorted.

Ex) Bubble sort, Insertion sort

Unstable Algo ⇒ A sorting algorithm is said to be unstable if any items that rank the same, the order of the tied members is not guronteed to stay the same with successive sorts of that collection.

Ex) Selection Sort, Quick Sort

Q: Which sorting algo's are stable?

A Any sorting algo has stable version but there can be additional time / space complexities.

→ Swaps of non-adjacent elements are the root cause of instability of sorting algorithms.

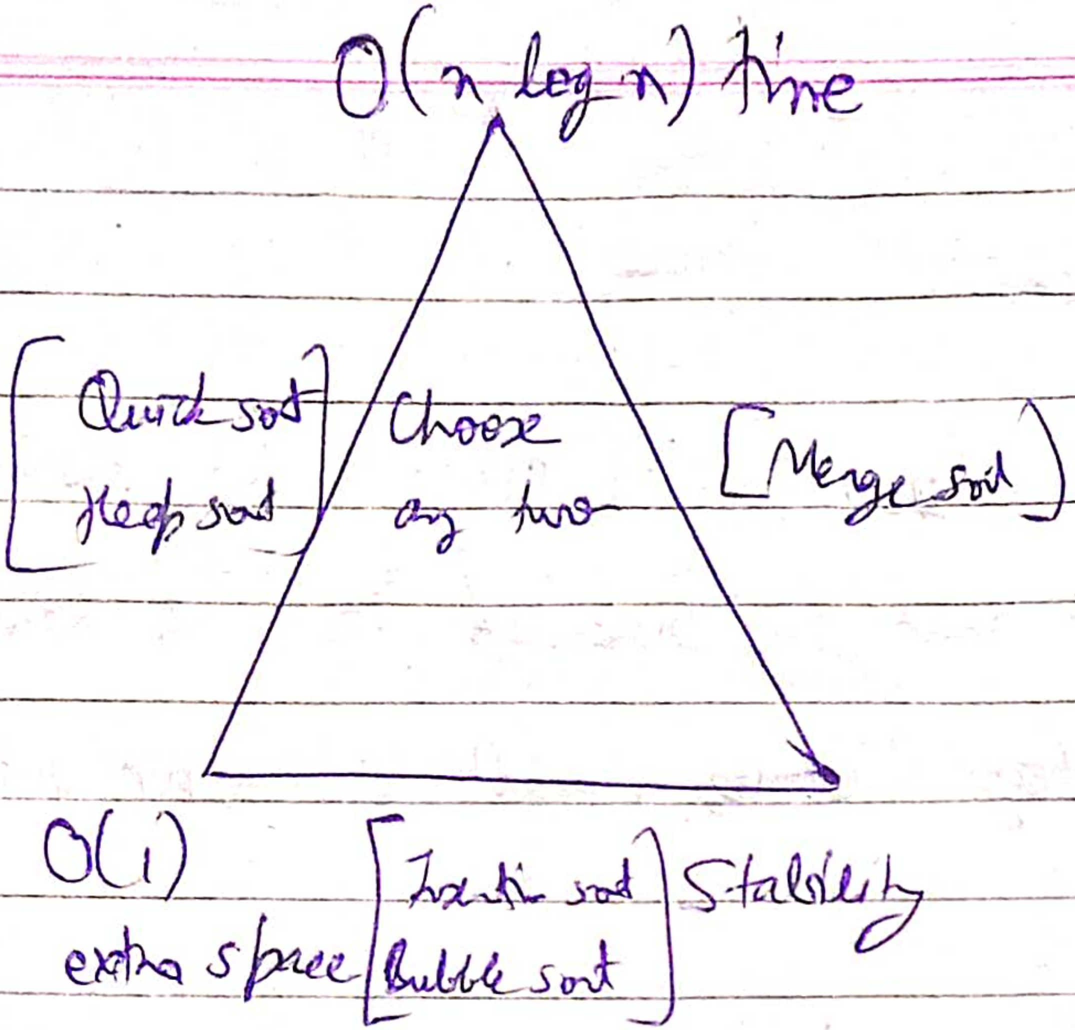
—	—	14	—	18_2	—	—	18_1	(Unstable)

Merge, Insertion, Counting sorts :→
(No swaps ⇒ Stable) (✓)

Bubble Sort :→
(Swaps only adjacent elements ⇒ stable) (✓)

Quick, Heap, Selection Sort :→
(Swaps non-adjacent elements ⇒ Not stable) (✗)

Impossibility Linearity for comparison sorts →



Selection Sort:

Q. Why unstable despite $O(n^2)$ time ?

A nshifts are replaced by 1 swap as an Optimization.