



Sunbeam Institute of Information Technology Pune and Karad

Module – Data Structures

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Sorting Algorithm : Selection Sort

Algorithm:

- Find the minimum element in an array $A[i \rightarrow n-1]$ and place it at beginning
 - where n – size of array and $i = 0, 1, 2, \dots, n-2$
- Repeat the above procedure $n - 1$ times where n is size of array
- Select i th element ($i = 0 \rightarrow n-1$)
 - Compare with all elements other than i th
 - if($A[i] > A[\text{other}]$)
 - Swap both elements

arr

| | | | | | |
|----|----|----|----|----|----|
| 44 | 11 | 55 | 22 | 66 | 33 |
| 0 | 1 | 2 | 3 | 4 | 5 |



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Sorting Algorithm : Bubble Sort

Algorithm:

- Find the maximum element from two consecutive elements of an array $A[i \rightarrow n-i-1]$ and place it at second location
 - where n – size of array and $i = 0, 1, 2, \dots, n-2$
- Repeat the above procedure $n - 1$ times where n is size of array
- Repeat for $n-1$ times
 - Compare two consecutive elements
 - If left element $>$ right element
 - Swap both elements

arr

| | | | | | |
|----|----|----|----|----|----|
| 33 | 22 | 66 | 55 | 44 | 11 |
| 0 | 1 | 2 | 3 | 4 | 5 |



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Sorting Algorithm : Insertion Sort

Algorithm:

- Repeat from 1 to $n-1$
 - Select i th element in the array
 - Compare i th element with all its left neighbours
 - Insert at appropriate position

arr

| | | | | | |
|----|----|----|----|----|----|
| 55 | 44 | 22 | 66 | 11 | 33 |
| 0 | 1 | 2 | 3 | 4 | 5 |



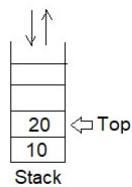
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Stack

Stack

- Stack is Last-In-First-Out structure.
 - Stack Operations:
 - push()
 - pop()
 - peek()
 - is_empty()
 - is_full()



Stack

- Parenthesis balancing
- Expression conversion and evaluation
- Function calls
- Used in advanced data structures for traversing
- **Expression conversion and evaluation:**
 - Infix to postfix
 - Infix to prefix
 - Postfix evaluation
 - Prefix evaluation
 - Prefix to postfix
 - Postfix to infix



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Thank you!

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