

## Important Algorithms for Placement :-

arr = {-1, -2, -3, -4, -5, 0}

### 1. Kadane's Algorithm (Maximum Subarray Sum) $O(n)$

```
int[] arr = {5, -8, 1, 2, -1, 4}; // = 6
int cmax = arr[0];
int gmax = arr[0];
for (int i = 1; i < arr.length; i++) {
    cmax = max(arr[i], cmax + arr[i]);
    gmax = max(cmax, gmax);
}
return gmax;
```

arr[i]	cmax + arr[i]	cmax	gmax
-8	5 + (-8) = -3	-3	5
1	-3 + 1 = -2	1	5
2	1 + 2 = 3	3	5
-1	3 + (-1) = 2	2	5
4	2 + 4 = 6	6	6

### \* Count Sort Algorithm $O(n + \max)$

- \* NCA - Non Comparison Algo
- \* Single digit whole numbers (0-9)

Step 1: Find the max = 6

Step 2: Create a count array [0-6]

Step 3: Calculate the freq of each element

Step 4: Calculate the cumulative count

Step 5: Create the output array

Step 6: Start from the end of the array (R to L)

Step 7: Copy output to input

Input → 3 4 6 1 4 3 2 3 1

Count →

0	2	1	3	2	0	1
0	1	2	3	4	5	6

Cumulative Count →

0	2	3	6	8	8	9
0	1	2	3	4	5	6

Output → 1 1 2 3 3 3 4 4 6

### Radix Sort Algo → (1's, 10's, 100's and so on) (Bucket Sort) $O(n + \max)$

- \* Non-comparison algo
- \* Multi-digit nos
- \* Constant length strings

"divya" "sneha" "samar"

Step 1: Find the max = 475

Step 2: (475) → digits → 3

Step 3: Create (0-9) 10 buckets

Step 4: Start with 1's, 10's, 100's

Pass 1: 091 002 082 475 329

Pass 2: 002 329 475 082 091

Pass 3: 002 082 091 329 475

Final sorted array: 0 1 2 3 4 5 6 7 8 9

091 002 082 475 329

002 082 091 329 475

\* How do we control the number of passes / iterations / rounds in the "Radix Sort Algorithm"?

⇒ It is based on the no. of digits in the max value.

Pseudo-code :

```
for (int exp = 1; max/exp > 0; exp *= 10) {
    countSort(arr, size, exp);
}
```

1, 2, 3 (step)

475 / 1 = 475

475 / 10 = 47

475 / 100 = 4

475 / 1000 = 0

\* Bosch: 8.5 LPA \* Infosys: 12 LPA \* Oracle: 15 LPA \* Mercedes: 22 LPA

\* Amazon: (Product Based): 45.5 LPA (Leetcode 1823)

(Winner of the circular game) (Josephus Problem)

### 1. Recursion

Solve(n, k) → Solve(n-1, k)

S(2, k) → S(1, k)

Solve(3, k) → Solve(2, k)

Solve(4, k) → Solve(3, k)

S(5, k) → S(4, k)

S(6, k) → S(5, k)

S(7, k) → S(6, k)

S(8, k) → S(7, k)

S(9, k) → S(8, k)

S(10, k) → S(9, k)

S(11, k) → S(10, k)

S(12, k) → S(11, k)

S(13, k) → S(12, k)

S(14, k) → S(13, k)

S(15, k) → S(14, k)

S(16, k) → S(15, k)

S(17, k) → S(16, k)

S(18, k) → S(17, k)

S(19, k) → S(18, k)

S(20, k) → S(19, k)

S(21, k) → S(20, k)

S(22, k) → S(21, k)

S(23, k) → S(22, k)

S(24, k) → S(23, k)

S(25, k) → S(24, k)

S(26, k) → S(25, k)

S(27, k) → S(26, k)

S(28, k) → S(27, k)

S(29, k) → S(28, k)

S(30, k) → S(29, k)

S(31, k) → S(30, k)

S(32, k) → S(31, k)

S(33, k) → S(32, k)

S(34, k) → S(33, k)

S(35, k) → S(34, k)

S(36, k) → S(35, k)

S(37, k) → S(36, k)

S(38, k) → S(37, k)

S(39, k) → S(38, k)

S(40, k) → S(39, k)

S(41, k) → S(40, k)

S(42, k) → S(41, k)

S(43, k) → S(42, k)

S(44, k) → S(43, k)

S(45, k) → S(44, k)

S(46, k) → S(45, k)

S(47, k) → S(46, k)

S(48, k) → S(47, k)

S(49, k) → S(48, k)

S(50, k) → S(49, k)

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