Max Contiguous Subarray Sum

i/p :	13	-3	-25	20	-3	-16	-23	18	20	-7	12	-5	-22	15	-4
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

43

$\Rightarrow$ 18 20 -7 12 (43)

Divide conquer

O(1)

$\parallel$ mid $= \frac{1+16}{2} = \frac{17}{2} = 8.5 \Rightarrow 8$

T(n/2)

13	-3	-25	20	-3	-16	-7	18
1	2	3	4	5	6	7	8

T(n/2)

20	-7	12	-5	-22	15	-4	-7
9	10	11	12	13	14	15	16

20

25

43

43

```
crossSum(a, low, mid, high)
```

13	-3	-25	20	-3	-16	-23	18
1	2	3	4	5	6	7	8

20	-7	12	-5	-22	15	-4	7
9	10	11	12	13	14	15	16

```
ls = -∞
s = 0
for(i = mid to low)
```

-5 -21 -24 -4 -29 -22 -29

```
    s = s + A[i]
    if(s > ls)
        ls = s
        max-left = i
```

n/2

n

8

```
rs = -∞ , s = 0
for(i = mid+1 to high)
```

9 16

-3 -10 -6 -21 -20 -13 -20

```
    s = s + A[i];
    if(s > rs){
        rs = s
        max-right = i
    }
```

n/2

20 25

11

8 — 11

18 + 25 ⇒ 43

```
return (ls+rs, max-left, max-right)
```

43, 8 — 11

}

$$T(n) = O(1) + 2T(n/2) + n$$

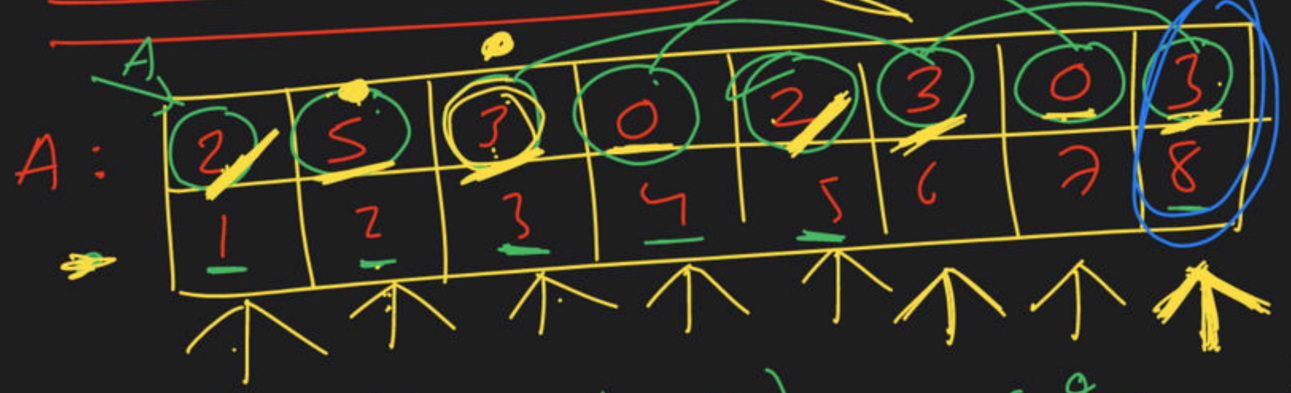
Divide conquer combine

$$= 2T(n/2) + n$$

$$= O(n \log n)$$

(EC) $O(n)$ time (Non-comparision Based algo) — CS ✓, RS ✓, ~~BS~~

Counting sort ⟹ range given



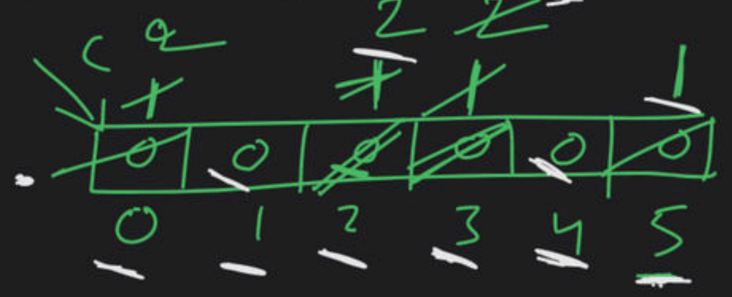
8 n-ele
0 — K

for(i=0 to K)

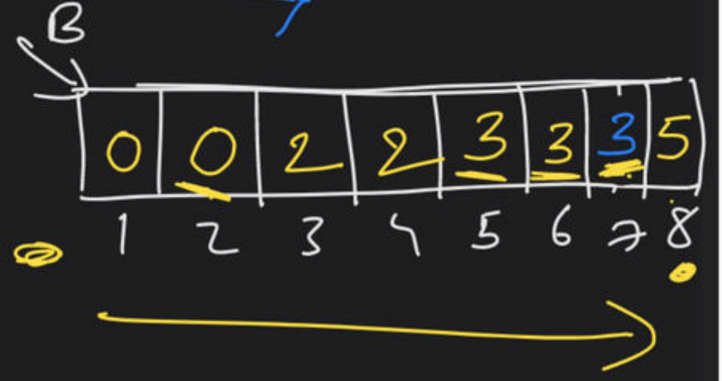
① K[ ] c[i] = 0

for(i=1 to n)

② n[ ] c[a[i]] = c[a[i]/5] + 1



=



③ for(i=1 to K)

c[i] = c[i] + c[i-1]

=

for(i=n to 1)

B[C[A[i]]] = A[i]

C[A[i]] = C[A[i]] - 1

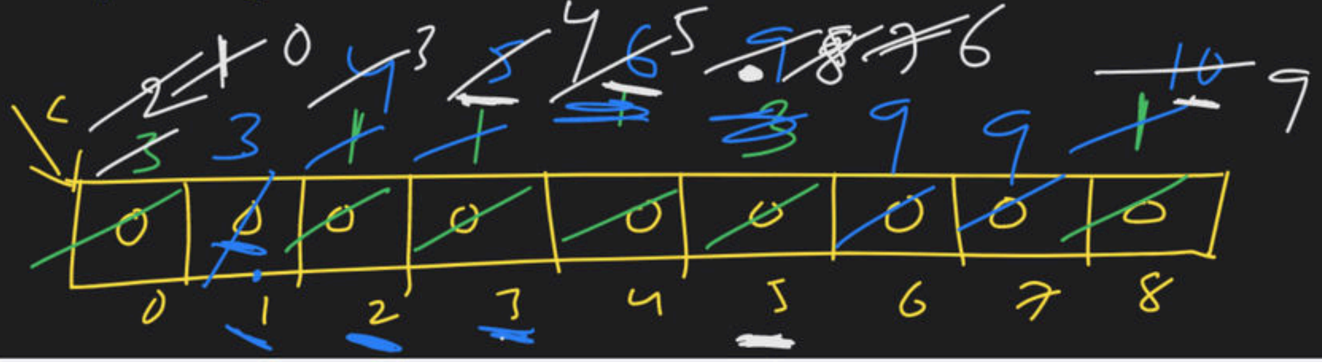
① stable

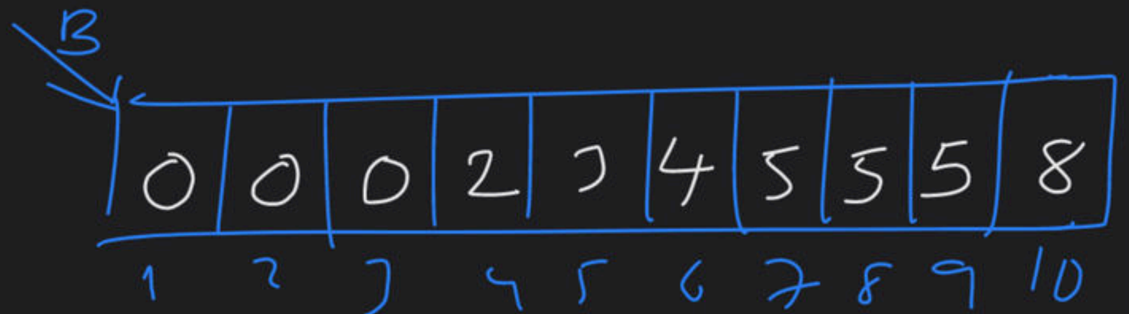
② outplace

③ TC = O(n+k)

extra array of size = n

Range.





O(n+k)

Radix Sort

LSD

$\Rightarrow$ 289 481 392 840 627 381 572

886 904 168 704

$\Rightarrow$ 840 481 381 392 572 904 704 886 627 168 289

$\Rightarrow$ 904 704 627 840 168 572 481 381 289 886 392

$\Rightarrow$ 168 289 381 392 481 572 627 704 840 881 904

$\Rightarrow$ $3(n+k) \Rightarrow O[d(n+k)]$

1. own place
2. stable

Bucket sort ⟹ H.W

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