22 April 2023 18:46

Left

- DSA
  - → DS
    - → Linear ⟷ Array
      - → Stack Q
      - → Q
      - → L.L
    - → Non Linear
  - → Algo

Fundamental
- → Java
- → C++

Right

Array

Intro

////

Meme, gif

Memory

gif

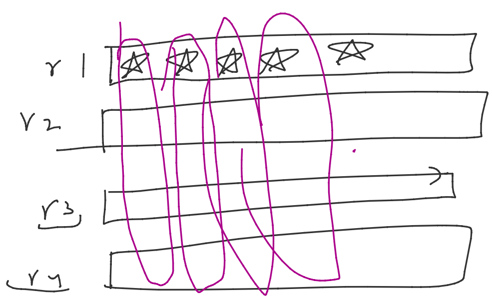
///// small

Understanding

/// /

See also

Algos
- → LS
- → BS
- ⋮



r	total_st
1	5
2	5
3	5
4	5
5	5

row	tot★
1	1
2	2
3	3
4	4
5	5

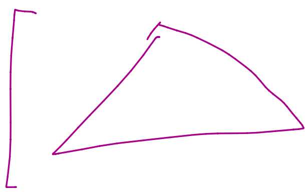
5 15

r	tot st
1	5
2	4
3	3
4	2
5	1

r	sp_	☆
1	4	1
2	3	2
3	2	3
4	1	4
5	0	5

n = 5

```
        *
      * *
    * * *
  * * * *
* * * * *
```



r	_	☆
1	0	5
2	1	4
3	2	3
4	3	2
5	4	1

r	☆
1	1
2	2
3	3
4	4
5	5
6	4
7	3
8	2
9	1

```
int n = 5;
int r = 1;
int tots_st = 1;
while (r <= 2 * n - 1) {
    int cnt_st = 0;
    while (cnt_st < tots_st) {
        System.out.print("*");
        cnt_st++;
    }
    System.out.println();
    r++;
    if (r <= n) {
        tots_st++;
    } else {
        tots_st--;
    }
}
```

1

r = 2, 3, 4, 5

++

r	☆1	—	☆2
1	1	7	1
2	2	5	2
3	3	3	3
4	4	1	4
5	5	-1	5

row

-1   -1

Ques 21:
n = 5

$2n-1-2 = 2n-3$

n - 1

```
*                 *
* *             * *
* * *         * * *
* * * *     * * * *
* * * * * * * * * *
```

2nd loop

1 — 4 | 0 — 3   0 — 4

cnt + 1 | cnt —

Ques 1:
n = 5

```
     0  1  2  3  4
r1   *  *  *  *  *
r2   *  *  *  *  *
r3   *  *  *  *  *
r4   *  *  *  *  *
r5   *  *  *  *  *
```

1,0   2,1   2,3   4,1   1,4   5,4   5,0

1,0
2,1
3,2
4,3
5,4

r = c + 1

1,4
2,3
3,2
4,1
5,0

r + c = n   r = c + 1   n   r + c = 5

Ques 18:
n = 7

n/2 + 1   n/2

```
         *
      *  *  *
   *  *  *  *  *
*  *  *  *  *  *  *
   *  *  *  *  *
      *  *  *
         *
```

a / b   a % b

7 / 2   3

Q

divisor) dividend
R

Data Type.   int x = 10

2
Primitive   Non - Primitive

8
byte → 1 byte → 8 bit → -128 to 127
short → 2 byte → 16 bit → -2^{15} to $2^{15}-1$

pos: 0 to $2^n - 1$

2's compliment

-2^{n-1} to $2^{n-1} - 1$

byte → 1 byte → 8 bit → -128 to 127

short → 2 byte → 16 bit → -2^{15} to $2^{15}-1$

int → 4 byte → 32 bit → -2^{31} to $2^{31}-1$

long → 8 byte → 64 bit → -2^{63} to $2^{63}-1$

→ -10^{18} to 10^{18}

2's compliment

-2^{n-1} to $2^{n-1}-1$

$$2^{31} = 2\cdot(2)^{30} = 2\left(2^{10}\right)^3 \approx 2\cdot\left(10^3\right)^3 = 2\cdot 10^9$$

-2×10^9 to 2×10^9

$$2^{10} = 1024 \approx 10^3$$

$$2^{63} = 2^3\cdot 2^{60} = 8\cdot\left(2^{10}\right)^6 = 8\cdot\left(10^3\right)^6 = 8\times10^{18}$$

$n-1 = S_n$ — (1)

$n = 2S_n$ — (2)

$2^n - 2^0$

$S_n = 2^n - 1$

5246

6 7 8 9   19   29

$(99)_{10}$

$(\ \ )_4$ → 0–3

0	0
1	1
2	2
3	3
4	10
5	11
6	12
7	13
8	20
9	21
10	22
11	23
12	30
13	31
14	32
15	$(33)_4$
16	100

$(123)_4$

$3\times4^0 + 2\times4^1 + 1\times4^2 = (\ \ )_{10}$

$\underbrace{3}_{4^1}\ \underbrace{3}_{4^0}$ = 15

$\underbrace{2}_{4^1}\ \underbrace{2}_{4^0} = 10$

$1\underbrace{0}_{4^1}\underbrace{0}_{4^0}$ = 16

$(64)_8 \rightarrow (\ \ )_{10}$

(1010)

8+2

0 — 0
1 — 1
10 — 2
11 — 3
100 — 4
101 — 5
110 — 6
111 — 7
1000
1001
$(1010)_2$

1011
1100
1101
1110
$(1111)_2$ → 15
10000
10001
10010
10011
10100

{ _ _ _ _ _ _ _ }

8

{ …1000010 }

{ 1 0 0 0 0 1 0 1 0 }

2^8 2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0

256 + 8 + 2 = 266

{ 1 0 0 0 0 0 0 0 }

2^7 { 1 2 7 }

102

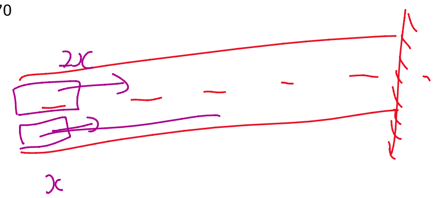
From <https://hack.codingblocks.com/app/contests/4347/161/problem>

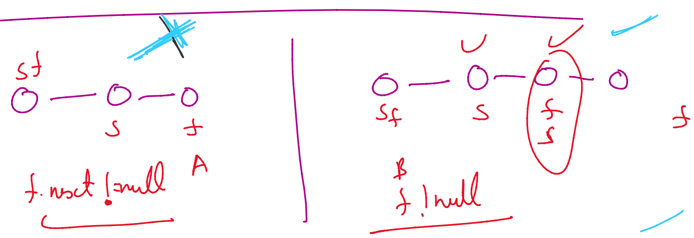
102

2×10^0 + 0×10^1 + 1×10^2

size

10,20,30,40,50,60,70

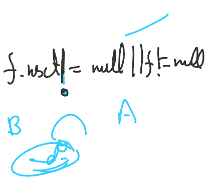




Q1) and || or

Q2) A ∪ B

B ∪ A



10 → 20 → 30 → 40 → 50

1) Basic

2) Stack

~~3)~~ size

4) ?? Gaddi

Kth last

O(n) → O(1) space.

K = 1 → 50

K = 2 → 40

K = 3 → 30

M1) Stack → T O(n+m), S O(n+m)

M2) Hero Kidnap. → O(n+m) T, S O(1)

size pass

size → diff → O(n+m) T

O(1) space

M3) →

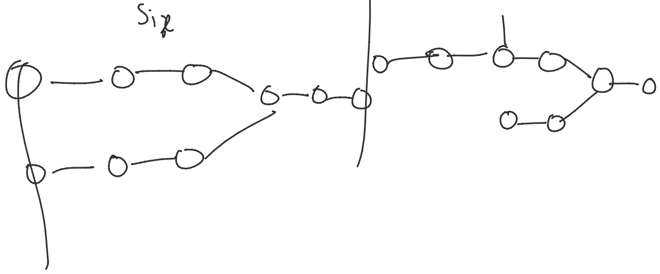
size pass

M3) → size → diff → $O(n+m)$ T

$O(1)$ space

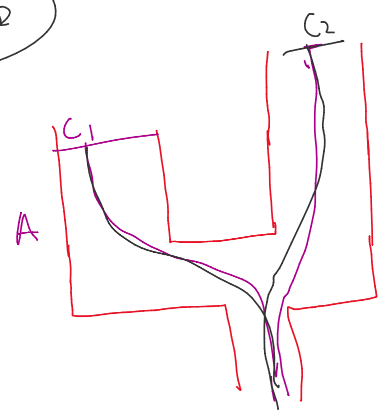
Case 1 | Case 2

Size



Q

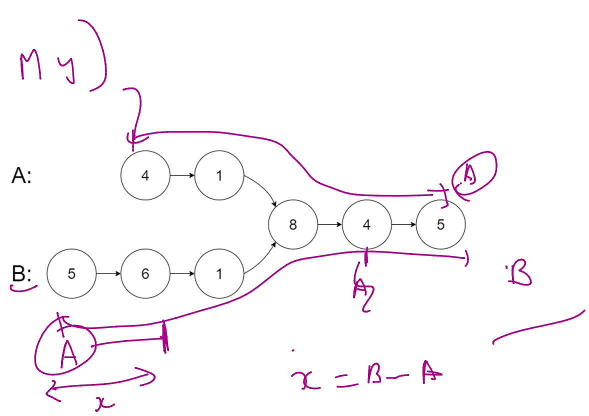
size



$C_1 = A + B$

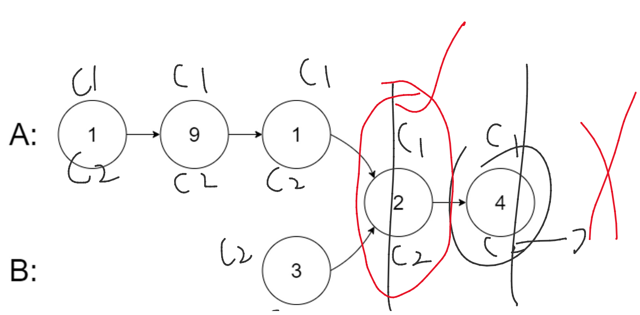
$C_2 = A + B$

M4)

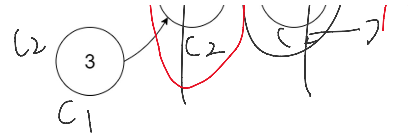


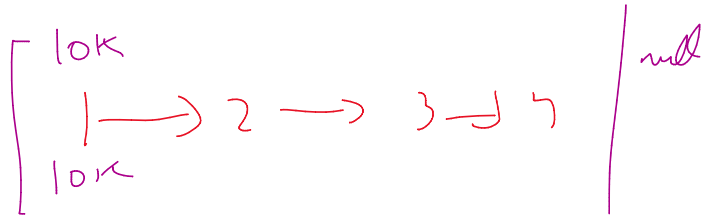
$x = B - A$

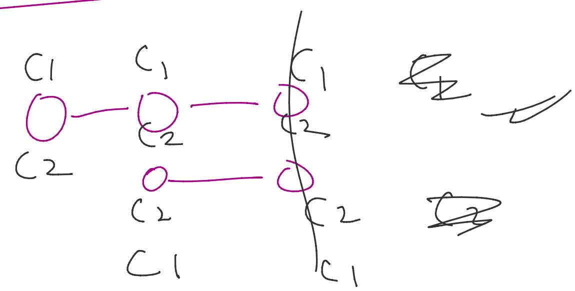
$A + x = B$

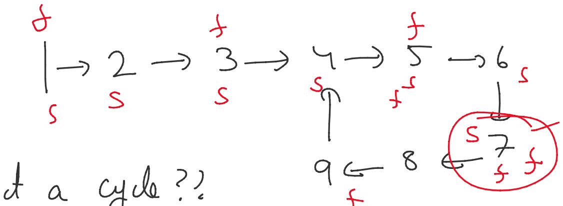


B:



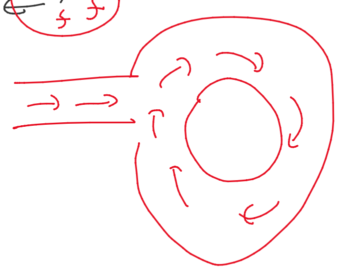


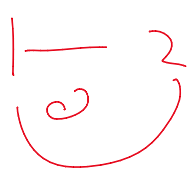




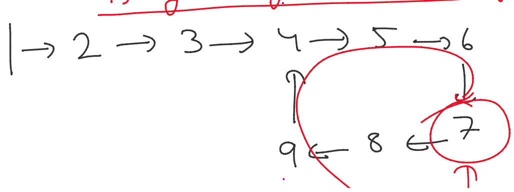
Detect a cycle ??

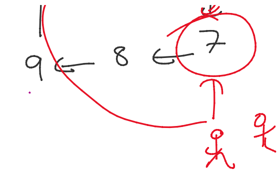
M1) Hero, Kidnap; track LLX





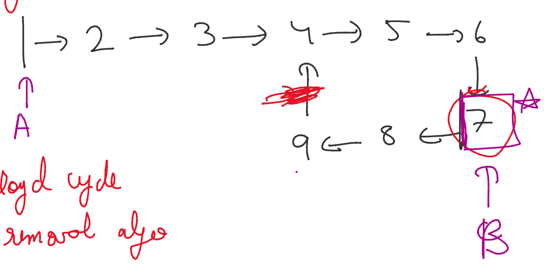
Floyd cycle detectⁿ algo] → fast & slow





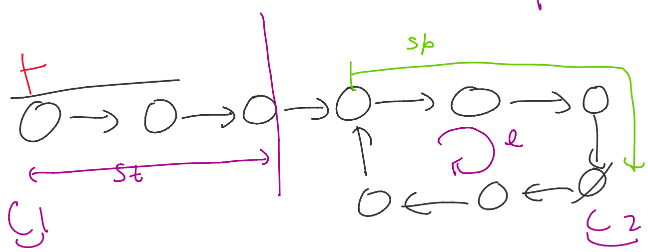
Q loop ki length

Q Cycle removal



floyd cycle removal algo

$| \ st+sp = (K_1-2K_2)l$



$$F = st + K_1 l + sp = D_1$$

$$S = st + K_2 l + sp = D_2$$

$$2(st + K_2 l + sp) = st + K_1 l + sp$$

$$\cancel{2}st + 2K_2 l + \cancel{2}sp = \cancel{st} + K_1 l + \cancel{sp}$$

$$st+sp = (K_1-2K_2)\,l$$

$\boxed{st+sp \text{ is a factor of } l}$