1, 3, 5, 9, 13

↳ strictly increasing

20, 18, 15, 13, 5, -1, -10

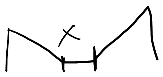
↳ strictly decreasing

$\overset{1}{5}, \overset{2}{4}, \overset{3}{3}, \ldots \overset{}{1}, \ldots \overset{n-1}{5}, \overset{n}{10}$ ✓

S.D S.I

n: $\overset{1}{15}, \overset{2}{12}, \overset{3}{11}, \overset{4}{9} \ldots, \overset{i}{5}, \overset{i+1}{6}, \overset{i+2}{8} \ldots, \overset{n-1}{20}, \overset{n}{25}$ ✓

S.D S.I

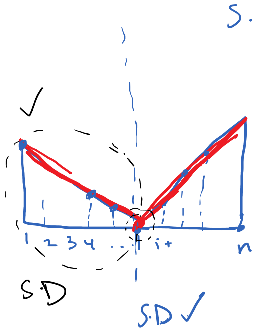


5, 4, 2, 2, 3, 4 ✗

S.D S.I

2, 2, 3, 4 S.I ?

$2 \leq 2 < 3 < 4$ ✗



5, 4, 2, 2 ✗ ✗

S.D >

int ✗ 10^{12}

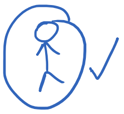
long ✓

S.D ✓

1, 2, 3, 4, 5

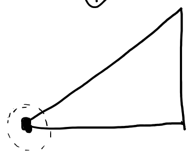
S.I

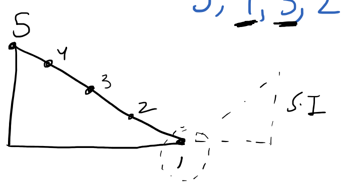
$S_1 - S_1$

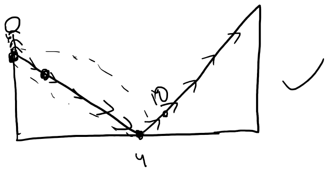


S.D → S.I

5, 4, 3, 2, 1





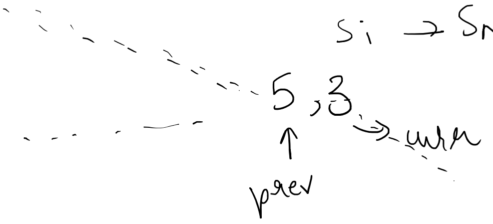


n; S✓

1, 2, 3, 4, 5

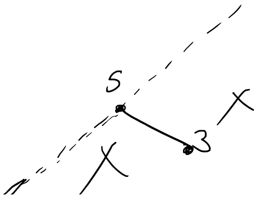
$S_1 \to S_i$: SD

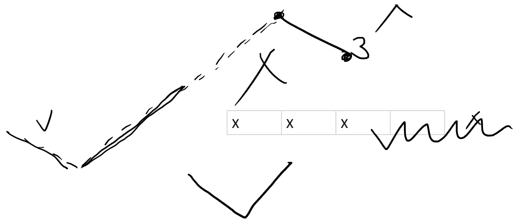
$S_i \to S_N$: SI

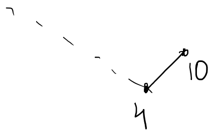


prev

5 2

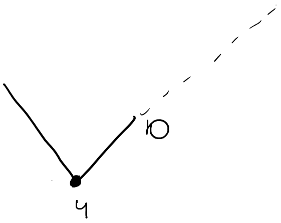


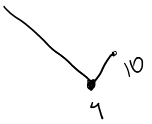


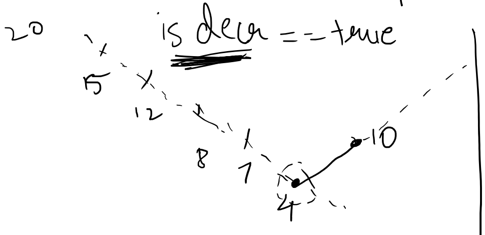


4, 10, 15

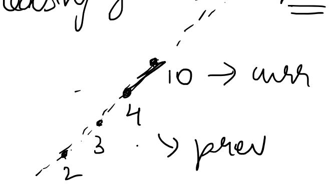
prev curr







isdecreasing = false ⇒ Sequence was increasing

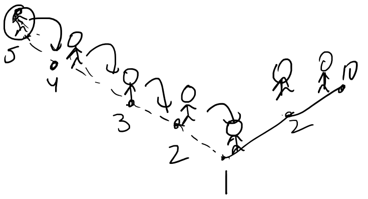


```
int n=7
int prev = scn.nextInt();
boolean isDecreasing = true;

boolean ans = true;
int i=~~0~~ ~~1~~ ~~2~~ ~~3~~ ~~4~~ 5
              6
while (i < n - 1) {
    curr = scn.nextInt();
       5
    if (prev == curr) {✗
        ans = false;
              10       5
    } else if (prev > curr) {✓
        if (isDecreasing == true) {

        } else { // isDecreasing == false
            ans = false;
        }

                  1      2
    } else { // prev < curr
        if (isDecreasing == true) {✗
            isDecreasing = false;
            // bottom most
//                  System.out.println(prev);
        } else {
            // sequence pehle se hi
            increasing
        }
```



5, 4, 3, 2, 1, 2, 10, 5

prev

prev = 10

curr = 5

isDec = false

0
9 0 9
8 9 0 9 8
7 8 9 0 9 8 7

```
    }
    prev = curr;
    i++;
}
```

29 October 2022 10:29

Numbers Words

Java

Data types → Primitive Non Primitive

Primitive : 8

↳ Integral, Decimal, boolean, character

$2^8 = 256$

$0 \to 2^n - 1$: -2^{n-1}

$\frac{2^n}{2} = 2^{n-1}$

Integral

↳ byte = 1 byte = 8 bits (n) → -128 to 127

↳ short = 2 byte = 16 bits

↳ int = 4 byte = 32 bits

↳ long = 8 byte = 64 bits

1 Capacity

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

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

int

Range -2^{31} to $2^{31} - 1$

$2^{31} = 2 \cdot 2^{30}$

$= 2 \cdot (2^{10})^3$

$\approx 2 \cdot (10^3)^3$

$= 2 \times 10^9$

int 1000000000000 ~~10^{12}~~ 10^9 ✓

$2^{63} = 2^3 \times 2^{60}$

$= 2^3 \times (2^{10})^6$

$= 2^3 \times (10^3)^6$

$= 2^3 \times 10^{18}$

long 10^{18}

1024

9

Binary n digits $(0, 2^n - 1)$

↳ Base 2

(0 - 1)

$(\underset{2^4}{1}\underset{2^3}{1}\underset{2^2}{1}\underset{2^1}{1}\underset{2^0}{1})_2$

↳

$1 \times 2^4 +$

$1 \times 2^3 +$

$1 \times 2^2 +$

$1 \times 2^1 +$

1×2^0

$= 31$

0 → 0

1 → 1

1 0 → 2

1 1 → 3

1 0 0

1 0 1

1 1 0

1 1 1

Decimal

↳ Base 10

(0

1

2

3

4

5

6

7

8

9

10

11

12

13

⋮

19

20

21

⋮

99

100

101

102

$(\underset{10^4}{9}\underset{10^3}{9}\underset{10^2}{9}\underset{10^1}{9}\underset{10^0}{9})_{10}$

↳

$9 \times 10^4 +$

$9 \times 10^3 +$

$9 \times 10^2 +$

$9 \times 10^1 +$

9×10^0

$$2^0 + 2^1 + 2^2 + 2^3 + 2^4 = \frac{a(r^n - 1)}{r - 1}$$

$$= \frac{1(2^5 - 1)}{2 - 1}$$

$= 2^5 - 1$

$= 32 - 1$

$= 31$

5 bits ka binary

$2^5 - 1$

6 bits $= 2^6 - 1$

7 bits $= 2^7 - 1$

⋮

. . . . $2^n - 1$

2^3	2^2	2^1	2^0	
0	0	0	0	= 0
0	0	0	1	= $1 \times 2^0 = 1$
0	0	1	0	= $1 \times 2^1 = 2$
0	0	1	1	= $1 \times 2^1 + 1 \times 2^0 = 3$
0	1	0	0	= $1 \times 2^2 = 4$
0	1	0	1	= $1 \times 2^4 + 1 \times 2^0 = 5$

⋮

n^{th} bits = $\underline{\underline{2^n - 1}}$

0 0 1 1 $= 1 \times 2^1 + 1 \times 2^0 = 3$

0 1 0 0 $= 1 \times 2^2 = 4$

0 1 0 1 $= 1 \times 2^4 + 1 \times 2^0 = 5$

0 1 1 0 $= 1 \times 2^4 + 1 \times 2^1 = 6$

0 1 1 1

1 0 0 0

1 0 0 1

1 0 1 0

1 0 1 1

Type casting

↳ Implicit ⇒ Automatic Vali

↳ Explicit ⇒ Zabardasti Vali

$-\underline{\underline{128}}$, -127, ... 0, 1, 2, ...94, 126, 127, 128

Decimals :→ Floating Point Numbers

↳ float : 4 byte

↳ double : 8 byte → By Default

int i

float f

A) i=f; ✗

B) f=i; ✓

(int) 10.4

↳ 10

f = 10

↳ 10.0 ✓

29 October 2022 12:12

7) boolean 1 bit
↳ true false

boolean b = 0;
boolean b = 1;
~~C/C++~~

boolean b = true; ✓
= false; ✓

= conditions ✓

boolean b = (a > 10) && (c < 5) || (d > e); ✓

8) **char** → Characters
a, b, c, ☺, !, 1, 2, 3, ;, '0', ~~'π'~~ ^
✓ ✗

↳ 2 byte → 16 bits
↳ 2^{16}

C/C++ : 1 byte 0 - 255 E
↳ 8 bits 2^{8}

'a' + 1 = 'b'
'a' + 2 = 'c'

syso('a');
syso((int)'a');

a to z → Lowercase

A to Z → Uppercase