cost = 0 + $|h_1 - h_2|$ 10 + $|h_2 - h_4|$ 10

Problem Statement

There are N stones, numbered $1, 2, \ldots, N$. For each i ($1 \leq i \leq N$), the height of Stone i is h_i.

There is a frog who is initially on Stone 1. He will repeat the following action some number of times to reach Stone N:

- If the frog is currently on Stone i, jump to Stone $i+1$ or Stone $i+2$. Here, a cost of $|h_i - h_j|$ is incurred, where j is the stone to land on.

Find the minimum possible total cost incurred before the frog reaches Stone N.

$1 \to N$

min possible cost to reach N^{th} stone

$1 \to N$

$i \to i+1$

$i \to i+2$

f - - - h_i - - -

i^{th} index

Input

Input is given from Standard Input in the following format:

```
N
h1 h2 ... hN
```

$i \to i+1$

$i \to i+2$

1 2 3 4

10 30 40 20

Output

Print the minimum possible total cost incurred.

Recursively

$i \to i+1$ $(|h_i - h_{i+1}|)$

$i \to i+2$ $(|h_i - h_{i+2}|)$

Sample Input 1

Copy

```
4
10 30 40 20
```

Sample Output 1

Copy

```
30
```

$|h_1 - h_2| + |h_2 - h_4| = 30$

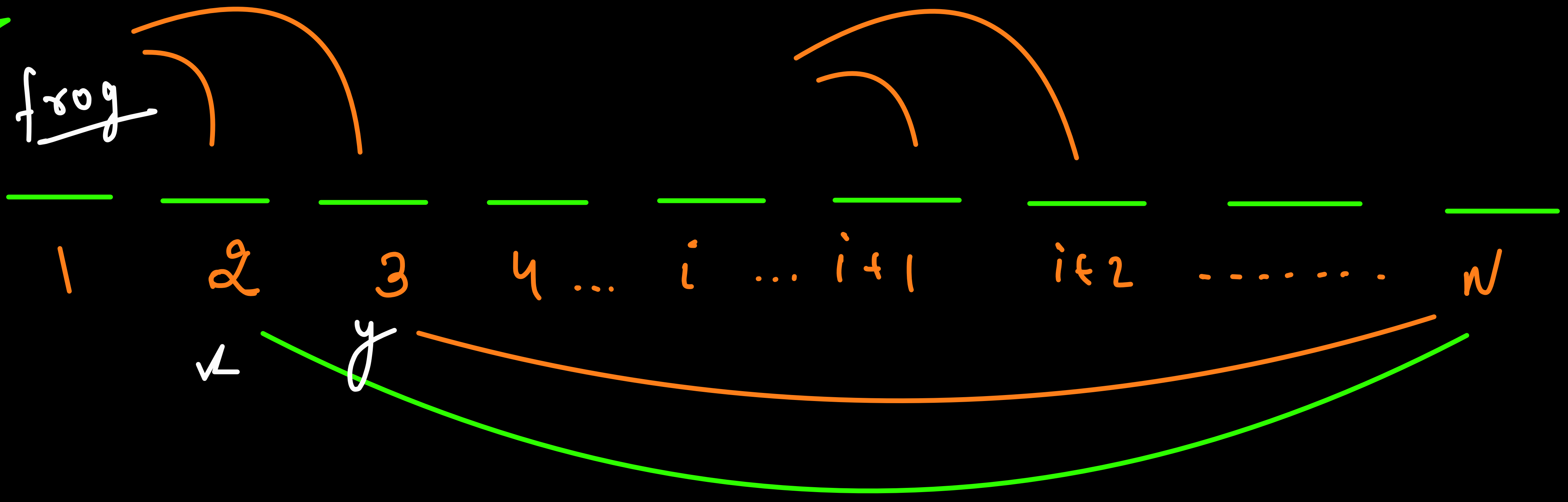
If we follow the path $1 \to 2 \to 4$, the total cost incurred would be $|10 - 30| + |30 - 20| = 30$.

$\min\left[x + |h_1 - h_2|,\ y + |h_1 - h_3| \right]$

via 2 $\leftarrow$ $1 \rightarrow 2 \rightarrow |h_1 - h_2| + x$

via 3 $\leftarrow$ $1 \rightarrow 3 \rightarrow |h_1 - h_3| + y$

Approach!



let's say we already know mincost to go from $2 \rightarrow N$

and we already know mincost to go from $3 \rightarrow N$

then we can very easily calc the cost from $1 \rightarrow 2$, $1 \rightarrow 3$

and see the best ans.

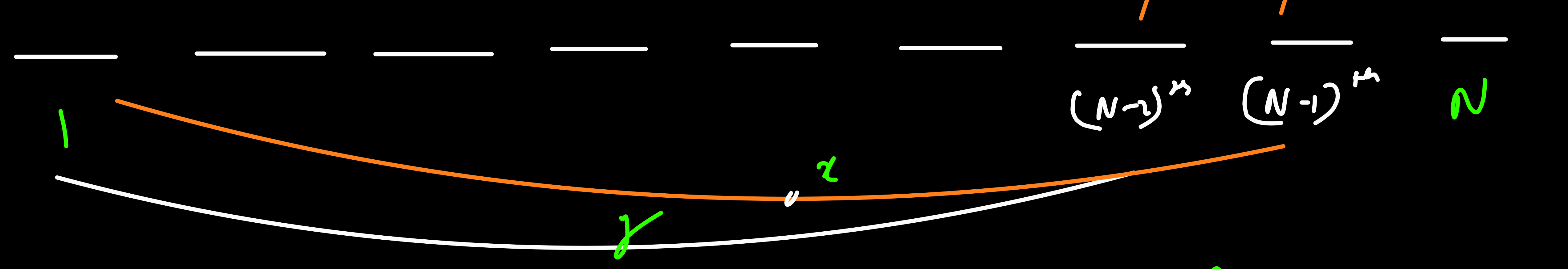
Approach 2

reach N via N-1 $\quad N-1 \rightarrow N \rightarrow x + |h_{n-1} - h_n|$

reach N via N-2 $\quad N-2 \rightarrow N \rightarrow y + |h_{n-2} - h_n|$

$$\min\left(x + |h_{n-1} - h_n|,\; y + |h_{n-2} - h_n| \right)$$

frog



One more way to look at the problem is for reaching N as the last stone, only N-1 or N-2 can be the 2nd last.

if we know min cost to reach $1 \rightarrow N-1$ as x and $1 \rightarrow N-2$ as y

Approach 1

self cycle

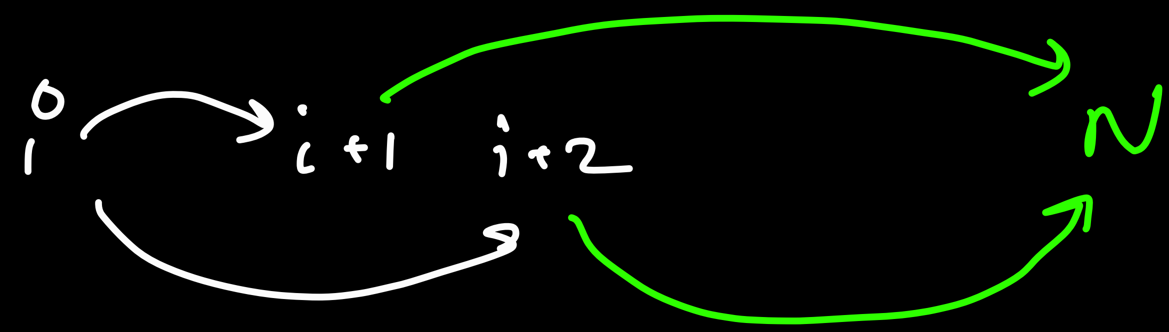
$$f(i) = \min\left(f(i+1) + |h_i - h_{i+1}| ,\ f(i+2) + |h_i - h_{i+2}| \right)$$

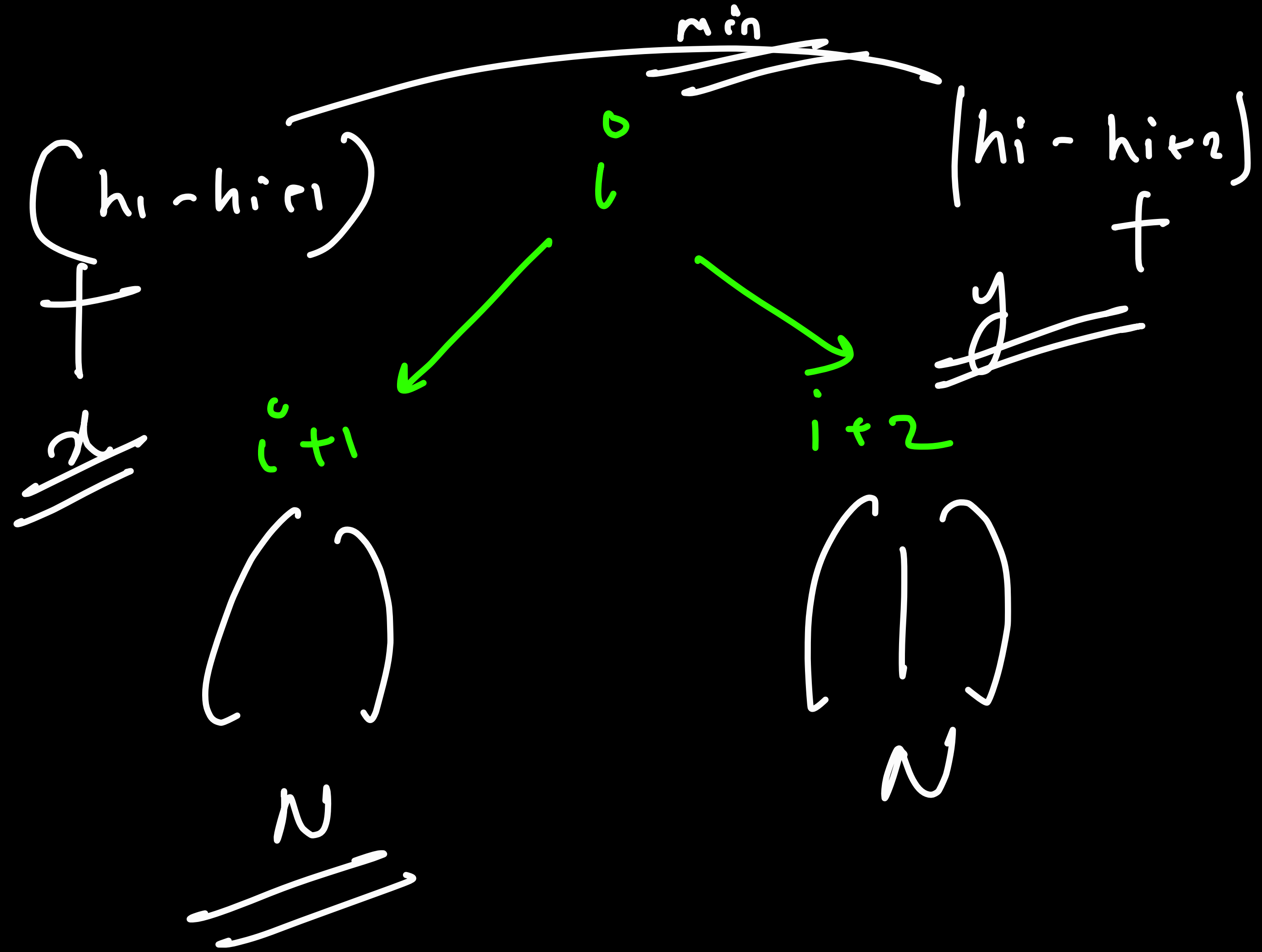
$f(i)$ → min cost to reach n^{th} stone from i^{th} stone.

$f(i+1)$ → correctly calc min cost to reach n^{th} stone from $(i+1)^{th}$ stone

$f(i+2)$ → correctly calc min cost to reach n^{th} stone from $(i+2)^{th}$ stone

$f(1)$ → will tell us the final ans $(1 \to N)$




min
i
(hi - hi+1)
|hi - hi+2|
f
f
x
y
i+1
i+2
N
N

Approach 2

$$f(N) = \min\left(f(N-1) + |h_{N-1} - h_N|,\quad f(N-2) + |h_{N-2} - h_N|\right)$$

$f(N)$: min cost to reach N^{th} stone from 1^{st} stone

$f(N-1)$: correctly calcs min cost to reach $(N-1)^{th}$ stone from 1^{st} stone

$f(N-2)$: correctly calcs min cost to reach $(N-2)^{th}$ stone from 1^{st} stone

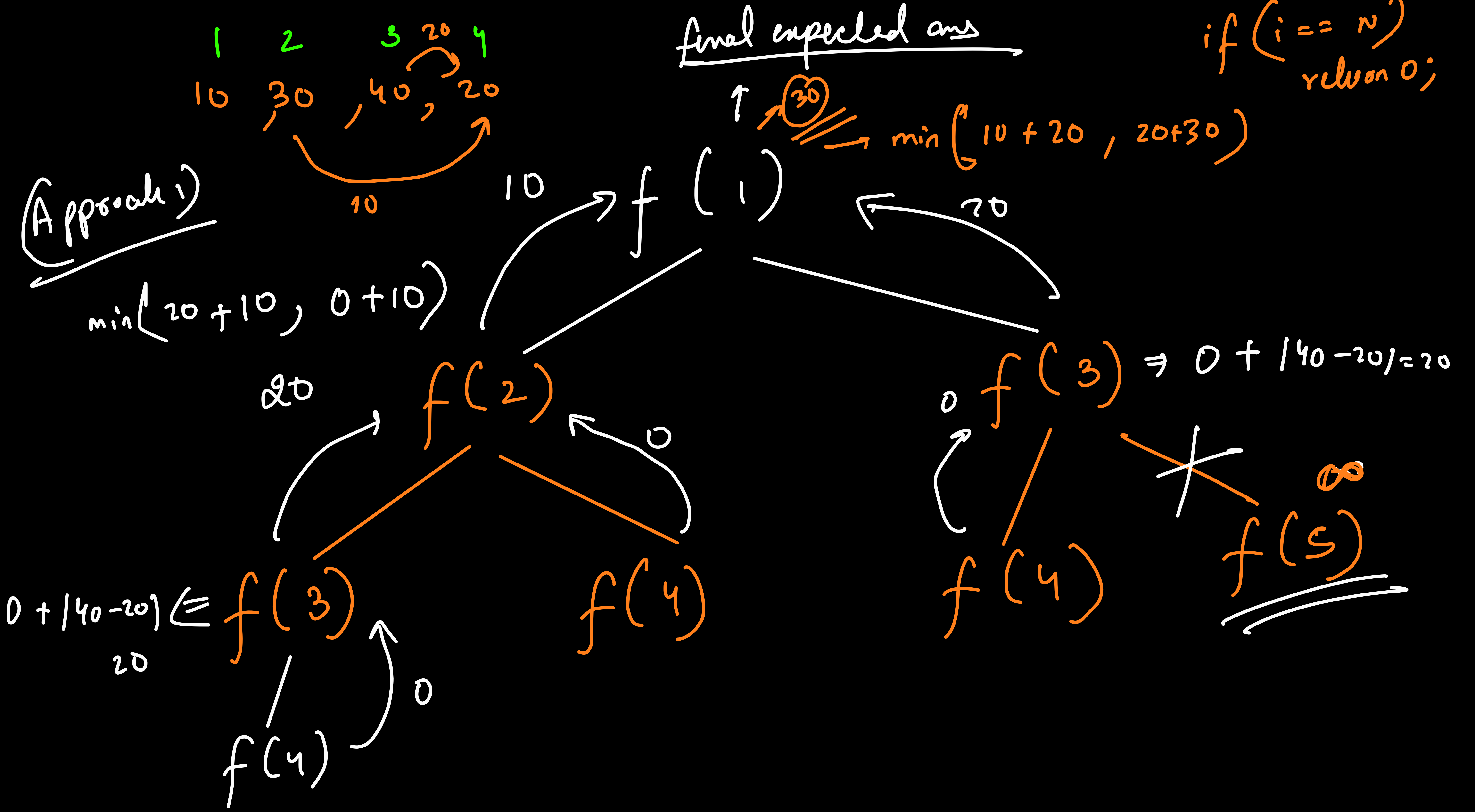
$1 \to x$ $\quad$ $1 \to y$

$f\,(N-1)$ $\quad\quad$ $(N-2)\,f$

$|h_{N-1} - h_N)$ $\quad\quad$ $|h_{N-2} - h_N)$

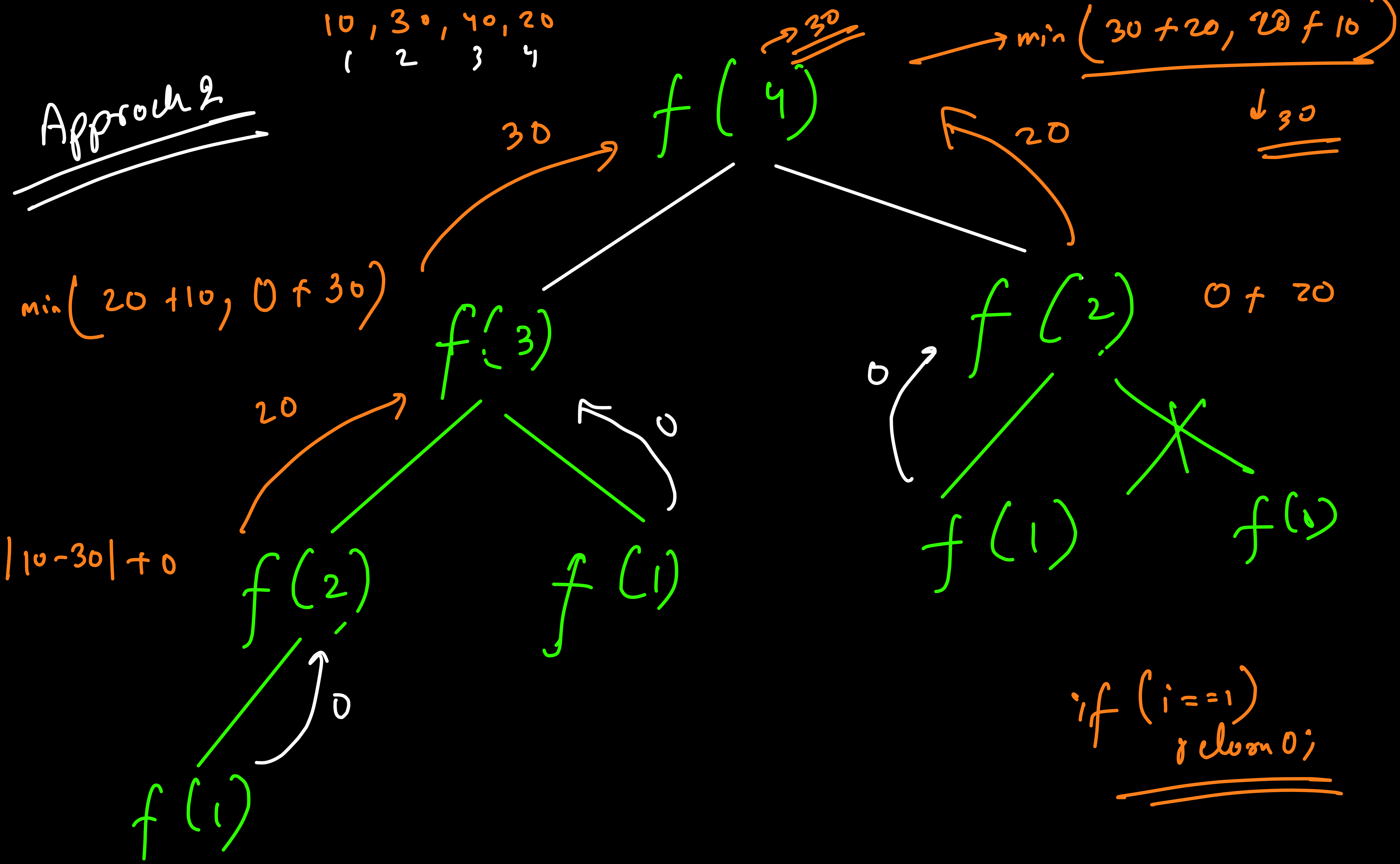
$N-1 \to N \leftarrow N-2$

$\underbrace{\quad\quad\quad\quad\quad\quad}_{\text{min}}$


1 2 3 20 4
10, 30, 40, 20
10
Approach 1)
final expected ans
30
min(10 + 20, 20+30)
if (i == N)
return 0;
f(1)
10
20
min(20+10, 0+10)
f(2)
20
0
f(3) ⇒ 0 + |40-20| = 20
0
f(3)
f(4)
f(4)
f(5)
∞
0 + |40-20| ⇐
20
f(4)
0

Approch 2

10, 30, 40, 20
1 2 3 4



if (i==1)
return 0;