Partition into k. Subset

Total number of ways to partition the array in k - subsets.

n=4) 1 2 3 4 ⟶

k=3

Total no. of k-size subset = 6

1 - 2 - 34

1 - 23 - 4

12 - 3 - 4

14 - 2 - 3

13 - 2 - 4

1 - 24 - 3

n = ?

k = ?

k=3

12-3-4 x3
1-23-4 x3
13-2-4 x3
14-2-3 x3
1-24-3 x3
1-2-34 x3

125-3-4
12-35-4
12-3-45

1234, 3

1234, 2

7

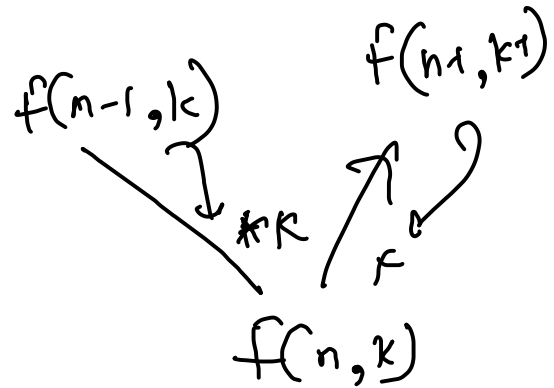
1-234
12-34
123-4
2-134
23-14
24-13
3-142

1234(5), 3

12 + 7 => 25

n = 5
k = 3 → 25

1-234-5
12-34-5
123-4-5
2-134-5
23-14-5
24-13-5
3-142-5



f(n,k) = k*f(n-1,k) + f(n-1,k-1)

$$f(n,k) = k * f(n-1,k) + f(n-1,k-1)$$

$dp[i][j] = i * dp[i][j-1] + dp[i-1][j-1]$

123
- 1-23
- 12-3
- 13-2

3

$n=5, \quad k=3$

Size of array →

No. of partitions (k)	0	1	2	3	4	5
k=0	0	0	0	0	0	0
1	0	1	1	1	1	1
2	0	0	1	3	7	15
3	0	0	0	1	5	25

$k = 2*1+1$; $2*3+1$; $2*7+1$

$3*1+2$; $6*3+7$

n, k : $3, 2$

$f(4,3) = 3 * f(3,3) + f(3,2)$

$5, 3$ → 25

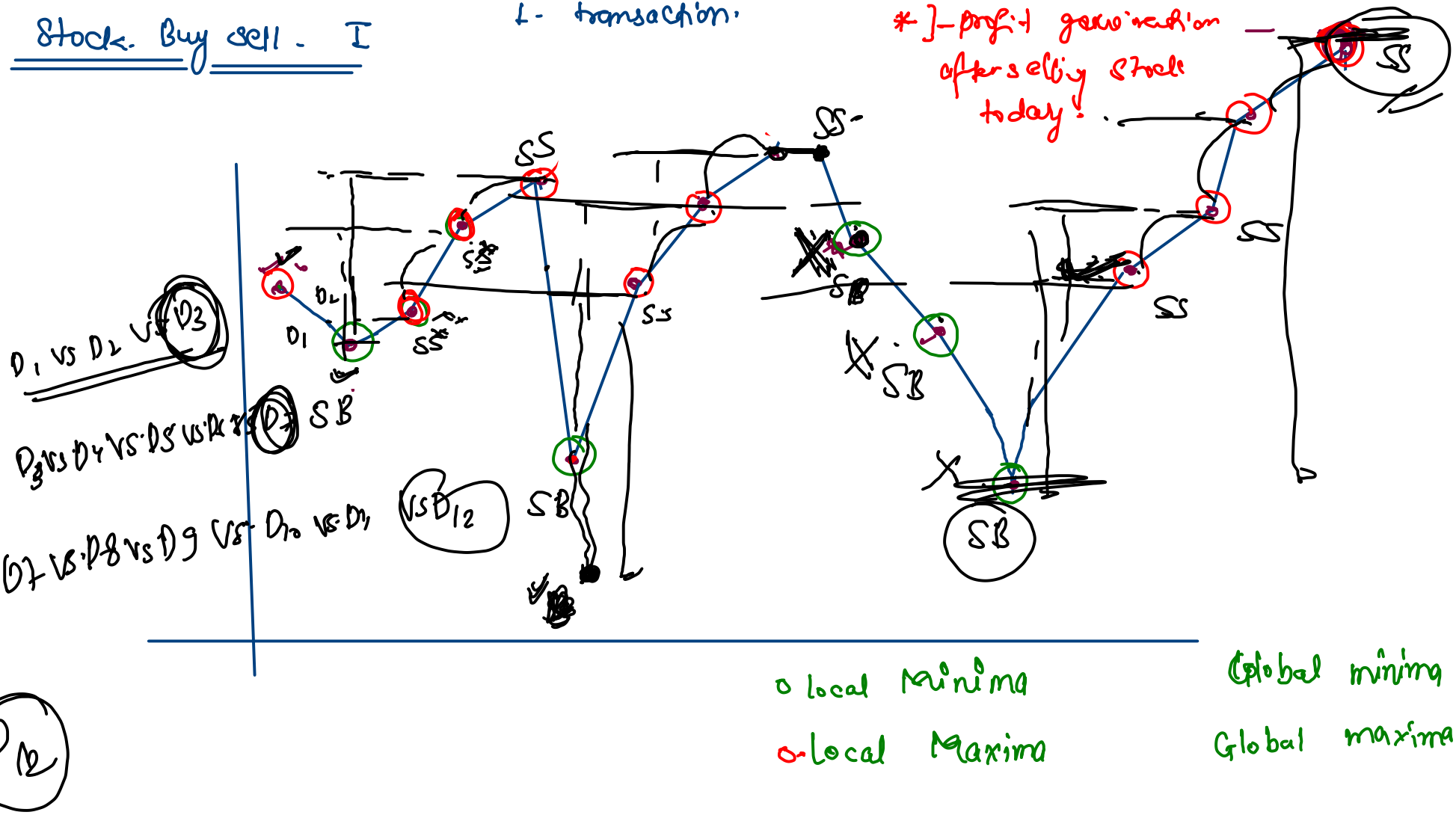
$f(4,2) = 2 * f(3,2) + f(3,1)$

$f(3,2) = 2 * f(2,2) + f(2,1)$

Stock Buy Sell - I

1- transaction.

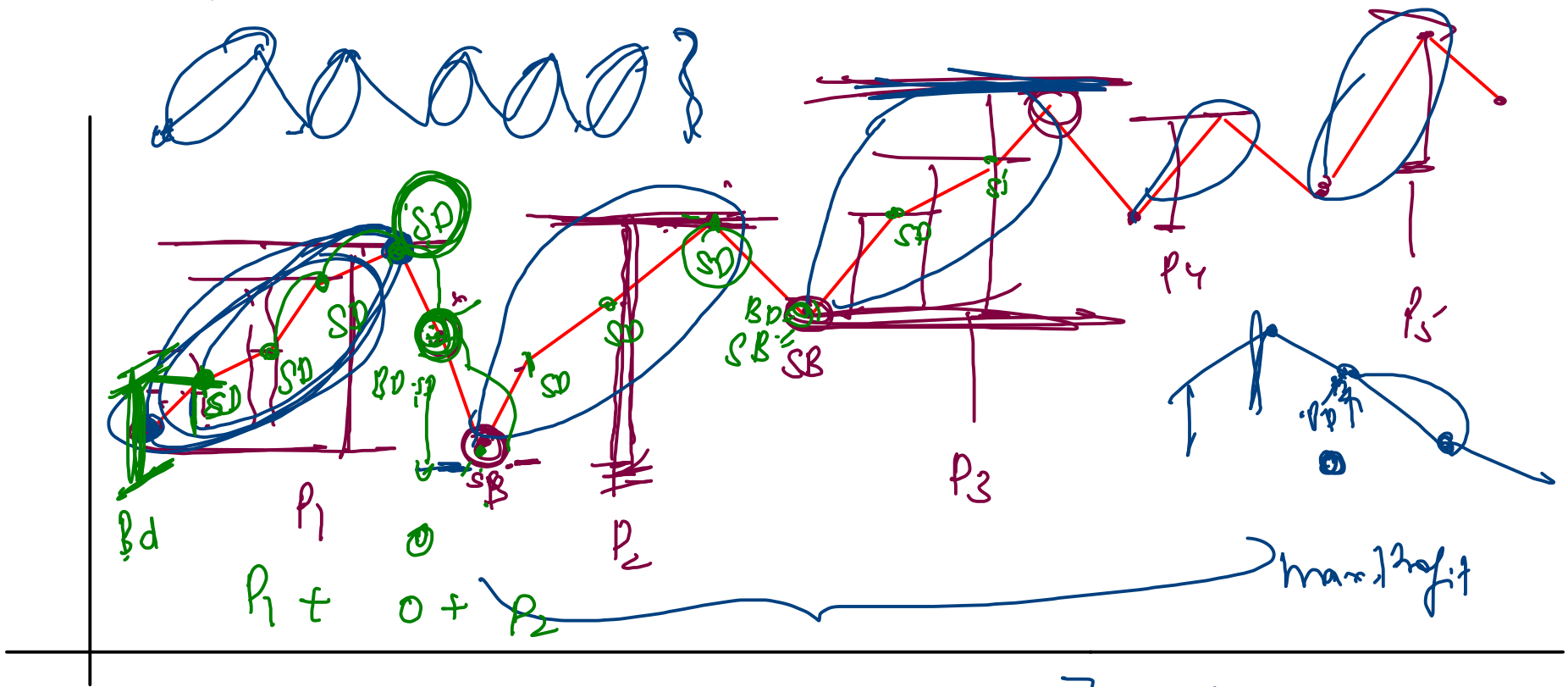
*]- profit generation after selling stock today!

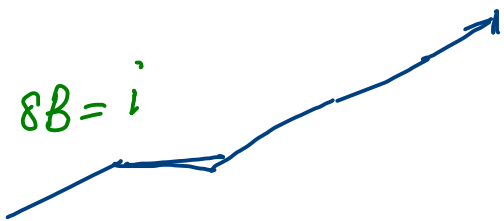


D12

Stock Buy Sell - Infinite Transaction

Buy Sell



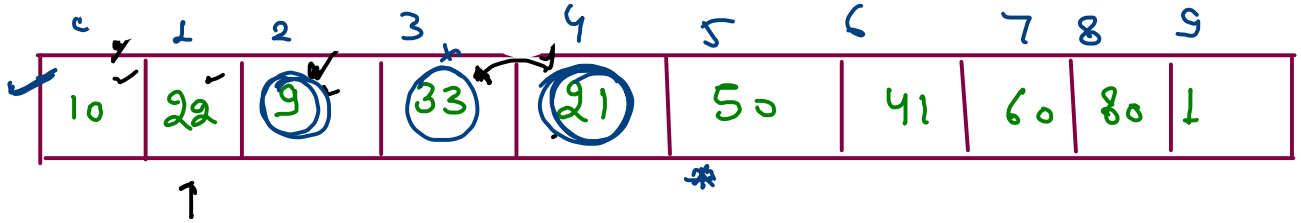


greater than previous day] = stock sell Date update

Smaller than previous day] = add profit for previous days + Buy today & update sell Date for today

Longest Increasing Subseq :-

- ✓ Storage
- ✓ Meaning
- ✓ Direction and Traversal.



0	1	2	3	4	5	6	7	8	9
1	2	1	3	2	4	4	5	6	1
10	10 22	9	10 22 33	10 21	10 22 33 50	10 22 33 41	10 22 33 50 60	10 22 33 50 60 80	1

ans = max

Max possible length of increasing subseq which are ending at (50)

String / array

Subsequence / Subset

"abc" → Subseq.
- - -
- - c
- b -
- b c
a - -
a - c
a b -
a b c

{10, 20, 30} → all possible Subsets
{ }
{30}
{20}
{20, 30}
{10}
{10, 30}
{10, 20}
{10, 20, 30}

* order maintain
* Non continuous.] can skip any Element

* No → 2^{length}

$2^3 = 8$

String / array.

Substring / Subarray

"abc" → Substring
a
ab
abc
b
bc
c

{10, 20, 30} → Subarray.
{10}
{10, 20}
{10, 20, 30}
{20}
{20, 30}
{30}

* order maintain
* continuous. } can't skip any Element b/w starting and Ending.

* No - $\frac{n(n+1)}{2}$

$\frac{3 \times 4}{2} = 6$