# NEXT PERMUTATION

$A_1 =$ | 1 | 2 | 3 |

→ If this is given array

The next permutation will be 1 3 2
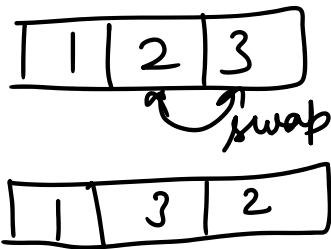
```
1   2   3
1   3   2
2   1   3
2   3   1
3   1   2
3   2   1
```
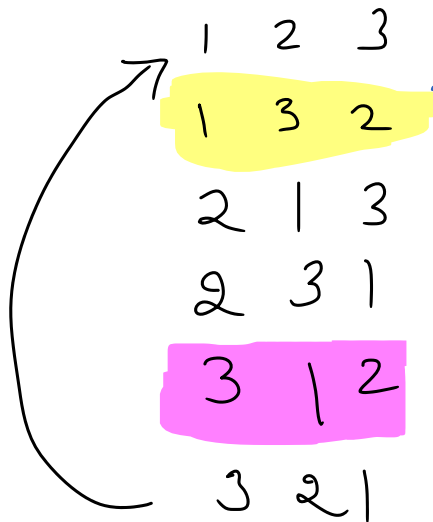
The next permutation if given array was

| 2 | 3 | 1 |

So How we can find the next permutation.

**Case 1**

| 1 | 2 | 3 |

swap

| 1 | 3 | 2 |

**This will be next permutation.**

**Case 2**

| 2 | 3 | 1 |

This will be next permutation
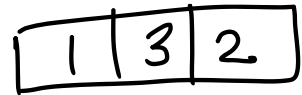
| 3 | 1 | 2 |

Case 3

| 3 | 2 | 1 |

next permutation

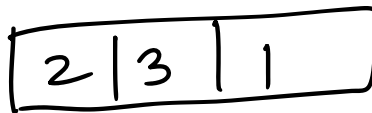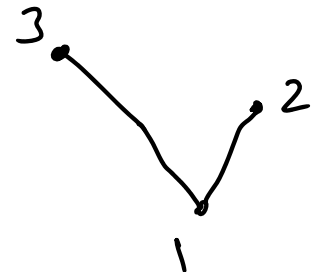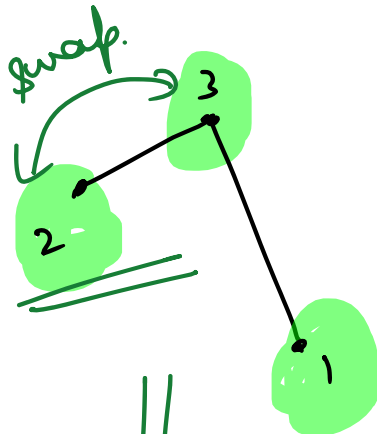| 1 | 2 | 3 |
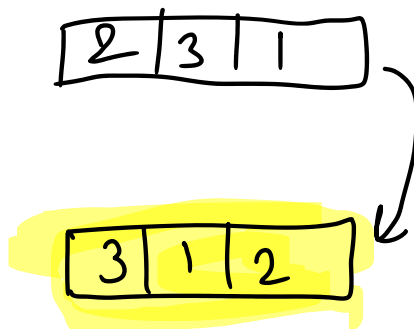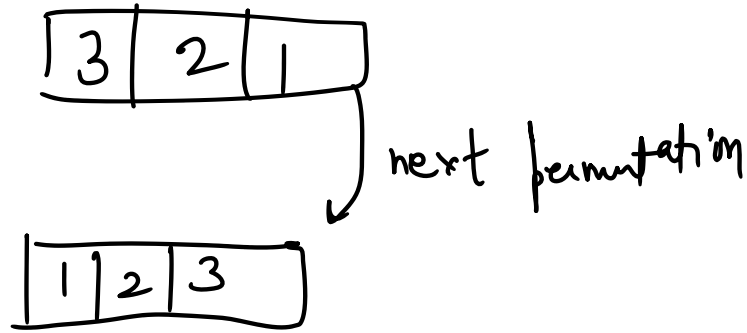
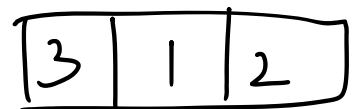Lds think if graphically what is happening

Case 1 | 1 | 2 | 3 |

np | 1 | 3 | 2 |
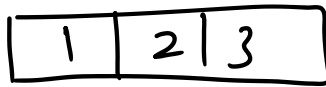
*focus on changing elements

swap

3
2
1

3
2
1

Case 2 | 2 | 3 | 1 |

np | 3 | 1 | 2 |

swap.

3
2
1

3
2
1

3

3
1
2

Case 3

| 3 | 2 | 1 |

np

★ Try to think कि ये क्या रूध है ||

| 1 | 2 | 3 |

peak element

np → | 1 | 3 | 2 |

| 5 | 7 | 3 | 2 | 1 |

np

| 7 | 5 | 1 | 2 | 3 |
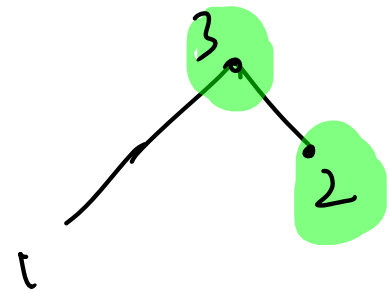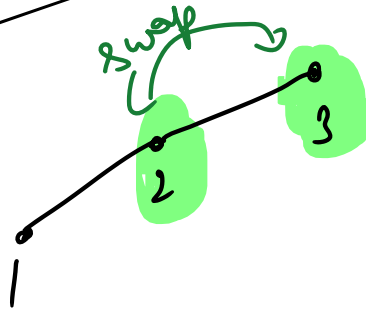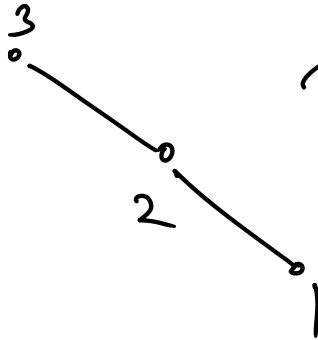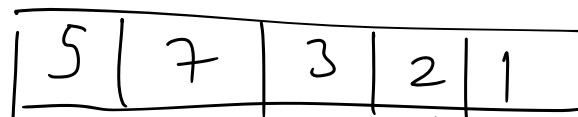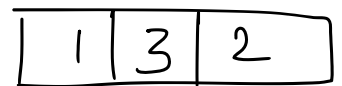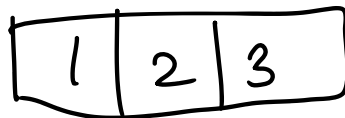
next permutation का मतलब है कि इससे just

greater जो बन सकता है Band upon given arrangement. ?

except for the case जब 24 greatest permutation यह दो ॥
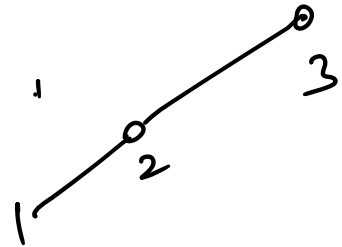
| 1 | 2 | 5 | 4 | 3 |

5
4
2
1
3

जो right side से सबसे बड़ी value देखो जिससे हम peak बोल रहे हैं। उसके साथ हमें करना है ॥

$$\begin{bmatrix} \text{peak banically} \\ \text{उसार} \\ arr[i°] \end{bmatrix} > arr[i-1]] \rightarrow \text{peak है}$$

5
4
2
1
3
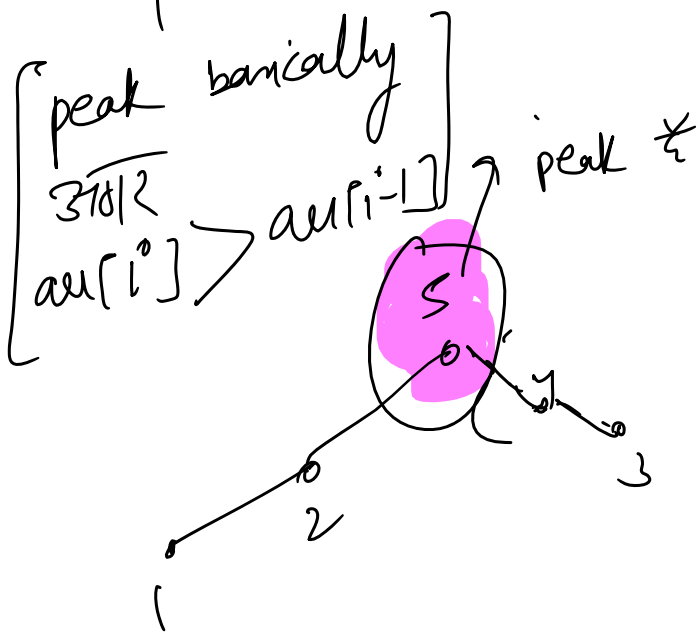
np

| 1 | 3 | 2 | 4 | 5 |

| 5 | 7 | 3 | 2 | 1 |

peak

Answer

peak

**Answer**

| 7 | 1 | 2 | 3 | 5 |
|---|---|---|---|---|

$\Longrightarrow$
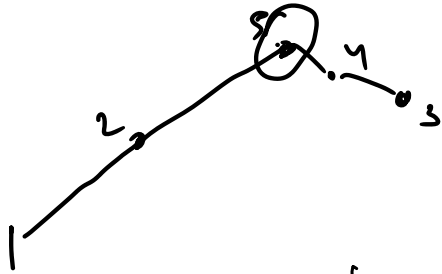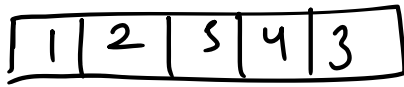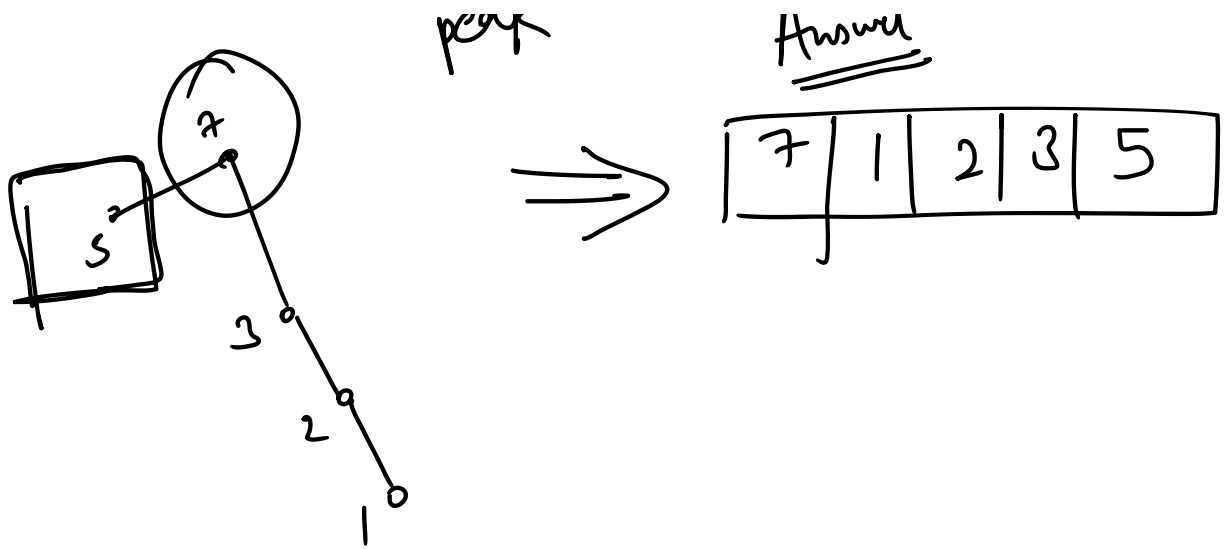


| 1 | 2 | 5 | 4 | 3 |
|---|---|---|---|---|



✩ ✩ right'से पहला peak मिलेगा. तो उसका कुछ use करेंगे।।।

→ peak

अब ?



1  2  2   $\Longrightarrow$
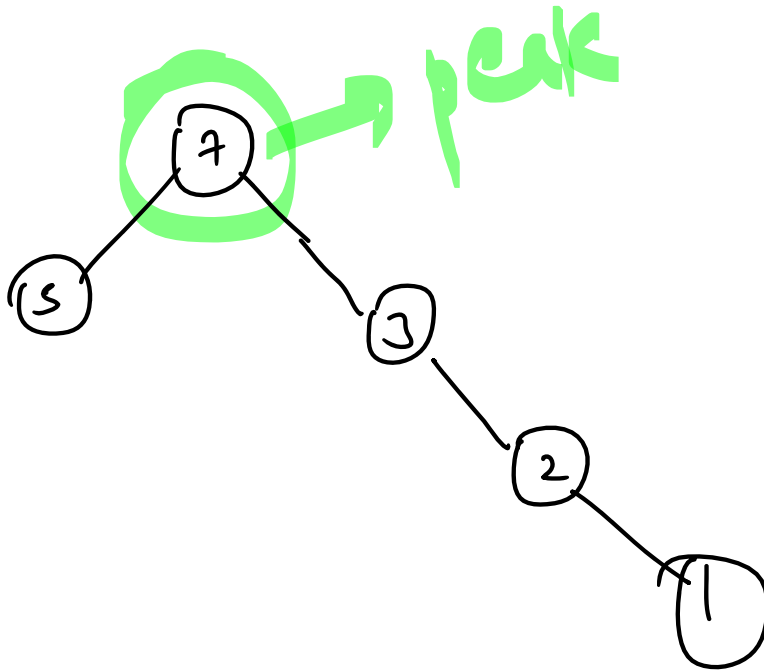
1  2  3  $\Longrightarrow$
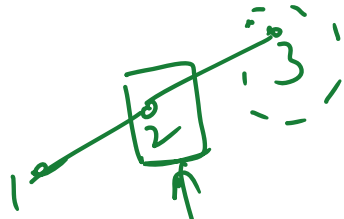


मतलब ये Basically peak के left वाले से है क्योंकि जो next permutation बनेगी वो इस digit से बड़ी value जो होगी right side से तो होगी ||
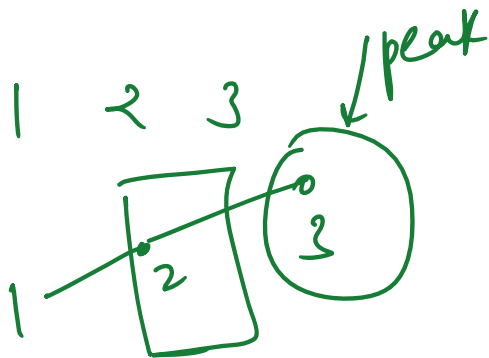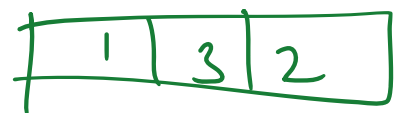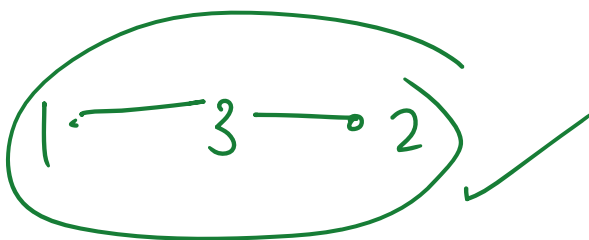
1  2  3  ↙peak



2 से बड़ी value right side से is 3 तो sweep करा दो ||

| | 1 | 3 | 2 |
|---|---|---|---|

1 • — 3 — • 2

**Ex2**

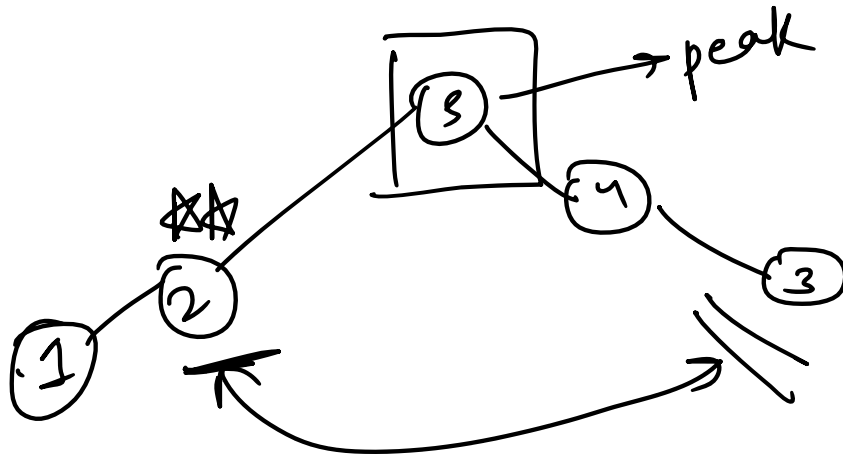| 1 | 2 | 5 | 4 | 3 |
|---|---|---|---|---|

| 1 | 2 | 5 | 4 | 3 |
|---|---|---|---|---|



→ peak

1   3   5   4   2   (Is it our answer) ✗

1   3   2   4   5 }— Answer.

※ The next step of Algorithm is to sort from peak-index to end of the array.

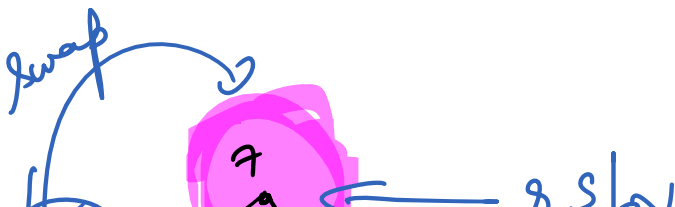1   3   5   4   2
        ⌣_sort_⌣
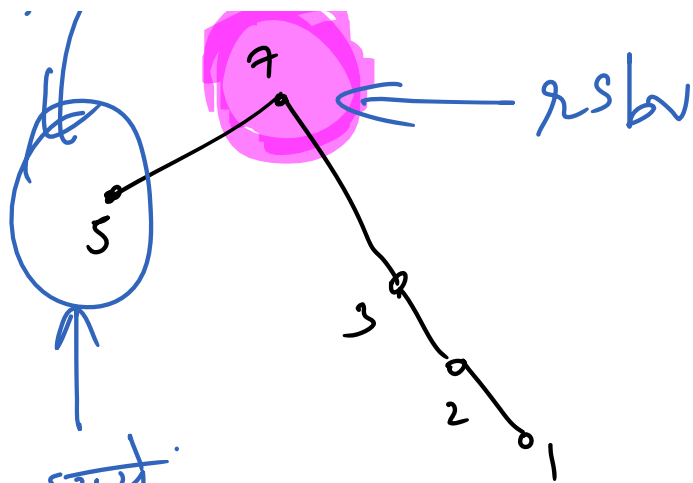
1   3   2   4   5        Answer

## Steps followed

① Find peak element index.

$$( arr[i^0] > arr[i-1] )$$

② Basically तो peak_index - 1 वाली value से बड़ी value जो right side से मिलेगी उसको swap करना है ||

such that

swap( Arr[peak_index - 1] , Arr[rsbv] )

③ Sort करना है peak-index से लेकि

Array end तक .

Ex

| 5 | 7 | 3 | 2 | 1 |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

swap

7

rsbv ⟶

$\Rightarrow$

| 7 | 5 | 3 | 2 | 1 |
|---|---|---|---|---|

sort this part

5

इसमें
बड़ी value
के right
ride हम निकलेंगी

Step3 peak_index से Array_size तक sort कर दो.

| 7 | 1 | 2 | 3 | 5 |
|---|---|---|---|---|

Answer