



To exit full screen, press Esc

Days (Recursion):**1. Combination sum-1**

https://www.youtube.com/watch?v=OyZFFqQtu98&list=PLgUwDviBIf0p4ozDR_kJJkONnb1wdx2Ma&index=49

2. Combination sum-2

https://www.youtube.com/watch?v=G1fRTGRxXU8&list=PLgUwDviBIf0p4ozDR_kJJkONnb1wdx2Ma&index=50

3. Palindrome Partitioning

https://www.youtube.com/watch?v=WBgsABoCIE0&list=PLgUwDviBIf0p4ozDR_kJJkONnb1wdx2Ma&index=51

4. Subset Sums

https://www.youtube.com/watch?v=rYkfBRtMJr8&list=PLgUwDviBIf0p4ozDR_kJJkONnb1wdx2Ma&index=52

5. Subset-II

https://www.youtube.com/watch?v=RIn3gOkbhQE&list=PLgUwDviBIf0p4ozDR_kJJkONnb1wdx2Ma&index=53

6. K-th permutation Sequence**Day10: (Backtracking)**

1. N queens Problem
2. Sudoku
3. M coloring Problem (Graph prob)
4. Rat in a Maze
5. Print all Permutations of a string/array
6. Word Break (print all ways)

60. Permutation Sequence

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The set `[1, 2, 3, ..., n]` contains a total of $n!$ unique permutations.

By listing and labeling all of the permutations in order, we get the following sequence for $n = 3$:

1. `"123"`
2. `"132"`
3. `"213"`
4. `"231"`
5. `"312"`
6. `"321"`

Given n and k , return the k^{th} permutation sequence.

Example 1:

```
Input: n = 3, k = 3
Output: "213"
```

Example 2:

```
Input: n = 4, k = 9
Output: "2314"
```

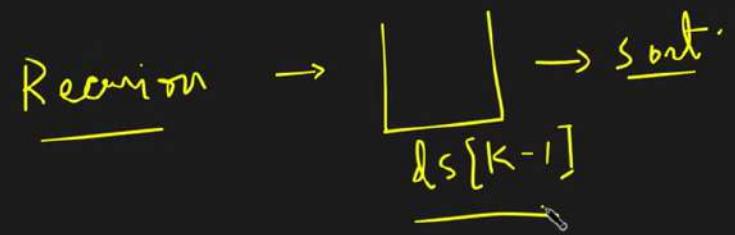
Example 3:

```
Input: n = 3, k = 1
Output: "123"
```

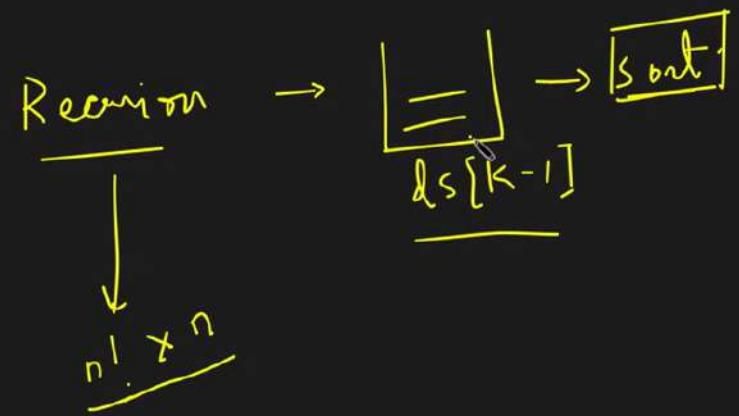
$$n = 4, \quad K = 17$$

4

$$n = 4, K = 17$$



$$n = 4, K = 17$$



L18. K-th Permutation Sequence | Leetcode

$$\begin{array}{c}
 \text{Top Level: } \left[\frac{16!}{6!} = 20,16,000 \right] \\
 \text{Second Level: } \left[\frac{16!}{6!} = 20,16,000 + (2, 3, 4) \right] \\
 \text{Third Level: } \left[\frac{16!}{6!} = 20,16,000 + (2, 3, 4) + (1, 3, 4) \right] \\
 \text{Fourth Level: } \left[\frac{16!}{6!} = 20,16,000 + (2, 3, 4) + (1, 3, 4) + (1, 2, 4) \right] \\
 \text{Final Result: } 20,16,000 + (2, 3, 4) + (1, 3, 4) + (1, 2, 4) = 24
 \end{array}$$

1 2 3 4 → (0)
 ↓
 (1, 2, 3, 4)

3
 ↓ — — —
 4 3 2 1 — 234

$$\begin{aligned}
 & n = 4, \quad \boxed{K=17} = \underline{\underline{16}}^+ \\
 & \boxed{24} \quad \left(\begin{smallmatrix} 1, 2, 3 \\ 0, 1, 2, 3 \end{smallmatrix} \right) \quad 16/6 = 2 \quad \underline{1} + \left[\begin{smallmatrix} 3! \\ (2, 3, 4) \end{smallmatrix} \right] \frac{6}{6} \quad (0-5) \\
 & \underline{2} + \left[\begin{smallmatrix} 3! \\ (1, 3, 4) \end{smallmatrix} \right] \frac{6}{6} \quad (6-11) \\
 & \underline{3} + \left[\begin{smallmatrix} 3! \\ (1, 2, 4) \end{smallmatrix} \right] \frac{6}{6} \quad (12-17) \\
 & \underline{4} + \left[\begin{smallmatrix} 3! \\ (1, 2, 3) \end{smallmatrix} \right] \frac{6}{6} \quad (18-23) \\
 & \hline
 & \quad \quad \quad \boxed{24}
 \end{aligned}$$

$$\begin{array}{ccccccc}
 & & 3 & & & & \\
 & & \uparrow & & - & - & - \\
 4 & 3 & 2 & 1 & - & z_3^+ &
 \end{array}$$

$$\begin{aligned}
 & \frac{n=4}{\boxed{1}} , \boxed{K=17} = \underline{\underline{16^{+4}}} \\
 & \boxed{24} \quad \left(\begin{smallmatrix} 1, 2, 3 \\ 0, 1, 2, 3 \end{smallmatrix} \right) \quad 16/6 = 2 \quad \underline{1} + \left[\begin{smallmatrix} 3! \\ (2, 3, 4) \end{smallmatrix} \right] \underline{\underline{6}} \quad (0-5) \\
 & \quad \underline{2} + \left[\begin{smallmatrix} 3! \\ (1, 3, 4) \end{smallmatrix} \right] \underline{\underline{6}} \quad (6-11) \\
 & \quad \underline{3} + \left[\begin{smallmatrix} 3! \\ (1, 2, 4) \end{smallmatrix} \right] \underline{\underline{6}} \quad (12-17) \\
 & \quad \underline{4} + \left[\begin{smallmatrix} 3! \\ (1, 2, 3) \end{smallmatrix} \right] \underline{\underline{6}} \quad (18-23) \\
 & \qquad \qquad \qquad \underline{\underline{24}}
 \end{aligned}$$

$$4321 - 23^{+4}$$

$\frac{3}{\uparrow 0} - - -$

$$\begin{aligned}
 & n = 4, \boxed{K=17} = \underline{\underline{16^{+1}}} \\
 & \downarrow \\
 & \boxed{(1, 2, 3, 4)} \\
 & 16/6 = 2 \quad \underline{1} + (\underline{2, 3, 4}) \quad \boxed{6} \quad (0-5) \\
 & 16 \cdot 1/6 = (4) \\
 & \underline{2} + (1, 3, 4) \quad \boxed{6} \quad (6-11) \\
 & \boxed{3} + (1, 2, 4) \quad \boxed{6} \quad (12-17) \\
 & \underline{4} + (1, 2, 3) \quad \boxed{6} \quad (18-23) \\
 & \hline
 & \boxed{24}
 \end{aligned}$$

$$\frac{n=4}{4}, \boxed{K=17} = \underline{\underline{16^{+4}}}$$

$$\boxed{24} \\ (1, 2, 3, 4) \\ \begin{matrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ & & 3 \end{matrix}$$

$$\textcircled{0} \quad 1 \quad \left\{ \begin{matrix} 2 \\ 4 \end{matrix} \right\} \quad \boxed{ } \quad \approx (0^{-1})$$

$$\textcircled{1} \quad 2 \quad \left\{ \begin{matrix} 1 \\ 4 \end{matrix} \right\} \quad \boxed{ } \quad 2 \quad (2^{-3})$$

$$\{1, 2, 4\}, \underline{K=4}/_2 = \textcircled{2} \\ 3! = \textcircled{6}$$

$$\Rightarrow \textcircled{2} \quad \underline{4} \quad \left\{ \begin{matrix} 1 \\ 2 \end{matrix} \right\} \quad \boxed{ } \quad \frac{2}{6} \quad (4-5)$$

$$4 \ 3 \ 2 \ 1 - z_3^{+4}$$

$$\begin{matrix} 3 & 4 \\ \uparrow & - - - \end{matrix}$$

$$n = 4, \quad \boxed{K=17} = \underline{\underline{16^4}}$$

$|24|$
 $(\underbrace{1, 2, 3}_{0, 1, 2}, \underbrace{4}_{3})$

$$\Rightarrow 0 + \{2\} \quad \underline{\underline{1}} \quad (0-0)$$

$$\{1, 2, 4\}, \quad \underline{K=4}/2 = 2$$

$3! = 6$

$$2 + \{1\} \quad \underline{\underline{1}} \quad (1-1)$$

$$\{1, 2\} \quad \underline{K=0}/1 = 0$$

$2! = 2$

$$4 \ 3 \ 2 \ 1 - z_3^4$$

$\frac{3}{\uparrow} \quad \underline{\underline{4}} \quad \underline{\underline{-}} \quad \underline{\underline{-}}$

$$\frac{n=4}{\boxed{1}} , \boxed{K=17} = \underline{\underline{16^4}}$$

$\boxed{24}$ (1, 2, 3, 4)
0 1 2 3

$$\Rightarrow \boxed{0} + \{ 2 \} \boxed{1} \perp (0-0)$$

$$2 + \{ 1 \} \boxed{1} \perp (1-1)$$

$$\{ \underline{\underline{1, 2, 4}} \} , \underline{K=4}/2 = \boxed{2}$$

$3! = \boxed{6}$ $4 \cdot 2 = 0$

$$\{ \underline{\underline{1, 1, 2}} \} \quad \underline{K=0}/1 = \underline{0}$$

1
2! = 2

$$\begin{array}{cccc} 3 & 4 & 1 & \\ \uparrow & - & - & - \end{array}$$

$$4 \cdot 3 \cdot 2 \cdot 1 = 24^4$$

$$n = 4, \boxed{K=17} = \underline{\underline{16^{+4}}}$$

↓

$$\boxed{24} \quad (1, \underbrace{2, 3}_{1}, \underbrace{4}_{2}, 3)$$

$$2 + \underline{\quad}$$

$$\left\{ \underbrace{1, 1^2}_{\downarrow} \right\} \quad |k=0|_1 = \underline{\underline{0}}$$

$k=0 \wedge 0 = 0$

$21 = 2$

$\left\{ \underbrace{2} \right\} \quad k=0$

$(\begin{array}{cccc} 3 & 4 & 1 & 2 \\ \uparrow & - & - & - \end{array})$

$$n = 4, \quad K = 17 = 16^{+1}$$

$\binom{4}{1} = \boxed{24}$

$(\underbrace{1, 2, 3}_0, \underbrace{2}_1, \underbrace{3}_3, 4)$

$3! = 6$

$$2! = 2$$

$$1! = 1$$

$\{1, 2, 4\}, \quad K = \binom{4}{2} / 2 = 2$

$3! = 6$

$4 \cdot 2 = 0$

$$\{ \underbrace{1, 2}_1, 2 \} \quad K = \binom{0}{1} / 1 = 0$$

$K = 0 \therefore 0 = 0$

$2! = 2$

$\{ 2 \} \quad K = 0$

$(\frac{3}{\uparrow}, \frac{4}{-}, \frac{1}{-}, \frac{2}{-})$

$|(\text{sh})$

$$\begin{aligned} & \boxed{6} \\ & \boxed{6} \\ & \boxed{0} \leftarrow 16 \cdot 6 = \boxed{0} \\ & \boxed{6} \\ & \boxed{2} \quad 0-1 \\ & \boxed{2} \quad 2-3 \\ & \boxed{2} \quad \checkmark (2-3) \\ & \boxed{1} \\ & \boxed{1} \end{aligned}$$

$$n = 4, \quad K = 17 \quad = 16^{+} \quad k = 16/6$$

\downarrow

$$(1, 2, 3, 4)$$

0 1 2 3

$$3! = 6$$

$$2! = 2$$

$$1! = 1$$

$$\{1, 2, 4\}, \quad k = 4/2 = 2$$

\downarrow

$$3! = 6$$

$$4/2 = 0$$

$$\{1, 2\}, \quad k = 0/1 = 0$$

$$2! = 2$$

$$\{2\}, \quad k = 0$$

$$\left(\frac{3}{1}, \frac{4}{2}, \frac{1}{1}, \frac{2}{2} \right)$$

$$\begin{aligned} & \boxed{6} \\ & \boxed{6} \\ & \boxed{0} \leftarrow 16 \times 6 = 0 \\ & \boxed{6} \\ & \boxed{2} \quad 0-1 \\ & \boxed{2} \quad 2-3 \\ & \boxed{2} \quad \checkmark (2-5) \end{aligned}$$

$$\boxed{1}$$

$$\boxed{1}$$

$$\begin{aligned}
 & n = 4, \quad \boxed{K=17} = \cancel{16^{+1}} \quad k = 16/6 = 2 \\
 & \boxed{17} = \boxed{24} \quad (1, 2, \underbrace{3}_0, 2, 3) \quad 3 \\
 & 3! = 6 \\
 & 2! = 2 \\
 & 1! = 1 \\
 & \{1, 2, \boxed{4}\}, \quad \boxed{k=4}/2 = \cancel{2} \quad 4 \\
 & 3! = 6 \quad 4 \cdot 2 = 0 \\
 & \{ \cancel{1}, 2 \} \quad \boxed{k=0}/1 = \cancel{0} \quad 1 \\
 & 2! = 2 \\
 & \{ \cancel{2} \} \quad \boxed{k=0} \quad ? \\
 & \quad \quad \quad \left(\frac{3}{1}, \frac{4}{2}, \frac{1}{1}, \frac{2}{2} \right) \quad \text{!}
 \end{aligned}$$

$$\begin{aligned}
 & \boxed{6} \\
 & \boxed{6} \\
 & \boxed{0} \leftarrow 16 \cdot 6 = \cancel{16} \\
 & \boxed{6} \\
 & \boxed{2} \quad 0-1 \\
 & \boxed{2} \quad 2-3 \\
 & \boxed{2} \quad \cancel{(4-5)} \\
 & \boxed{1} \\
 & \boxed{1}
 \end{aligned}$$

$$n = 4, \quad K = 17 \quad = 16^{+1} \quad k = 16/6 = 2$$

$$(1) = \boxed{24} \quad (1, 2, 3) \quad 3! = 6$$

$\checkmark 3$

$$2! = 2 \quad (1, 2) \quad 3! = 6$$

$$4 \% 2 = 0$$

$$1! = 1 \quad 3! = 6$$

$$K = 0 / 1 = 0 \quad \checkmark 1$$

$$K = 0 \% 0 = 0$$

$$2! = 2 \quad K = 0 \quad \checkmark 2 \quad \text{ans} \rightarrow \left(\begin{array}{c} 3 \\ \uparrow \\ 1 \end{array} \right) \quad \left(\begin{array}{c} 4 \\ \uparrow \\ 2 \end{array} \right)$$

$$\begin{aligned} TC &\rightarrow D(n) \times D(n) \\ &= O(n^2) \\ SC &= O(n) \end{aligned}$$

$n = 4$, $\boxed{K=17} = \cancel{16+1}$ $k = 16/6 = 2$
 $(1) \boxed{24}$
 $3! \rightarrow 6$
 $2! \rightarrow 2$
 $1! \rightarrow 1$
 $3! = 6$
 $2! = 2$
 $1! = 1$
 $4! / 2 = 0$
 $\{1, 2, 3\}$, $K = \cancel{17}/2 = \cancel{2} \checkmark 4$
 $\{1, 2\}$
 $K = 0/1 = \cancel{0} \checkmark 1$
 $\{2\}$, $K = 0$ $\checkmark 2$ $\rightarrow (3 \quad 4 \quad 1 \quad 2)$

$$TC \rightarrow O(n)$$

$$SC = O(n)$$

LeetCode Explore Problems Mock Contest Limited time event to win giveaway! 

```

1 C++ Autocomplete
2
3 class Solution {
4 public:
5     string getPermutation(int n, int k) {
6         int fact = 1;
7         vector<int> numbers;
8         for(int i = 1; i < n; i++) {
9             fact = fact * i;
10            numbers.push_back(i);
11        }
12        numbers.push_back(n);
13        string ans = "";
14        k = k - 1;
15        while(true) {
16            ans = ans + to_string(numbers[k / fact]);
17            numbers.erase(numbers.begin() + k / fact);
18            if(numbers.size() == 0) {
19                break;
20            }
21            k = k % fact;
22            fact = fact / numbers.size();
23        }
24    }
}
    
```

$n = 4$, $K = 17 \rightarrow 16^t$, $K = \lceil \frac{16}{b} \rceil = 2$
 $\boxed{1} \boxed{2} \boxed{3} \boxed{4}$
 $3! \rightarrow 6$
 $2! = 2$, $1! = 1$
 $3! = 6$, $K = 6 / 2 = 3$
 $4 / 2 = 0$
 $\{ \cancel{1}, 2 \}$, $K = 0 / 1 = 0$
 $2! = 2$, $K = 0$
 $\{ 2 \}$
 $\{ \}$
 $(\boxed{3} \quad \boxed{4} \quad \boxed{1} \quad \boxed{2})$
 $ans = 3$

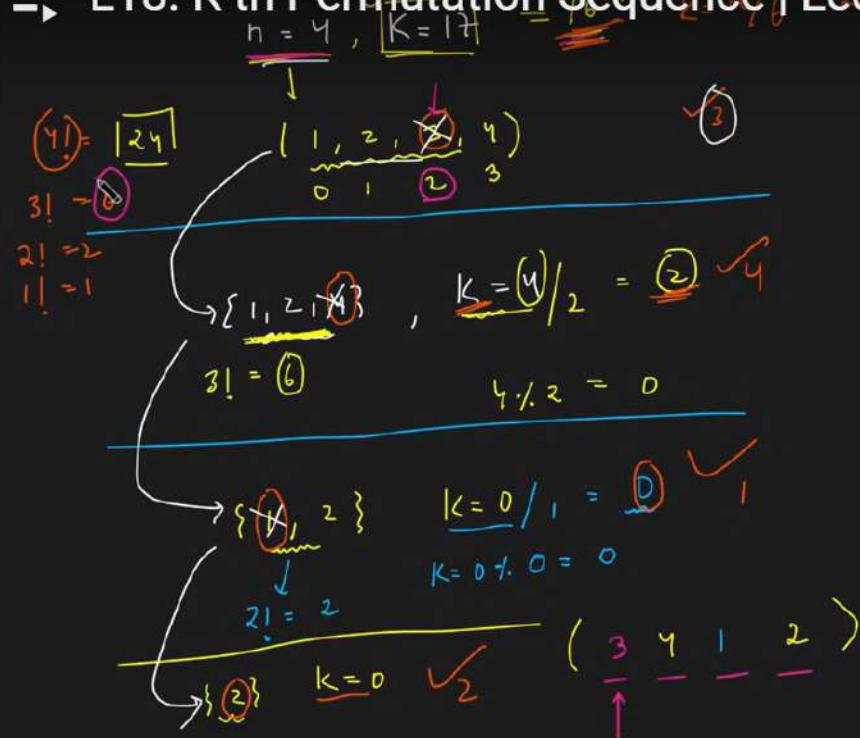
Day 3

LeetCode Explore Problems Mock Contest Discuss Store Limited time event to win giveaway! 🔥 ×

i C++ ▾ Autocomplete

```
1 class Solution {
2     public:
3         string getPermutation(int n, int k) {
4             int fact = 1;
5             vector<int> numbers;
6             for(int i = 1;i<n;i++) {
7                 fact = fact * i;
8                 numbers.push_back(i);
9             }
10            numbers.push_back(n);
11            string ans = "";
12            k = k - 1;
13            while(true) {
14                ans = ans + to_string(numbers[k / fact]);
15                numbers.erase(numbers.begin() + k / fact);
16                if(numbers.size() == 0) {
17                    break;
18                }
19                k = k % fact;
20                fact = fact / numbers.size();
21            }
22            return ans;
23        }
24    };
```

L18. K-th Permutation Sequence | Leetcode



```

class Solution {
    public String getPermutation(int n, int k) {
        int fact = 1;
        List<Integer> numbers = new ArrayList<>();
        for(int i = 1; i < n; i++) {
            fact = fact * i;
            numbers.add(i);
        }
        numbers.add(n);
        String ans = "";
        k = k - 1;
        while(true) {
            ans = ans + numbers.get(k / fact);
            numbers.remove(k / fact);
            if(numbers.size() == 0) {
                break;
            }
            k = k % fact;
            fact = fact / numbers.size();
        }
        return ans;
    }
}

```

TUF