PASCAL'S TRIANGLE

✡ In this problem we are supposed to compute ${}^{n}C_{r}$ in shortest possible time. or just print a specific row/element of the triangle.
A Pascal Triangle looks something like :

N = 6

```
          1
        1   1
      1   2   1
    1   3   3   1
  1   4   6   4   1
1   5  10  10   5   1
```

There can be 3 question variants.
1) Print a specific element

For row R and column C element is given by

$$ {}^{R-1}C_{C-1} = \frac{(R-1)!}{(C-1)!\,(R-C-2)!} $$

Pseudocode :

```
nCr(n, r) {
    res = 1
    for (i = 0 → r) {
        res = res × (n - i)
        res = res / (i + 1)
    }
    return res
```

}

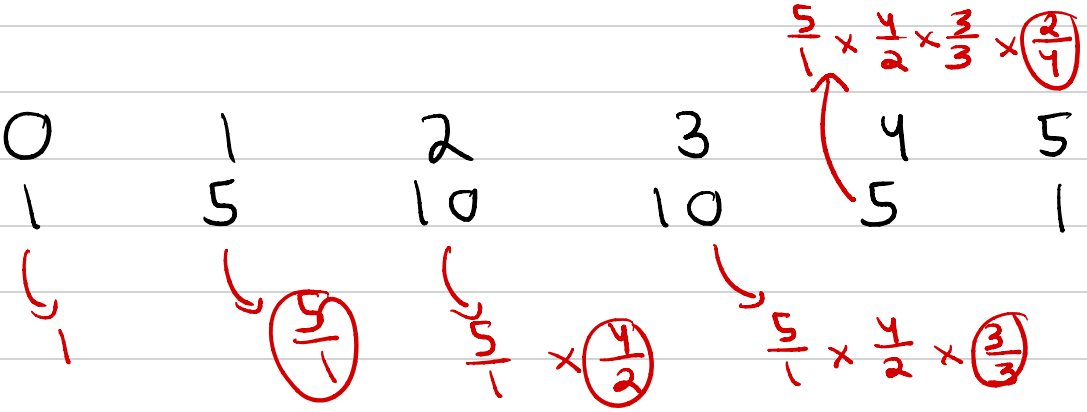
2) Print N^{th} row

Brute force solution here is to find all elements of this N^{th} row using the above formula

Optimal solution is to carry on the multiplication of previous element and to only multiply the extra factor

Eg :

Column :	0	1	2	3	4	5
Row 5 :	1	5	10	10	5	1



OR

$$ans = ans \times \frac{(row - col)}{col}$$

Pseudocode

```
pascalsTriangleRow(N) {
    ans = 1
    print(ans)
    for(i = 1 → N) {
        ans = ans × (N - i)
        ans = ans / i
        print(ans)
    }
}
```

3) Print Pascals Triangle

Optimal solution is to just loop from 1 to N and use the print row function each time