


$N = 5$

5 4 3 2 1

$fun(5) \rightarrow fun(4) \rightarrow fun(3) \rightarrow fun(2) \rightarrow fun(1)$

5

4

3

2

~~$fun(1)$~~

~~$fun(2)$~~

~~$fun(3)$~~

~~$fun(4)$~~

~~$fun(5)$~~

$fun(n)$

prints (n)

$fun(n-1)$

if

$n == 1$

print(1)

return

$$f(n) = n * f(n-1)$$

$$f(1) = 1$$

$N!$

main
rec
 $f(5)$ 20

5 * $f(4)$ 24

4 * $f(3)$

3 * $f(2)$

2 * ~~$f(1)$~~

Q: Sum of digits

$$N = 1342$$

$$\text{Ans} = 1 + 3 + 4 + 2 \\ = 10$$

$$\text{rem} = N \% 10$$

$$N = N / 10$$

$$134$$

$$1 + f(342)$$

$$3 + f(42)$$

$$\boxed{f(N) = f(N/10) + (N \% 10)} \quad \frac{134\textcircled{2}}{10} = \textcircled{2}$$

$f(1342)$
return $2 + f(134)$

return $4 + f(13)$

$n = 5$ for
 $n = 5$

subtract first,
then pass

// $n = n - 1$

Q: Reverse a number

$$N = 1824 \Rightarrow 4281$$

$$1824 \rightarrow 4 + f(182)$$

$$2 + f(18) \\ \downarrow \\ 8 + f(1)$$

$$f(N) = (N \% 10)$$

$$f(N/10)$$

①

Sum = 0

fun(n) {

if (n == 0) {
return;

}

rem = n % 10

Sum = Sum * 10 + rem

fun(n / 10);

}

2 4 3 1

1 3 4 2

2 + K(174)

24 + 10 + 3

243 * 10 + 1

= 2431

Q

$N = 1234$

$$\begin{array}{ccc} 4 & + & 123 \\ \downarrow & & \\ 4 \times 1000 & + & 123 \end{array}$$

$$4 \times 10^3 + 123$$

$$\begin{array}{l} 3 \times 10^2 + F(12) \\ \quad \downarrow \\ 2 \times 10^1 + F(1) \end{array}$$

$$f(N, \text{arg}) = \text{rem} \times 10^{\text{arg}-1} + f(N/10, \text{arg}-1)$$

Q: Imp concept
Count no. of zeros in a number:

$N = 30204$

$Ans = 2$

① If we take count inside argument.

$f(N, \text{count}) \rightarrow$ If digit = 0
 $f(N/10, \text{count} + 1)$
else $f(N/10, \text{count})$

★ Special example to return ^{same} value to above function calls.

f (30204, 0)



(3020, 0)

(302, 1)

(30, 1)

(3, 2)

(0, 2)

return ans

$(41, 0)$



$(40, 1)$



$(20, 2)$



$(10, 3)$



$(5, 4)$



$(4, 5) \rightarrow$

$(0, 8)$



$(1, 7)$



$(2, 6)$

