Recursion

CSCI 335

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Did you mean: ***recursion***

Dictionary

Search for a word

re·cur·sion

/rəˈkərZHən/

noun MATHEMATICS • LINGUISTICS

the repeated application of a recursive procedure or definition.

- a recursive definition.
  plural noun: **recursions**

Translate recursion to Chinese (Simplified)

1. 递归

Definitions from Oxford Languages *Feedback*

More definitions and word origin

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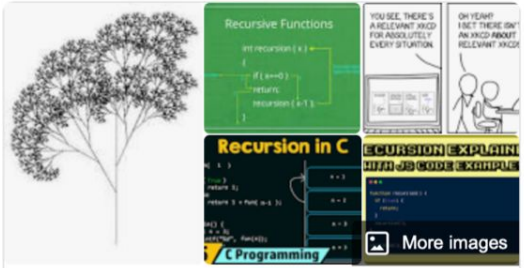


Recursion

Computer science

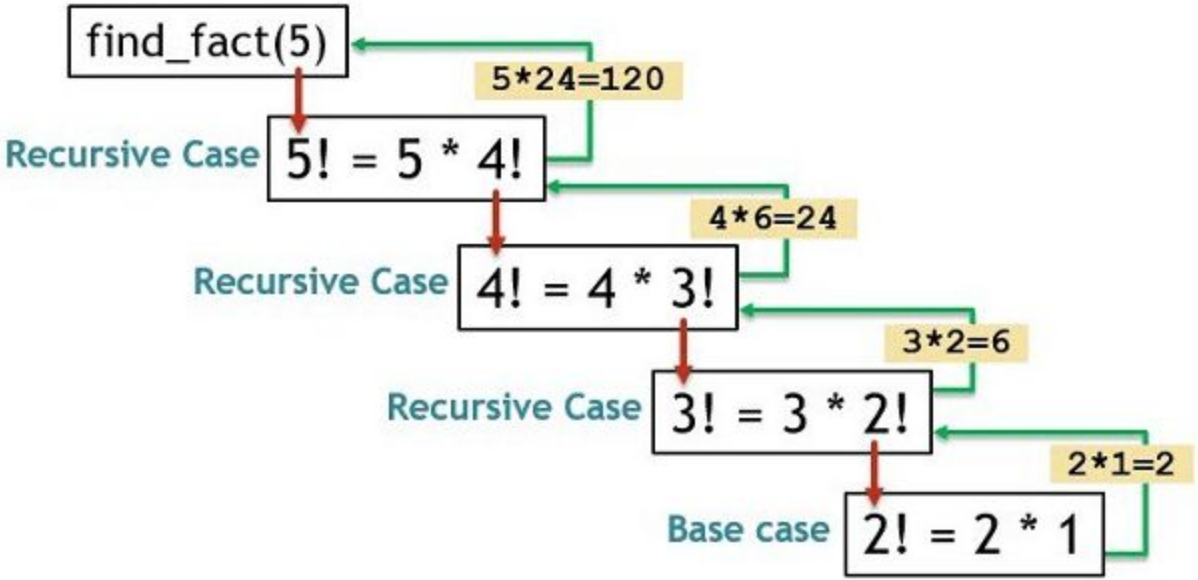
In computer science, recursion is a method of solving a problem where the solution depends on solutions to smaller instances of the same problem. Such problems can generally be solved by iteration, but this needs to identify and index the smaller instances at programming time. Wikipedia

Points

Importance

Pros and cons

factorial


find_fact(5)
5*24=120
Recursive Case
5! = 5 * 4!
4*6=24
Recursive Case
4! = 4 * 3!
3*2=6
Recursive Case
3! = 3 * 2!
2*1=2
Base case
2! = 2 * 1

- C code:

```
int fact (int n)
{
  if (n < 1) return f;
  else return n * fact(n - 1);
}
```

  - Argument n in $a0
  - Result in $v0

- MIPS code:

```
fact:
    addi $sp, $sp, -8       # adjust stack for 2 items
    sw   $ra, 4($sp)        # save return address
    sw   $a0, 0($sp)        # save argument
    slti $t0, $a0, 1        # test for n < 1
    beq  $t0, $zero, L1
    addi $v0, $zero, 1      # if so, result is 1
    addi $sp, $sp, 8        #   pop 2 items from stack
    jr   $ra                #   and return
L1: addi $a0, $a0, -1       # else decrement n
    jal  fact               # recursive call
    lw   $a0, 0($sp)        # restore original n
    lw   $ra, 4($sp)        #   and return address
    addi $sp, $sp, 8        # pop 2 items from stack
    mul  $v0, $a0, $v0      # multiply to get result
    jr   $ra                # and return
```