

# CODE CHALLENGE WORKED EXAMPLE: FACTORIAL FINDER

For each challenge, solve it using:

- A flowchart
- Pseudocode (see A Level Pseudocode Guide <http://www.ocr.org.uk/Images/202654-pseudocode-guide.pdf>)
- Program code (any high level language will do).

## The challenge: Factorial Finder

The Factorial of a positive integer,  $n$ , is defined as the product of the sequence  $n, n-1, n-2, \dots, 1$ .

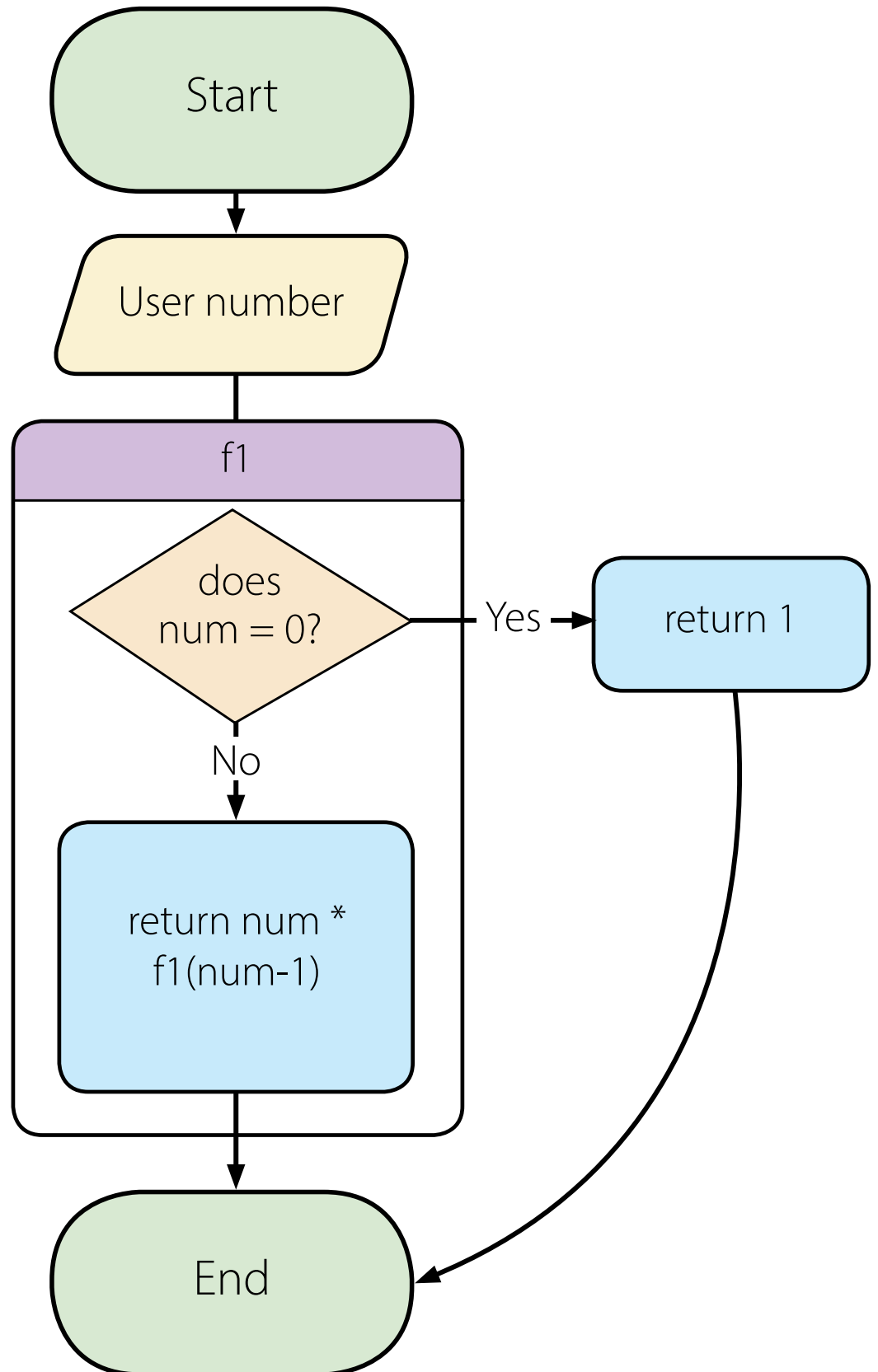
Note that the factorial of 0 is 1.

Solve this using loops and then by recursion.

**Useful Resources:** [http://en.wikibooks.org/wiki/Non-Programmer's\\_Tutorial\\_for\\_Python\\_3/Recursion](http://en.wikibooks.org/wiki/Non-Programmer's_Tutorial_for_Python_3/Recursion)



The flowchart:



**Pseudocode:**

Pseudocode	Explanation
<pre> ddef factorialRec(num):     if num == 0:         return 1     else:         return num * factorialRec(num - 1) </pre>	<ol style="list-style-type: none"> <li>1. 0 factorial is 1</li> <li>2. In the return statement we are calling the factorialRec function again, which is why we say this is using recursion</li> </ol>

**Program code (with comments):**

```

def main():
    print factorialRec(0)
    print factorialRec(10)
    print factorialLoop(0)
    print factorialLoop(10)

def factorialRec(num):
    #Recursive
    if num == 0:
        return 1
    else:
        #i.e. We re-use the function in the function - this is recursion
        return num * factorialRec(num - 1)

def factorialLoop(num):
    #Loop
    factorial = 1
    # factorial of 0 is 1
    if num == 0:
        return 1
    for i in range(1, num+1):
        factorial *=1
    return factorial

```





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