cis112-week10: Recursion

v2024-12-09

Content

Goal

Introduction

Adition, multiplication and power can be defined recursively, for $b \geq 0$, as follows:

$$\text{sum}(a, b) = \begin{cases} a, & b = 0, \\ \text{sum}(a, b-1) + 1, & \text{otherwise.} \end{cases}$$

$$\text{prod}(a, b) = \begin{cases} 0, & b = 0, \\ \text{prod}(a, b-1) + a, & \text{otherwise.} \end{cases}$$

$$\text{pow}(a, b) = \begin{cases} 1, & b = 0, \\ \text{pow}(a, b-1) \times a, & \text{otherwise.} \end{cases}$$

Steps:

G0. Fill `StudentInfo`

1. Fill your data in `StudentInfo`.

G1. Addition

1. Trace `sum(4, 3)` by hand.
2. Complete `sum` in `Arithmetic` in package `week10.lab`.
3. Test your implementation using `TS_Arithmetic_jUnit` in package `week10.lab.ts`.

G2. Multiplication

1. Trace `prod(4, 3)` by hand.
2. Complete `prod` in `Arithmetic` in package `week10.lab`.
3. Test your implementation using `TS_Arithmetic_jUnit` in package `week10.lab.ts`.

G3. Power

1. Trace `pow(4, 3)` by hand.
2. Complete `pow` in `Arithmetic` in package `week10.lab`.
3. Test your implementation using `TS_Arithmetic_jUnit` in package `week10.lab.ts`.

Challenge

Introduction

In a string a pattern can occure many time. The number of occurence is interesting to count.

Examples

string	substring	number of occurence
a	ab	0
ab	ab	1
abab	ab	2
ababab	ab	3
cc	cc	1
ccc	cc	2
cccc	cc	3

Steps:

C1. Occurance Number

1. Complete `OccuranceNumber` in `week10.lab`.

2. Test your implementation using `TS_OccuranceNumber_jUnit` in package `week10.lab.ts`.