Fibonacci - Comparativo de Tempo de Execução e Memória

ESTCMP005 - PLP - Atividade 007 por Gabriel Sena San Martin

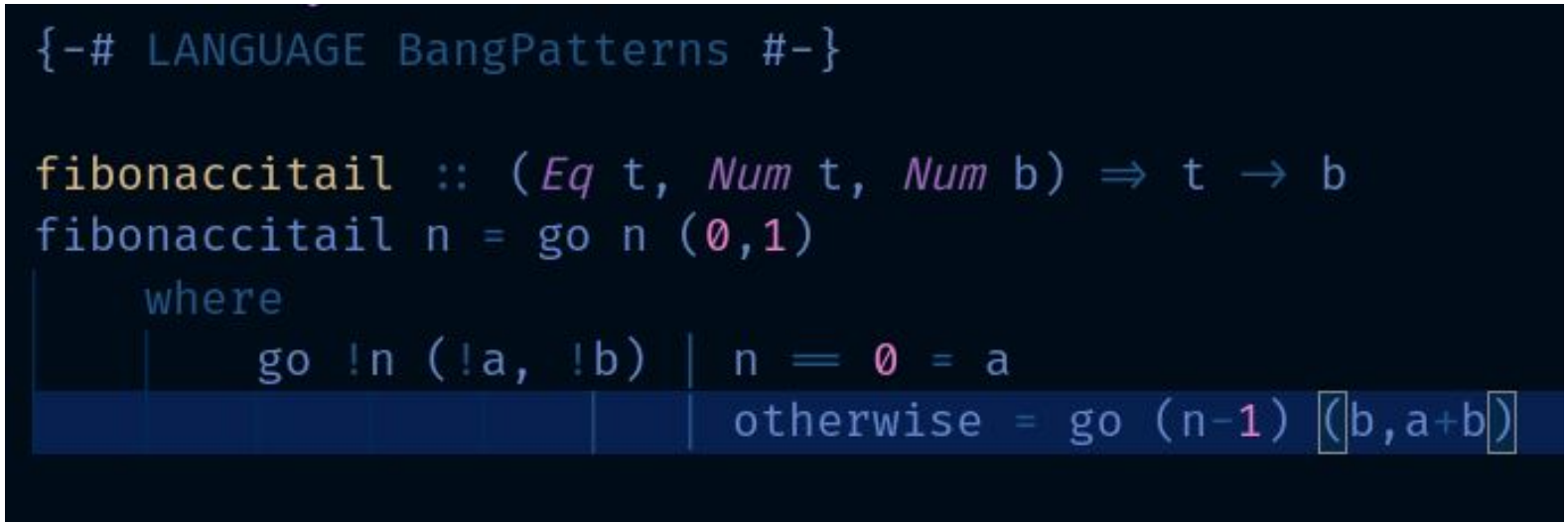
Fibonacci Recursivo Sem Cauda

```haskell
module Fibonacci where

fibonacci :: (Eq a, Num a, Num p) ⇒ a → p
fibonacci 0 = 0
fibonacci 1 = 1
fibonacci n = fibonacci (n - 1) + fibonacci (n - 2)
```

```
~/.../facul/assignment-007-haskell-fibonacci >>> ghci
GHCi, version 8.10.5: https://www.haskell.org/ghc/  :? for help
Prelude> :set +s
Prelude> :l fibonacci.hs
[1 of 1] Compiling Fibonacci        ( fibonacci.hs, interpreted )
Ok, one module loaded.
(0.03 secs,)
*Fibonacci> fibonacci 10
55
(0.01 secs, 123,536 bytes)
*Fibonacci> fibonacci 20
6765
(0.05 secs, 7,728,120 bytes)
*Fibonacci> fibonacci 30
832040
(1.47 secs, 943,121,280 bytes)
*Fibonacci>
```

Fibonacci Recursivo Com Cauda


{-# LANGUAGE BangPatterns #-}
fibonaccitail :: (Eq t, Num t, Num b) ⇒ t → b
fibonaccitail n = go n (0,1)
where
go !n (!a, !b) | n == 0 = a
otherwise = go (n-1) (b,a+b)

```
~/.../facul/assignment-007-haskell-fibonacci >>> ghci                                  [147]
GHCi, version 8.10.5: https://www.haskell.org/ghc/  :? for help
Prelude> :set +s
Prelude> :l fibonacci-tail.hs
[1 of 1] Compiling Main             ( fibonacci-tail.hs, interpreted )
Ok, one module loaded.
(0.04 secs,)
*Main> fibonaccitail 10
55
(0.01 secs, 66,120 bytes)
*Main> fibonaccitail 20
6765
(0.01 secs, 69,608 bytes)
*Main> fibonaccitail 30
832040
(0.01 secs, 75,160 bytes)
*Main> fibonaccitail 100
354224848179261915075
(0.01 secs, 115,944 bytes)
*Main> fibonaccitail 1000
434665576869374564356885276750406258025646605173717804024817290895365554179490518904038798400792551692959225930803226347752096896
23239873322471161642996440906533187938298969649928516003704476137795166849228875
(0.01 secs, 700,184 bytes)
*Main> 
```

Fibonacci

-	Recursivo sem cauda	Recursivo com cauda
10	(0,03 segundos, 121,47 KBs)	(0,01 segundos, 64,05 KBs)
20	(0,05 segundos, 7,72 MBs)	(0,01 segundos, 69,60 KBs)
30	(1.49 segundos, 943,12 MBs)	(0,01 segundos, 75,16 KBs)
100	' - '	(0,01 segundos, 115,94 KBs)
1000	; - ;	(0,01 segundos, 700,18 KBs)