

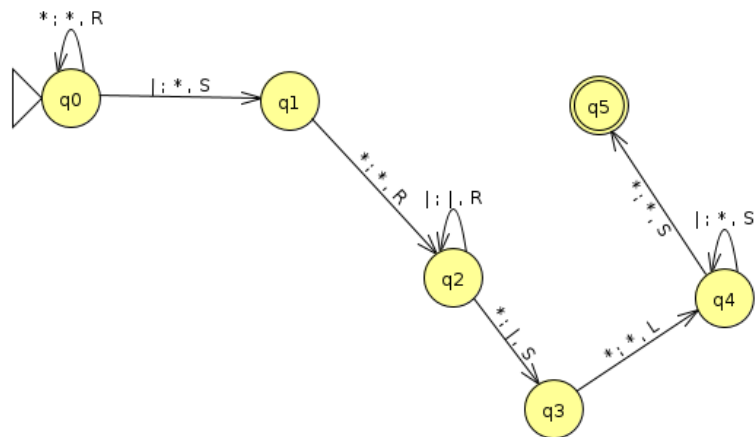
Practica 3

Salvador Ortega Vargas

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Ejercicios

1 Prove that the function $\text{add}(x, y) = x + y$, with $x, y \in \mathbb{N}$ is Turing-computable using the unary notation $|$. You have to create a TM with two arguments separated by a blank symbol that stars and ends behind the strings.



2 Define a recursive function for the sum of three values.

```

alumno@TALF: ~/Descargas/talfuma/software/recursivefunctions
Archivo Editar Ver Buscar Terminal Ayuda
ans = 29
octave:4> evalrecfunction('<pi^1_1|sigma(pi^3_3)>|sigma(pi^4_4)>',1,7,1)
<n^1:|sigma(n^3)>|sigma(n^4)>(1,7,1)
<n^1:|sigma(n^3)>|sigma(n^4)>(1,7,0)
<n^1:|sigma(n^3)>(1,7)
<n^1:|sigma(n^3)>(1,6)
<n^1:|sigma(n^3)>(1,5)
<n^1:|sigma(n^3)>(1,4)
<n^1:|sigma(n^3)>(1,3)
<n^1:|sigma(n^3)>(1,2)
<n^1:|sigma(n^3)>(1,1)
<n^1:|sigma(n^3)>(1,0)
n^1(1) = 1
sigma(n^3)(1,0,1)
n^3(1,0,1) = 1

sigma(1) = 2
sigma(n^3)(1,1,2)
n^3(1,1,2) = 2

sigma(2) = 3
sigma(n^3)(1,2,3)
n^3(1,2,3) = 3

sigma(3) = 4
sigma(n^3)(1,3,4)
n^3(1,3,4) = 4

sigma(4) = 5
sigma(n^3)(1,4,5)
n^3(1,4,5) = 5

sigma(5) = 6
sigma(n^3)(1,5,6)
n^3(1,5,6) = 6

sigma(6) = 7
sigma(n^3)(1,6,7)
n^3(1,6,7) = 7

sigma(7) = 8
sigma(n^4)(1,7,0,8)
n^4(1,7,0,8) = 8

sigma(8) = 9
ans = 9
octave:5>

```

3 Implement a WHILE program that computes the sum of three values. You must use an auxiliary variable that accumulates the result of the sum

```

Q = (3,s)
s:
while X2 != 0 do
    X2 := X2 - 1;
    X1 := X1 + 1
od;
while X3 != 0 do
    X3 := X3 - 1;
    X1 := X1 + 1
od;

```