

Teoría de Autómatas y Lenguajes Formales

Práctica 4: Ejercicio 1

Santiago, Atencia Jiménez

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1. Define the TM solution of exercise 3.4 of the problem list and test its correct behaviour.

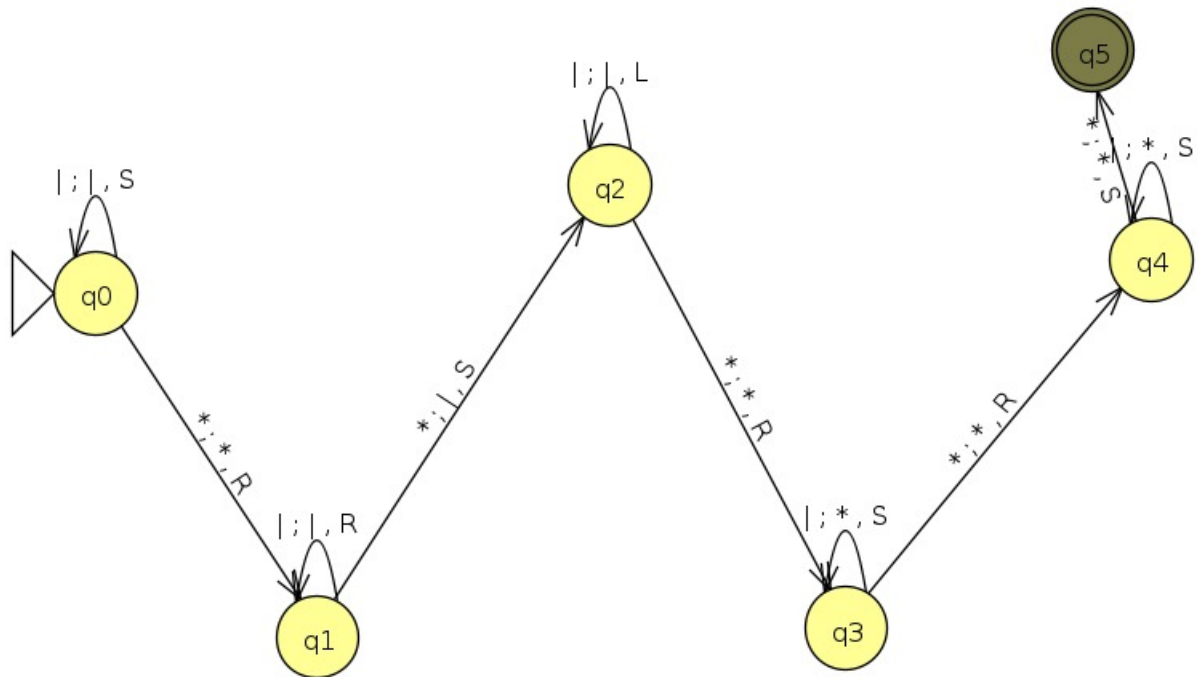


Figura 1:

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

The screenshot shows a software interface with a window titled "recursivefunctions". The window has a menu bar with "Abrir", "Guardar", and a search icon. Below the menu bar is a toolbar with icons for opening, saving, and searching. The main area of the window is divided into two panes. The left pane contains a list of recursive functions defined in a specific notation. The right pane shows the execution of these functions, displaying the results of various operations.

| Function Name | Definition |
|----------------|----------------------------------------------------------------------------------------------|
| 1 constant^1_0 | $\langle \theta n^2_2 \rangle$ |
| 2 constant^1_1 | $\sigma(\langle \theta n^2_2 \rangle)$ |
| 3 constant^2_3 | $\langle \langle \sigma(\sigma(\theta)) n^2_2 \rangle n^3_3 \rangle$ |
| 4 addition | $\langle n^1_1 \sigma(n^3_3) \rangle$ |
| 5 predecessor | $\langle \theta n^2_1 \rangle$ |
| 6 subtraction | $\langle n^1_1 \text{predecessor}(n^3_3) \rangle$ |
| 7 product | $\langle \text{constant}^1_0 \langle n^1_1 \sigma(n^3_3) \rangle (n^3_1, n^3_3) \rangle$ |
| 8 division | $\mu[\text{subtraction}(n^3_1, \text{product}(n^2_2, n^3_3))]$ |
| 9 power | $\langle \text{constant}^1_1 \text{product}(n^3_1, n^3_3) \rangle$ |
| 10 squareroot | $\mu[\text{subtraction}(n^2_1, \text{product}(n^2_2, n^2_2))]$ |
| 11 cuberoot | $\mu[\text{subtraction}(n^2_1, \text{power}(n^2_2, \text{constant}^2_3))]$ |
| 12 addition+ | $\langle \langle n^1_1 \sigma(n^3_3) \rangle \sigma(n^4_4) \rangle$ |

The right pane, titled "Ventana de comandos", shows the execution of these functions. It displays a series of commands and their results, including the calculation of the sum of three values (3, 2, 4) using the defined recursive functions. The results are shown in a structured format, with each command followed by its output.

```

addition+(3,2,4)
<<pi^1_1 | sigma(pi^3_3) > | sigma(pi^4_4) > (3,2,4)
<<pi^1_1 | sigma(pi^3_3) > | sigma(pi^4_4) > (3,2,3)
<<pi^1_1 | sigma(pi^3_3) > | sigma(pi^4_4) > (3,2,2)
<<pi^1_1 | sigma(pi^3_3) > | sigma(pi^4_4) > (3,2,1)
<<pi^1_1 | sigma(pi^3_3) > | sigma(pi^4_4) > (3,2,0)
<pi^1_1 | sigma(pi^3_3) > (3,2)
<pi^1_1 | sigma(pi^3_3) > (3,1)
<pi^1_1 | sigma(pi^3_3) > (3,0)
pi^1_1(3) = 3
sigma(pi^3_3)(3,0,3)
pi^3_3(3,0,3) = 3

sigma(3) = 4
sigma(pi^3_3)(3,1,4)
pi^3_3(3,1,4) = 4

sigma(4) = 5
sigma(pi^4_4)(3,2,0,5)
pi^4_4(3,2,0,5) = 5

sigma(5) = 6
sigma(pi^4_4)(3,2,1,6)
pi^4_4(3,2,1,6) = 6

sigma(6) = 7
sigma(pi^4_4)(3,2,2,7)
pi^4_4(3,2,2,7) = 7

sigma(7) = 8
sigma(pi^4_4)(3,2,3,8)
pi^4_4(3,2,3,8) = 8

sigma(8) = 9
ans = 9
>> |
  
```

Figura 2:

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. no funciona el script

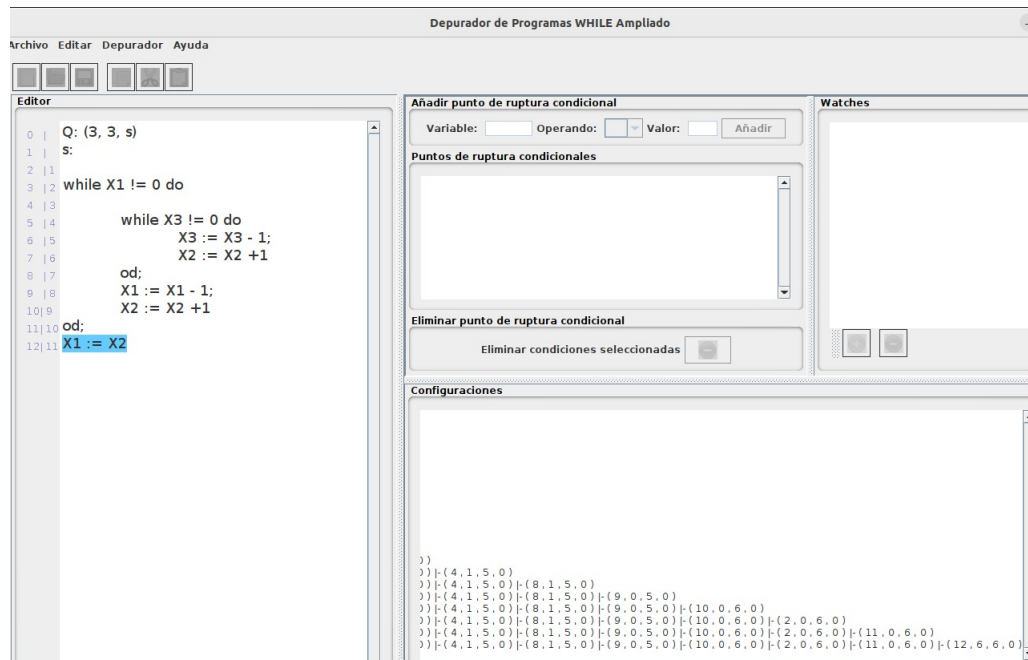


Figura 3: