Actividad Practica 3

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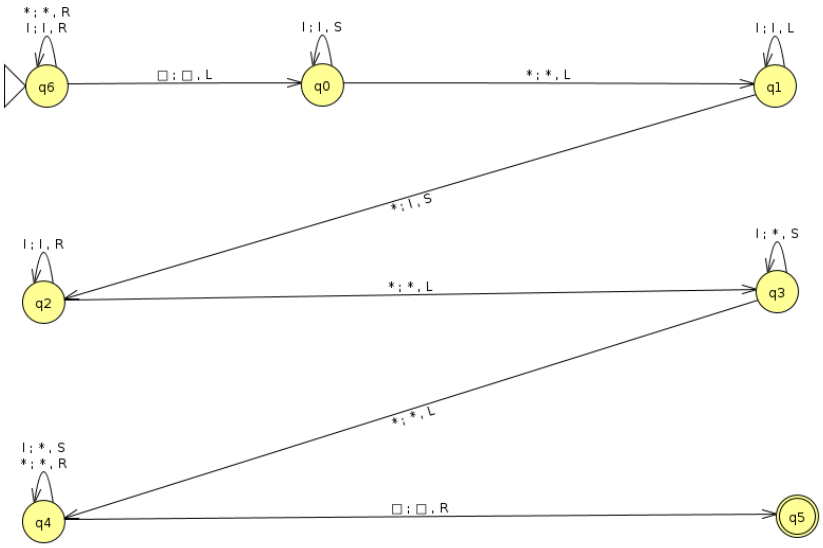
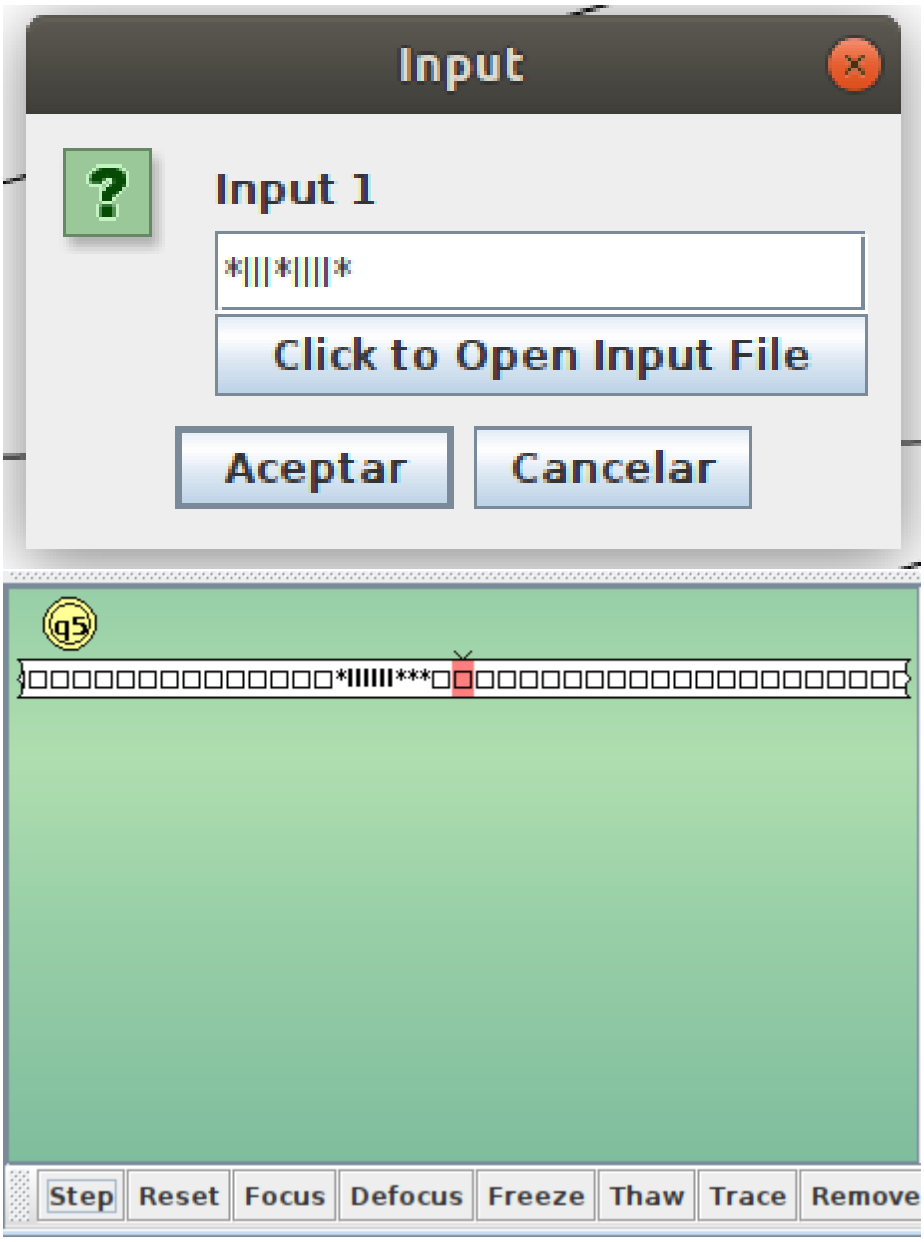
EJERCICIO 1. Define the TM solution of exercise 3.4 of the problem list and test its correct behaviour.

3.4. Prove that the function add(x, y) = x + y, with x, y 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 stings.




Input
Input 1
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EJERCICIO 2. Define a recursive function for the sum of three values.

$add(x, y, z) =< \pi_1^1 | \sigma(\pi_3^3) > (< \pi_1^1 | \sigma(\pi_3^3) > (x, y), z)$

```
>> evalrecfunction('addition3', 3, 2, 1);
addition3(3,2,1)
addition(addition(π³₁,π³₂),π³₃)(3,2,1)
addition(π³₁,π³₂)(3,2,1)
π³₁(3,2,1) = 3

π³₂(3,2,1) = 2

addition(3,2)
<π¹₁|σ(π³₃)>(3,2)
<π¹₁|σ(π³₃)>(3,1)
<π¹₁|σ(π³₃)>(3,0)
π¹₁(3) = 3
σ(π³₃)(3,0,3)
π³₃(3,0,3) = 3

σ(3) = 4
σ(π³₃)(3,1,4)
π³₃(3,1,4) = 4

σ(4) = 5

π³₃(3,2,1) = 1

addition(5,1)
<π¹₁|σ(π³₃)>(5,1)
<π¹₁|σ(π³₃)>(5,0)
π¹₁(5) = 5
σ(π³₃)(5,0,5)
π³₃(5,0,5) = 5

σ(5) = 6
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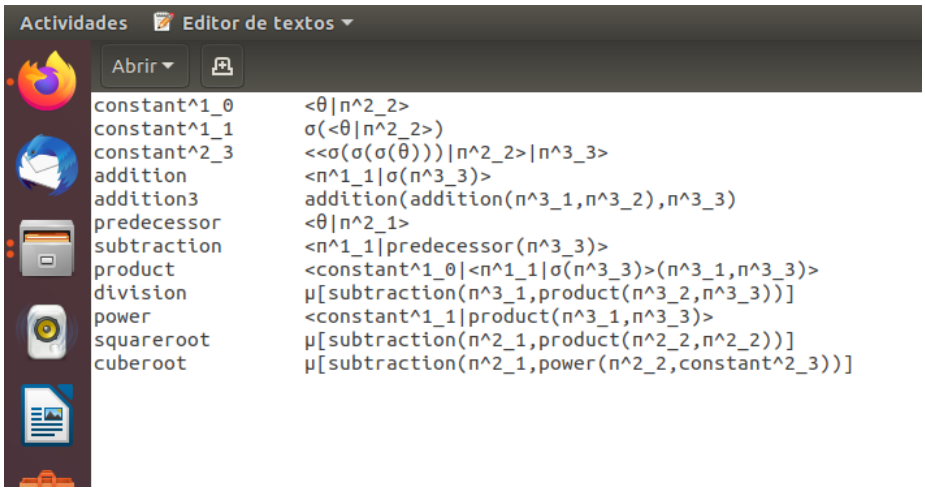

EJERCICIO 3. Implement a WHILE program that computes the sum of three values. You must use an auxiliary variable that accumulates the result of the sum.

Q=(3, s)
s:
$X_4 := X_1$
$while X_2 \neq 0$ do
$X_4 := X_4 + 1$
$X_2 := X_2 - 1$
od;
$while X_3 \neq 0$
$X_4 := X_4 + 1$
$X_3 := X_3 - 1$
od;
$X_1 := X_4$