

Práctica 3 TALF

Jesús Alcázar Pérez 2ºA Ingeniería Informática

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1 Turing Machine example done with JFLAP

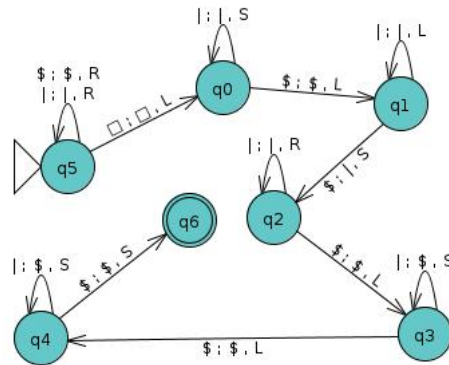


Figure 1: TM that sums 2 values

2 Requested Recursive function and an Octave capture

$$\text{addition_3} = \langle \langle \pi_1^1 | \sigma(\pi_3^3) \rangle | \sigma(\pi_4^4) \rangle$$

```
octave:11> evalrecfunction('<n^1_1|σ(n^3_3)>|σ(n^4_4)>', 1,2,3)
<n^1_1|σ(n^3_3)>|σ(n^4_4)>(1,2,3)
<n^1_1|σ(n^3_3)>|σ(n^4_4)>(1,2,2)
<n^1_1|σ(n^3_3)>|σ(n^4_4)>(1,2,1)
<n^1_1|σ(n^3_3)>|σ(n^4_4)>(1,2,0)
<n^1_1|σ(n^3_3)>(1,2)
<n^1_1|σ(n^3_3)>(1,1)
<n^1_1|σ(n^3_3)>(1,0)
n^1_1(1) = 1
σ(n^3_3)(1,0,1)
n^3_3(1,0,1) = 1

σ(1) = 2
σ(n^3_3)(1,1,2)
n^3_3(1,1,2) = 2

σ(2) = 3
σ(n^4_4)(1,2,0,3)
n^4_4(1,2,0,3) = 3

σ(3) = 4
σ(n^4_4)(1,2,1,4)
n^4_4(1,2,1,4) = 4

σ(4) = 5
σ(n^4_4)(1,2,2,5)
n^4_4(1,2,2,5) = 5

σ(5) = 6
ans = 6
octave:12>
```

Figure 2: Addition3 in Octave execution

3 WHILE program that computes the sum of 3 values

Q: (3, 4, s)

s:

```
while X1 != 0 do
```

```
    X2 := X2 + 1;
```

```
    X1 := X1 - 1
```

```
od;
```

```
X4 := X2;
```

```
while X2 != 0 do
```

```
    X3 := X3 + 1;
```

```
    X2 := X2 - 1
```

```
od;
```

```
X1 := X4
```

```
//Done with verbatim due to error in package whilecode
```