Teoría de Autómatas y Lenguajes Formales

Practice 4 Program Numbering and EXWHILE

Athenea, Martín Moreno

December 25, 2022

1 Create the simplest WHILE program that computes the diverge function (with zero arguments) and compute the codification of its code

$X_1 := X_1 + 1;$
while $X_1 \neq 0$ **do**
$X_1 := X_1 + 1;$
od

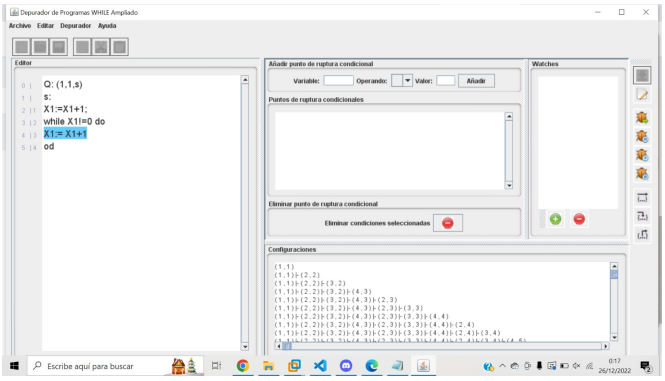

Figure 1: Debbuger

```
>> CODE2N("X1:=X1+1;while X1!=0 do X1:=X1+1 od")
ans = 16689751
>>
```

Figure 2: CODE2N

```
>> printNvectors (7)
()
(0)
(0  0)
(1)
(0  0  0)
(1  0)
(2)
```

Figure 3: printNvectors

2 Create an Octave script that enumerates all the vectors

```
function printNvectors(N)
for i=0:N-1
disp(['(' num2str(godeldecoding(i)) ')'])
endfor
end
```

```
>> printNwhilePrograms(5)
(0, X1=0)
(1, X1=0)
(0, X1=0; X1=0)
(2, X1=0)
(1, X1=0; X1=0)
>>
```

Figure 4: printNwhilesPrograms

3 Create an Octave script that enumerates all the WHILE programs

```
function printNwhilePrograms(N)
for i=0:N-1
disp(N2WHILE(i))
endfor
end
```