# Teoría de Autómatas y Lenguajes Formales

# Práctica 4.

Carlos Velasco Hilario

24/12/2022

## 1. Create the simplest WHILE program that computes the diverge function and compute the codification of its code.

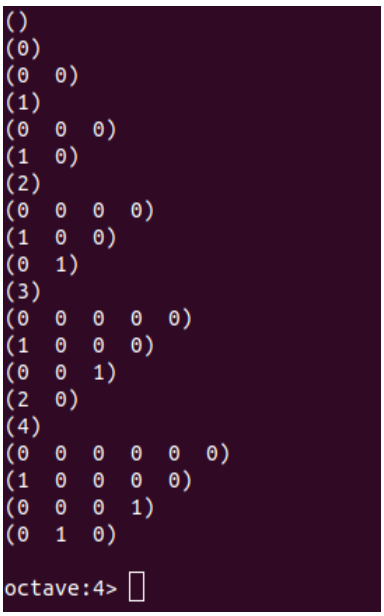
```
Q = (0,s)
  s:
    X1 := X1 + 1;
    while X1 != 0 do
     X1 := X1
    od
```

La primera instruccion es la mas importante para asegurarnos de que el programa siempre diverje. Para esto, nos aseguramos de utilizar un bucle con el minimo cuerpo posible.

```
> CODE2N("X2:=X1+1; while X2!=0 do X1:=0 od")
 ans = 10876
```

## 2. Create an Octave script that enumerates all the vectors.

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



## 3. Create an Octave script that enumerates all the WHILE programs.

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

```
program = (0, X1:=0)
program = (1, X1:=0)
program = (0, X1:=0; X1:=0)
program = (2, X1:=0)
program = (1, X1:=0; X1:=0)
program = (1, X1:=0)
program = (3, X1:=0)
program = (2, X1:=0; X1:=0)
program = (1, X1:=0)
program = (0, X1:=0; X1:=0; X1:=0)


octave:5>
```