Architecture et Système 2021-2022

Département Informatique, ENS Paris Saclay

TP 11 : Leader election and Memory Management

1 Network implementation of the ring election

Last TP, we had a look at the network version of the program, `ring-net.c` instantiates a single node per run. The program takes 3 arguments : the port listening node, the name of the neighbor node (machine name), the connection port to the neighbor node.

The program creates a server in a thread and waits for a neighbor to connect. In parallel, in a another thread, it tries a connection on its neighbor (machine name and port passed as argument). You can find it in the folder amritasuresh.github.io/teaching/ring.tar.gz.

— Run it on your local machine, and try to create a ring in your system (use different processes to emulate this).

— Create a ring with your neighbors and extend it to the whole lab room.

2 The function of Hénon

We will calculate the orbit of a dynamic system of dimension 2. The function of Hénon is described by the system

$$H_{a,b} = \begin{cases} x_{n+1} = a - by_n - x_n^2 \\ y_{n+1} = x_n. \end{cases}$$

We already have the function from last week. We will modify the program to use threads instead. We will use one thread to calculate the sequence$(x_n)_n$ and another thread for the sequence$(y_n)_n$. Propose a means of synchronization to ensure interleaving of the computations of x_n and y_n. Implement it.

We can plot the function with the command `gnuplot henon.p` after having downloaded the script "henon.p". The file `henon.dat` must be in the same folder as `henon.p`. (You will need `gnuplot` for this).

Observe the graph you get for values $a = 1.4$ et $b = -0.3$.

3 Questions from class revisited

1. Let us look at the file `smash.c` discussed in the course this week. First, identify the values of J and D in order for the program to output $x = 0$. How did you find it ?
2. Next, we look at `input.c`. What do we observe when we investigate it using gdb ?