ATIVIDADE 010: MORTE POR CONCORRÊNCIA

Paradigmas de Linguagens de Programação

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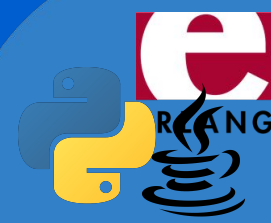
DESCRIÇÃO DA ATIVIDADE

Morte por Concorrência em Java

1) Crie uma versão em Python
2) Crie uma versão em Erlang
3) Rode os 3 programas com
    - 100 processos e 100 mensagens
    - 1.000 processos e 1.000 mensagens
    - 10.000 processos e 1.000 mensagens
    - 100.000 processos e 10.000 mensagens

Anote e apresente os tempos.



VERSÃO PYTHON

```python
from threading import Thread
import sys
import time

class MiniThread(Thread):

    def __init__(self, th_n, m):
        Thread.__init__(self)
        self.th_n = th_n
        self.msg = m


    def run(self):
        while (self.msg):
            time.sleep(0.000001)
            self.msg -= 1


threads = int(sys.argv[1])
times = int(sys.argv[2])

for i in range(threads,0,-1):
    t = MiniThread(i, times)
    t.start()
```

VERSÃO ERLANG

```erlang
-module(morte).
-export([send/2]).


send(M, N) ->

  H = lists:foldl(
    fun(Id, Pid) -> spawnlink(fun() -> loop(Id, Pid, M) end) end,
    self(),
    lists:seq(N, 2, -1)),
    {, Time} = statistics(runtime),
    io:format("~p processes spawned in ~p ms~n", [N, Time]),
  statistics(runtime),
  H ! M,
  loop(1, H, M).

loop(Id, Pid, M) ->
  receive
    1 ->
      {_, Time} = statistics(runtime),
      io:format("~p messages sent in ~p ms~n", [M, Time]),
      exit(self(), ok);
    Index ->
      erlang:yield(),
      Pid ! Index - 1,
      loop(Id, Pid, M)
  end.
```

VERSÃO JAVA

```java
class MiniThread extends Thread {
    int n, t;
    MiniThread(int m, int th) { n=m; t=th; }
    public void run() {
        do {
            yield();
            n--;
        } while (n>0);
    }
}

public class Death {
    public static void main(String[] argv) {
        int threads = Integer.parseInt(argv[0]);
        int times   = Integer.parseInt(argv[1]);
        for(int i=threads;i>0;i--) {
            MiniThread t = new MiniThread(times, i);
            t.start();
        }
    }
}
```

COMPARAÇÕES

	100p 100m	**1.000p 1.000m**	**10.000p 1.000m**	**100.000p 10.000m**
Python	108 ms	3,077 s	31,990 s	Indefinido
Java	0,126 ms	0,503 s	4,139 s	5 m 48,119 s
Erlang	9 ms / 0 ms	410 ms / 4 ms	3742 ms / 1 ms	System Limit

PRINT PYTHON

```
annamilani@DESKTOP-TF89JP0:/mnt/c/Users/milan/Documents/PLP$ time python morte.py 100 100

real    0m0.108s
user    0m0.016s
sys     0m0.047s
annamilani@DESKTOP-TF89JP0:/mnt/c/Users/milan/Documents/PLP$ time python morte.py 1000 1000

real    0m3.077s
user    0m1.875s
sys     0m13.500s
annamilani@DESKTOP-TF89JP0:/mnt/c/Users/milan/Documents/PLP$ time python morte.py 10000 1000

real    0m31.990s
user    0m23.219s
sys     2m34.656s
```

PRINT JAVA

```
jordan@DESKTOP-5QGE0PB:/mnt/c/Users/jorda/Documents/PLP/erlang$ time java Death 100 100

real    0m0.126s
user    0m0.110s
sys     0m0.063s
```

```
jordan@DESKTOP-5QGE0PB:/mnt/c/Users/jorda/Documents/PLP/erlang$ time java Death 1000 1000

real    0m0.503s
user    0m0.673s
sys     0m0.643s
```

```
jordan@DESKTOP-5QGE0PB:/mnt/c/Users/jorda/Documents/PLP/erlang$ time java Death 10000 1000

real    0m4.139s
user    0m6.201s
sys     0m5.831s
```

```
jordan@DESKTOP-5QGE0PB:/mnt/c/Users/jorda/Documents/PLP/erlang$ time java Death 100000 10000

real    5m48.119s
user    9m32.668s
sys     12m56.218s
```

PRINT ERLANG

```
3> morte:send(100, 100).
100 processes spawned in 9 ms
100 messages sent in 0 ms
```

```
2> morte:send(1000, 1000).
1000 processes spawned in 410 ms
1000 messages sent in 4 ms
```

```
3> morte:send(1000, 10000).
10000 processes spawned in 3742 ms
1000 messages sent in 1 ms
```

OBRIGADO PELA ATENÇÃO!

- Link do GitHub:
  https://github.com/caioandrademota/programacao-concorrente