

## CES-27 Distributed Processing

### 1th Activity

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## Task 1

It was implemented a Lamport's *Scalar Logic Clock* simulation. The implementation was made in Go and it can be seen on the Repository<sup>1</sup>.

### Suggested Test Case

As It was suggested, it was conducted a test with 3 terminal windows, on each one was opened one task of the program as shown in the Code 1.

The test was made according to the model represented on Figure 1. The results can be seen on the terminal windows shown from Figure 2 to Figure 4.

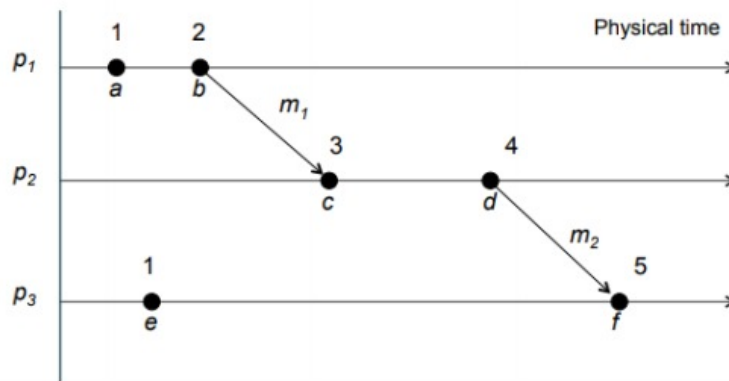


Figure 1: Model representing the execution of Task 1 example test case.

```
Terminal 1: go run Process.go 1 :10004 :10003 :10002
Terminal 2: go run Process.go 2 :10004 :10003 :10002
Terminal 3: go run Process.go 3 :10004 :10003 :10002
```

Code 1: Code that was run on each of the 3 terminal window on the execution of Task 1 example test case.

As expected, the logical clock on each process was updated to the bigger one, if the incoming message logical clock time was greater than the actual time on that process, and then it was also increased by one. This logic was applied and because of it the simulation on the terminals matched the model represented on Figure 1.

### Built Test Case

It was built a test case with 4 terminal windows, on each one was opened one task of the program as shown in the Code 2.

The test was made according to the model represented on Figure 1. The results can be seen on the terminal windows shown from Figure 6 to Figure 9.

<sup>1</sup><https://github.com/CarlosMatheus/CES-27/tree/master/lab01>



```
carlosmatheus@carlos-matheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 1 :10004 :10003 :10002
1
Destiny Id: 1
Current logical clock: 1
1
Destiny Id: 1
Current logical clock: 2
2
Destiny Id: 2
```

Figure 2: Window 1 after execution of Task 1 example test case.



```
carlosmatheus@carlos-matheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 2 :10004 :10003 :10002
2
Current logical clock: 3
2
Destiny Id: 2
Current logical clock: 4
3
Destiny Id: 3
```

Figure 3: Window 2 after execution of Task 1 example test case.

Terminal 1: go run Process.go 1 :10004 :10003 :10002 :10001  
Terminal 2: go run Process.go 2 :10004 :10003 :10002 :10001  
Terminal 3: go run Process.go 3 :10004 :10003 :10002 :10001  
Terminal 4: go run Process.go 4 :10004 :10003 :10002 :10001

Code 2: Code that was run on each of the 4 terminal window on the execution of Task 1 built test case.

As expected, the logical clock on each process was updated to the bigger one, if the incoming message logical clock time was greater than the actual time on that process, and then it was also increased by one. This logic was applied and because of it the simulation on the terminals matched the model represented on Figure 1.

```

carlosmatheus@carlos-matheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 3 :10004 :10003 :10002
3
Destiny Id: 3
Current logical clock: 1
Current logical clock: 5
[]

```

Figure 4: Window 3 after execution of Task 1 example test case.

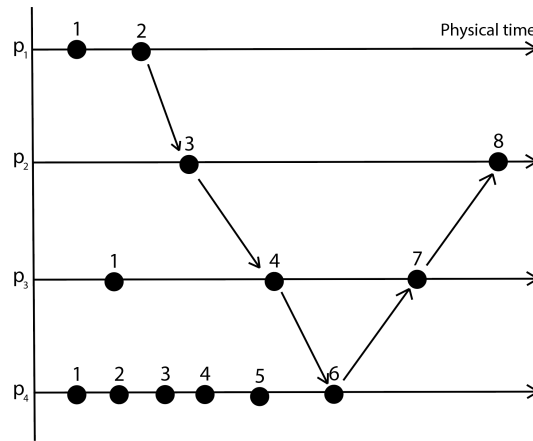


Figure 5: Model representing the execution of Task 1 built test case.

## Task 2

### Suggested Test Case

As It was suggested, it was conducted a test with 3 terminal windows, on each one was opened one task of the program as shown in the Code 3.

The test was made according to the model represented on Figure 10. The results can be seen on the terminal windows shown from Figure 11 to Figure 13.

```

Terminal 1: go run Process.go 1 :10004 :10003 :10002
Terminal 2: go run Process.go 2 :10004 :10003 :10002
Terminal 3: go run Process.go 3 :10004 :10003 :10002

```

Code 3: Code that was run on each of the 3 terminal window on the execution of Task 2 example test case.

As expected, the logical clock on each process was updated to the bigger one, if the incoming message logical clock time was greater than the actual time on that process, and then



```
carlosmatheus@carlos-matheus-Virtual: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 1 :10004 :10003 :10002 :10001
1
Destiny Id: 1
Current logical clock: 1
1
Destiny Id: 1
Current logical clock: 2
2
Destiny Id: 2
```

Figure 6: Window 1 after execution of Task 1 built test case.



```
carlosmatheus@carlos-matheus-Virtual: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 2 :10004 :10003 :10002 :10001
3
Destiny Id: 3
Current logical clock: 8
```

Figure 7: Window 2 after execution of Task 1 built test case.

it was also increased by one. This logic was applied and because of it the simulation on the terminals matched the model represented on Figure 10.

## Built Test Case

It was built a test case with 3 terminal windows, on each one was opened one task of the program as shown in the Code 4.

The test was made according to the model represented on Figure 14. The results can be seen on the terminal windows shown from Figure 15 to Figure 17.

```
Terminal 1: go run Process.go 1 :10004 :10003 :10002 :10001
Terminal 2: go run Process.go 2 :10004 :10003 :10002 :10001
Terminal 3: go run Process.go 3 :10004 :10003 :10002 :10001
Terminal 4: go run Process.go 4 :10004 :10003 :10002 :10001
```

Code 4: Code that was run on each of the 3 terminal window on the execution of Task 2 built test case.

```
carlosmatheus@carlos-matheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 3 :10004 :10003 :10002 :10001
3
Destiny Id: 3
Current logical clock: 1
Current logical clock: 4
4
Destiny Id: 4
Current logical clock: 7
2
Destiny Id: 2
[]
```

Figure 8: Window 3 after execution of Task 1 built test case.

```
carlosmatheus@carlos-matheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task01$ go run Process.go 4 :10004 :10003 :10002 :10001
4
Destiny Id: 4
Current logical clock: 1
4
Destiny Id: 4
Current logical clock: 2
4
Destiny Id: 4
Current logical clock: 3
4
Destiny Id: 4
Current logical clock: 4
4
Destiny Id: 4
Current logical clock: 5
Current logical clock: 6
3
Destiny Id: 3
[]
```

Figure 9: Window 4 after execution of Task 1 built test case.

As expected, the logical clock on each process was updated to the bigger one, if the incoming message logical clock time was greater than the actual time on that process, and then it was also increased by one. This logic was applied and because of it the simulation on the terminals matched the model represented on Figure 14.

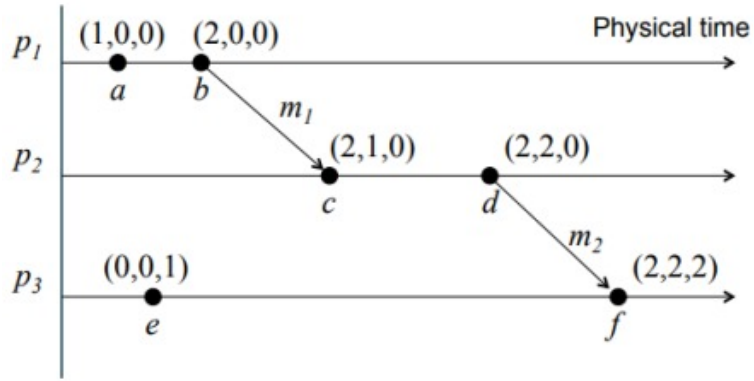


Figure 10: Model representing the execution of Task 1 example test case.

```

Default
carlosmatheus@carlosmatheus:~/Documents/CE5-27-Labs/Lab01/task02$ go run Process.go 1 :10004 :10003 :10002
1
Destiny Id: 1
Current logical Clocks: [1 0 0]
1
Destiny Id: 1
Current logical Clocks: [2 0 0]
2
Destiny Id: 2

```

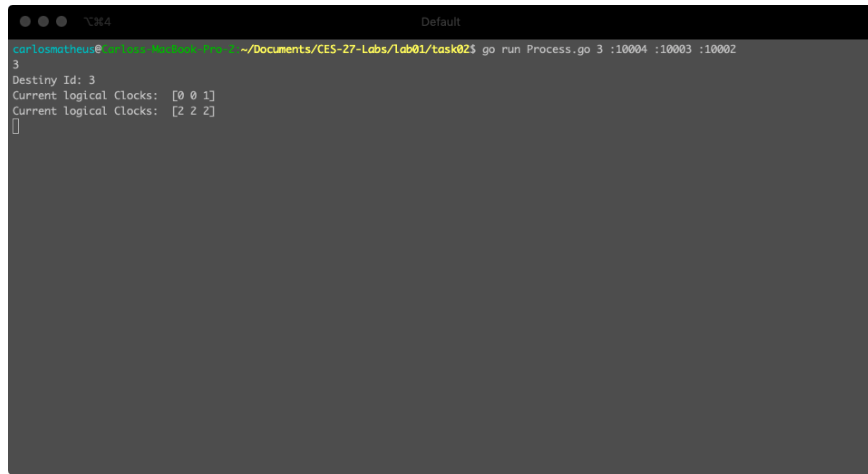
Figure 11: Window 1 after execution of Task 2 example test case.

```

Default
carlosmatheus@carlosmatheus:~/Documents/CE5-27-Labs/Lab01/task02$ go run Process.go 2 :10004 :10003 :10002
Current logical Clocks: [2 1 0]
2
Destiny Id: 2
Current logical Clocks: [2 2 0]
3
Destiny Id: 3

```

Figure 12: Window 2 after execution of Task 2 example test case.

A terminal window with a dark background and light text. The title bar shows three window control buttons and the text "Default". The terminal content shows a user prompt "carlosmatheus@carlos-matheus-MacBook-Pro: ~/Documents/CES-27-Labs/Lab01/task02\$" followed by the command "go run Process.go 3 :10004 :10003 :10002". The output consists of the number "3", "Destiny Id: 3", "Current logical Clocks: [0 0 1]", "Current logical Clocks: [2 2 2]", and an empty array "[]".

```
carlosmatheus@carlos-matheus-MacBook-Pro: ~/Documents/CES-27-Labs/Lab01/task02$ go run Process.go 3 :10004 :10003 :10002
3
Destiny Id: 3
Current logical Clocks: [0 0 1]
Current logical Clocks: [2 2 2]
[]
```

Figure 13: Window 3 after execution of Task 2 example test case.



Figure 14: Model representing the execution of Task 2 built test case.

```
carlosmatheus@carlosmatheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task02$ go run Process.go 1 :10004 :10003 :10002
1
Destiny Id: 1
Current logical Clocks: [1 0 0]
1
Destiny Id: 1
Current logical Clocks: [2 0 0]
2
Destiny Id: 2
1
Destiny Id: 1
Current logical Clocks: [3 0 0]
Current logical Clocks: [4 3 1]
1
Destiny Id: 1
Current logical Clocks: [5 3 1]
3
Destiny Id: 3
█
```

Figure 15: Window 1 after execution of Task 2 built test case.

```
carlosmatheus@carlosmatheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task02$ go run Process.go 2 :10004 :10003 :10002
Current logical Clocks: [0 1 1]
Current logical Clocks: [2 2 1]
2
Destiny Id: 2
Current logical Clocks: [2 3 1]
1
Destiny Id: 1
█
```

Figure 16: Window 2 after execution of Task 2 built test case.

```
carlosmatheus@carlosmatheus-VirtualBox: ~/Documents/CES-27-Labs/Lab01/task02$ go run Process.go 3 :10004 :10003 :10002
3
Destiny Id: 3
Current logical Clocks: [0 0 1]
2
Destiny Id: 2
3
Destiny Id: 3
Current logical Clocks: [0 0 2]
Current logical Clocks: [5 3 3]
█
```

Figure 17: Window 3 after execution of Task 2 built test case.