

System Programming

7th Laboratory (9 ... 12 April 2019)

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The code supplied implements the tic-tac-toe game (jogo do galo) for two player.

This version of the game requires players to take turns: the second player only selects the place put his piece after the first player terminated his play....

Modify this game to allow the players to play simultaneously. Each play takes its time to decide the position and types it in the keyboard. At the same time, the other plays does the same and both can send a message to the server simultaneously.

The server will read both messages at the same time and use synchronization mechanisms to sort and guarantee a correct play verification.

To implement this version of the game a few changes should be made:

- in the server:
 - the server will require one thread for each player.
 - in the server, after the processing of a play, the server should send the new board to both players
 - the manipulation of the board (in the function put_play should be synchronized)
- the client needs two threads
 - one thread will read from the keyboard and send the play to the server
 - other thread will receive the new boards from the server

REFERENCES

<https://fenix.tecnico.ulisboa.pt/downloadFile/845043405486513/06-Sun-ProgGuide-IPC.pdf> (section 7)

<https://fenix.tecnico.ulisboa.pt/downloadFile/282093452059683/05-MultiThreadProgGuide.pdf> (chapter 4)