MIEEC

Computer Networks

Lab work 1

Short Introduction

Data link protocol

Description

- Objectives
  - Implement a data link protocol
  - Test the protocol with a file transfer application
- Development environment
  - A Linux PC
  - The C programming language
  - An RS-232 serial port

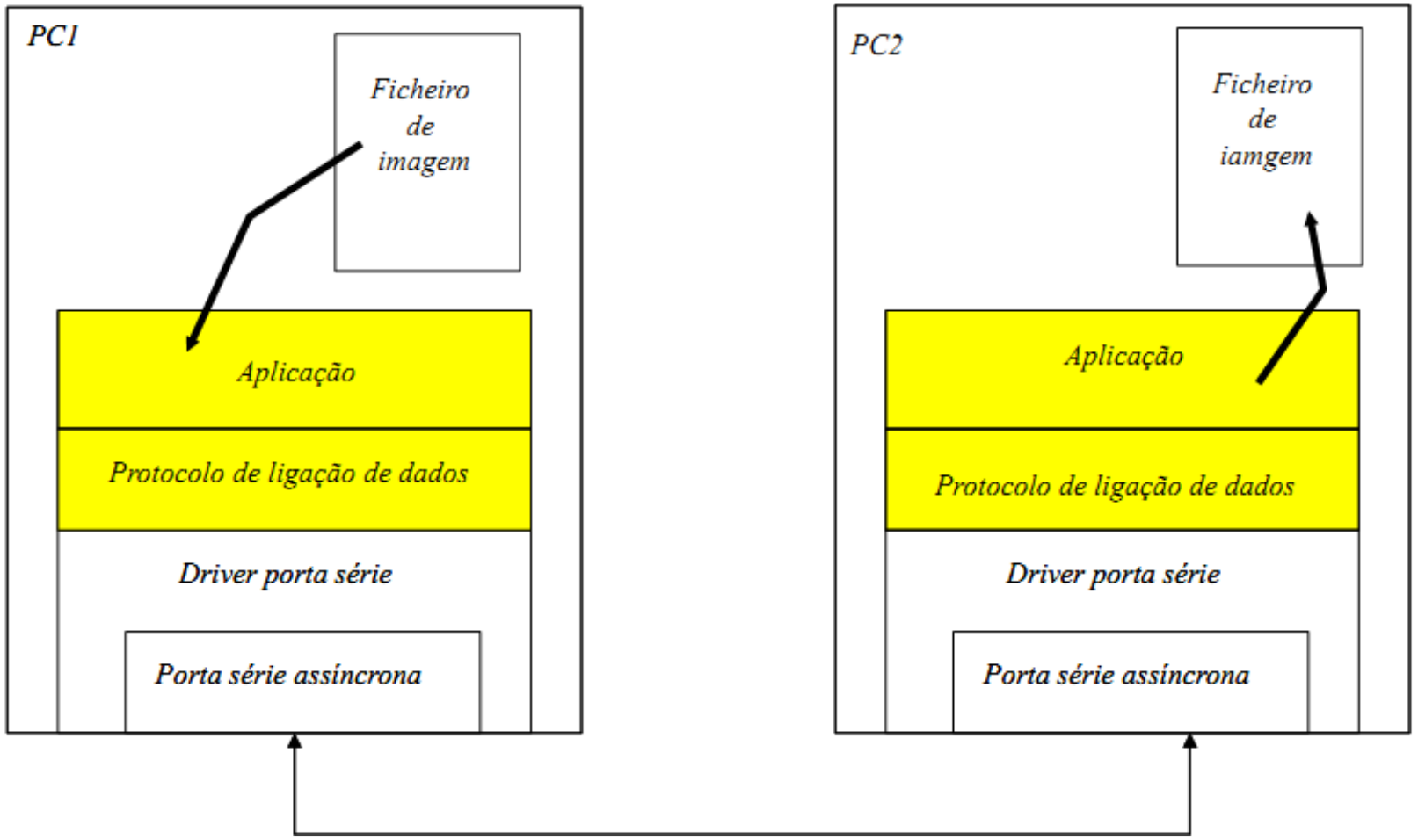
Groups and evaluation

- 2 element groups
  - Each group implements sender and receiver
  - Only one element of the group in class
  - The other element is remote:
    - Synchronously if schedule allows to attend class from home, can communicate with partner in class
    - Asynchronously if not
- Components of the evaluation
  - Class participation
  - Project demo
  - Final report

Infrastructure

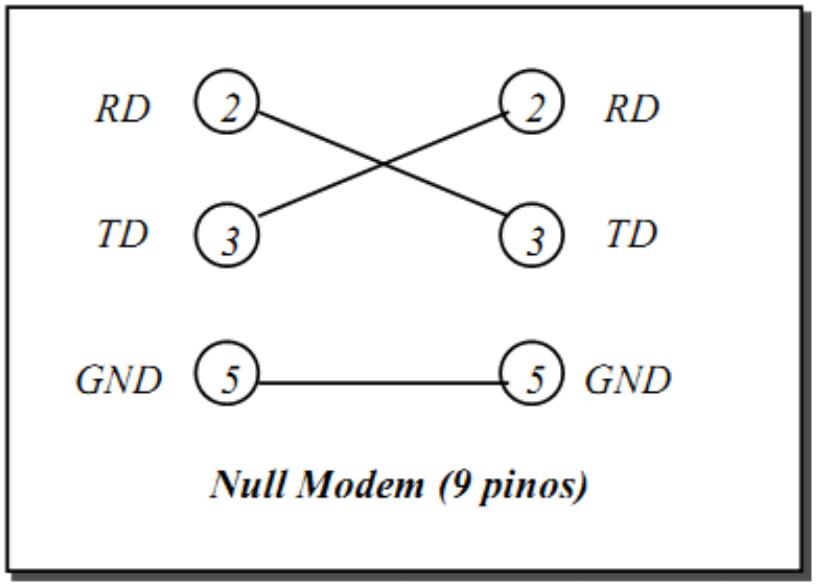
- At home:
  - Use virtual serial port in Linux
  - Use VirtualBox etc if your base system is not Linux
  - socat or VM serial port
- In the lab:
  - Use lab computers and ‘physical’ serial port
  - *Very important to test in lab*
    - .. because virtual serial ports will not have errors as physical ones do – and we want to check if the data link protocol you develop takes care of errors

Diagram of the target system

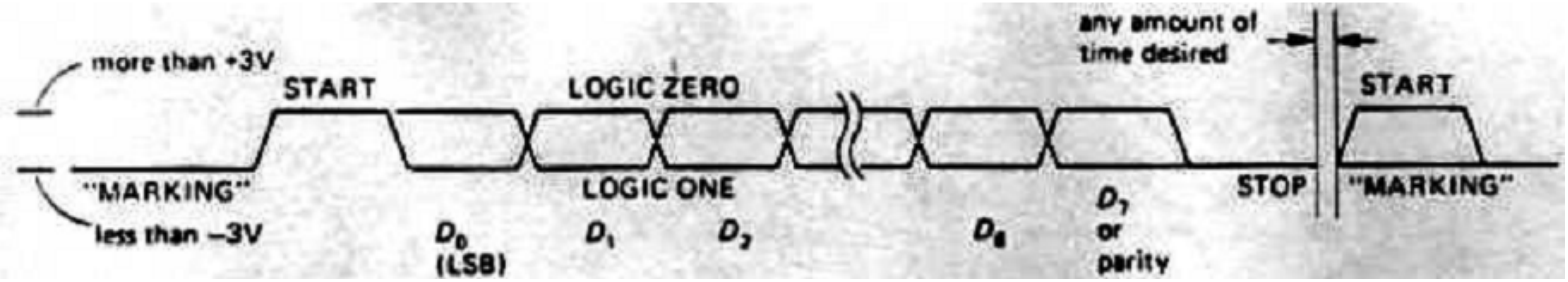


Asynchronous serial data transfer

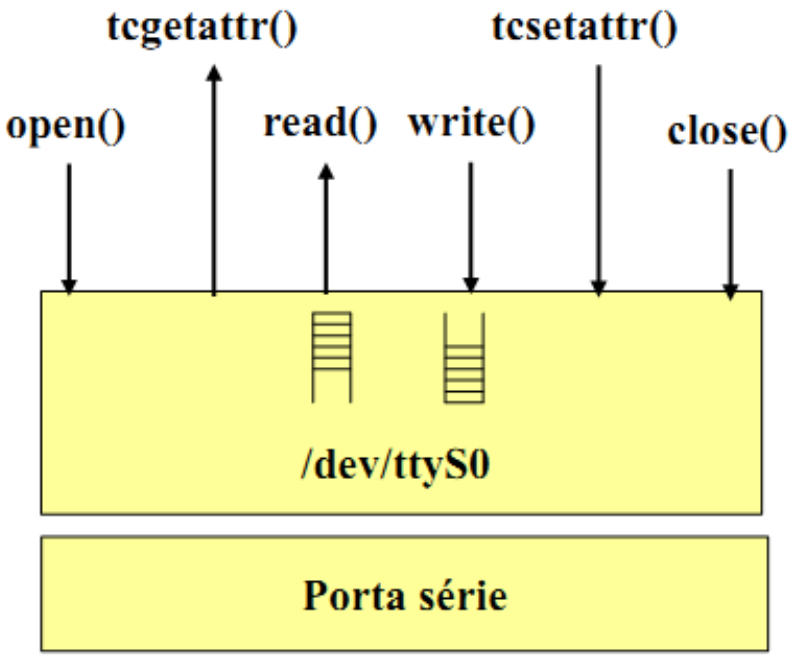
- Character transmission
- Each character is delimited by
  - Start bit
  - One or more stop bits
- Each character has 8 bits (D0-D7)



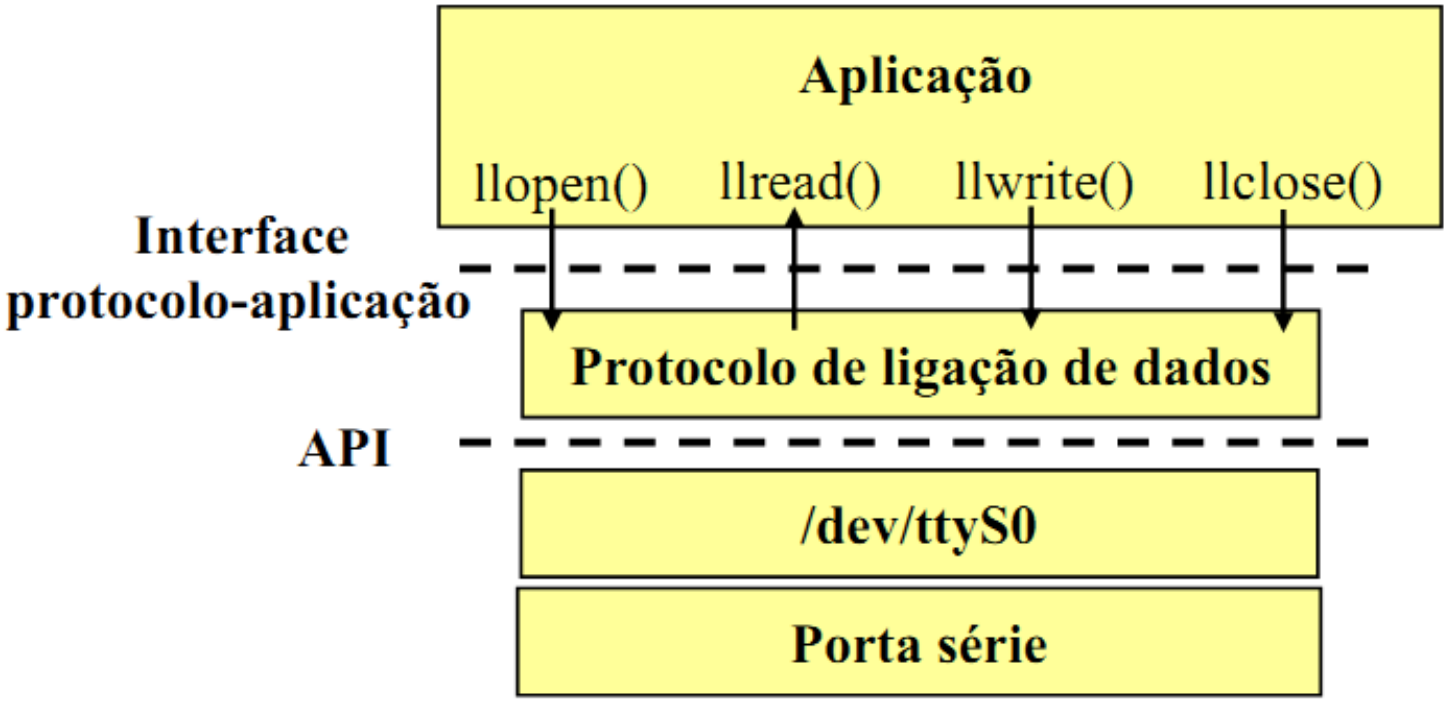
Null Modem (9 pinos)



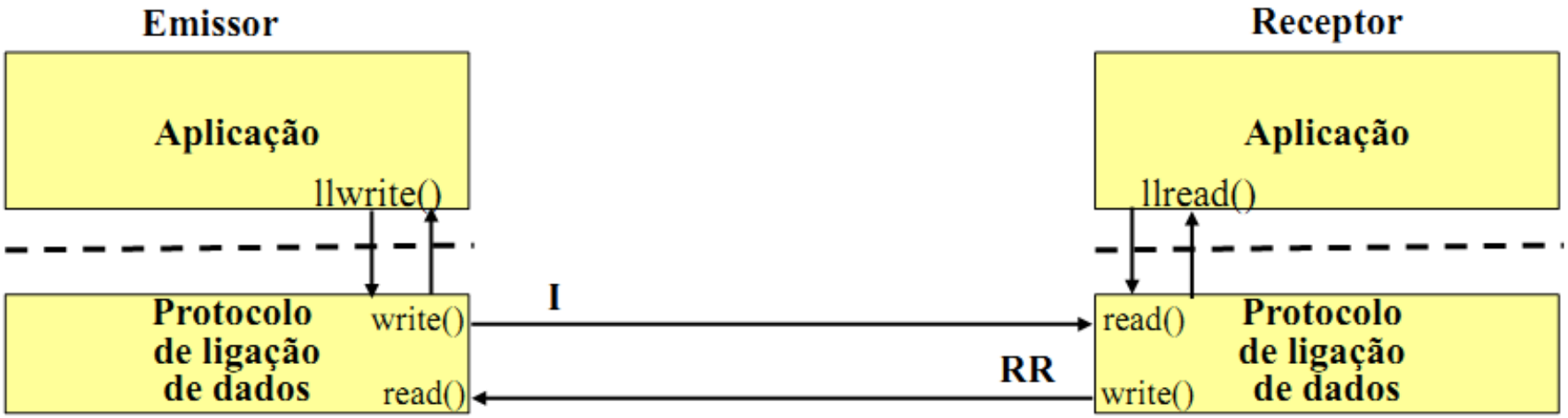
Serial port driver API



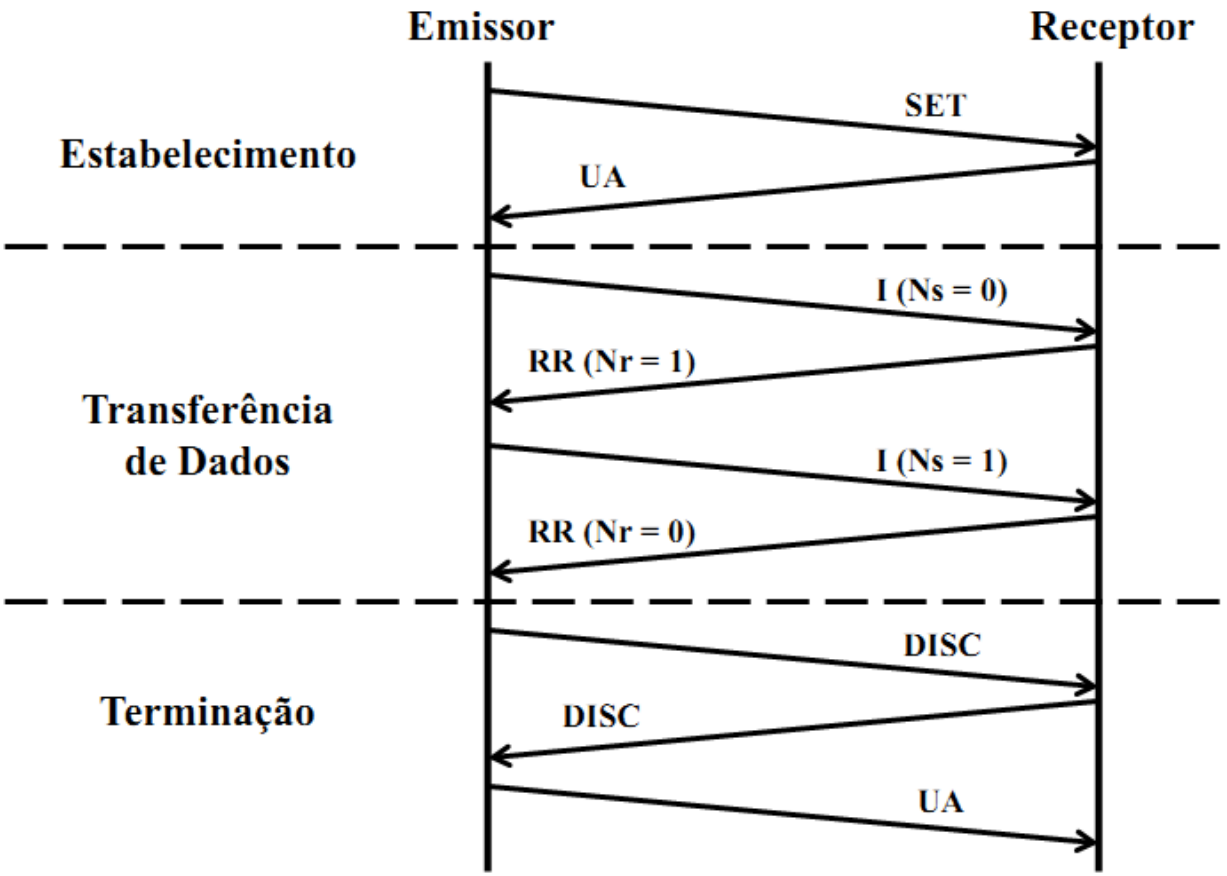
Protocol-Application API



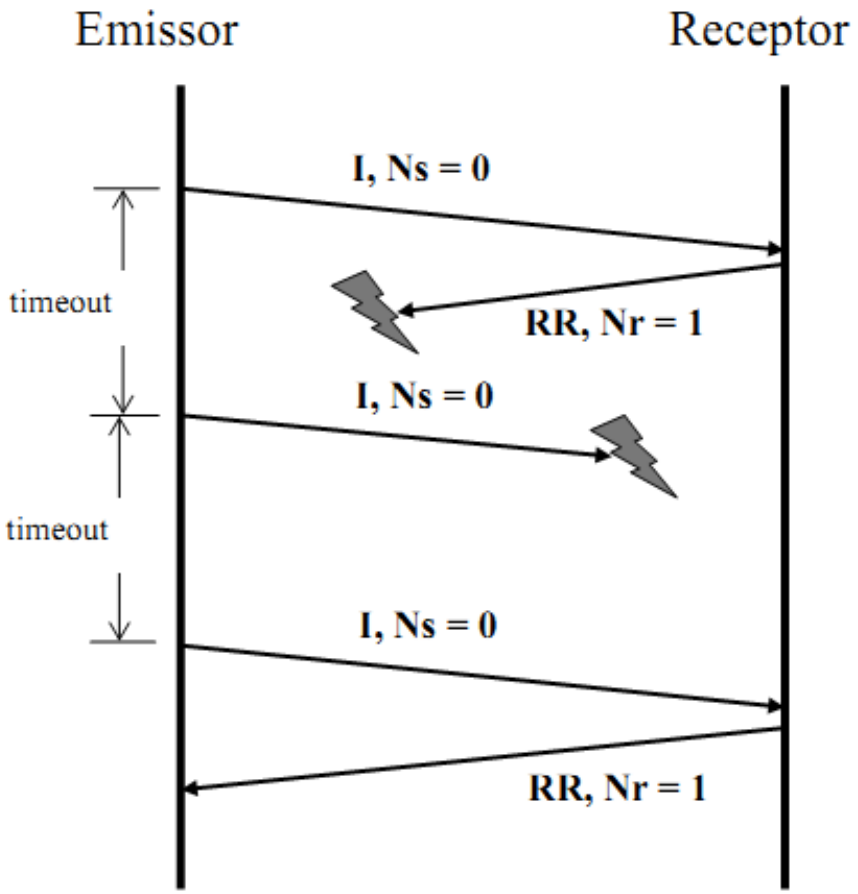
Protocol-Application API: read/write



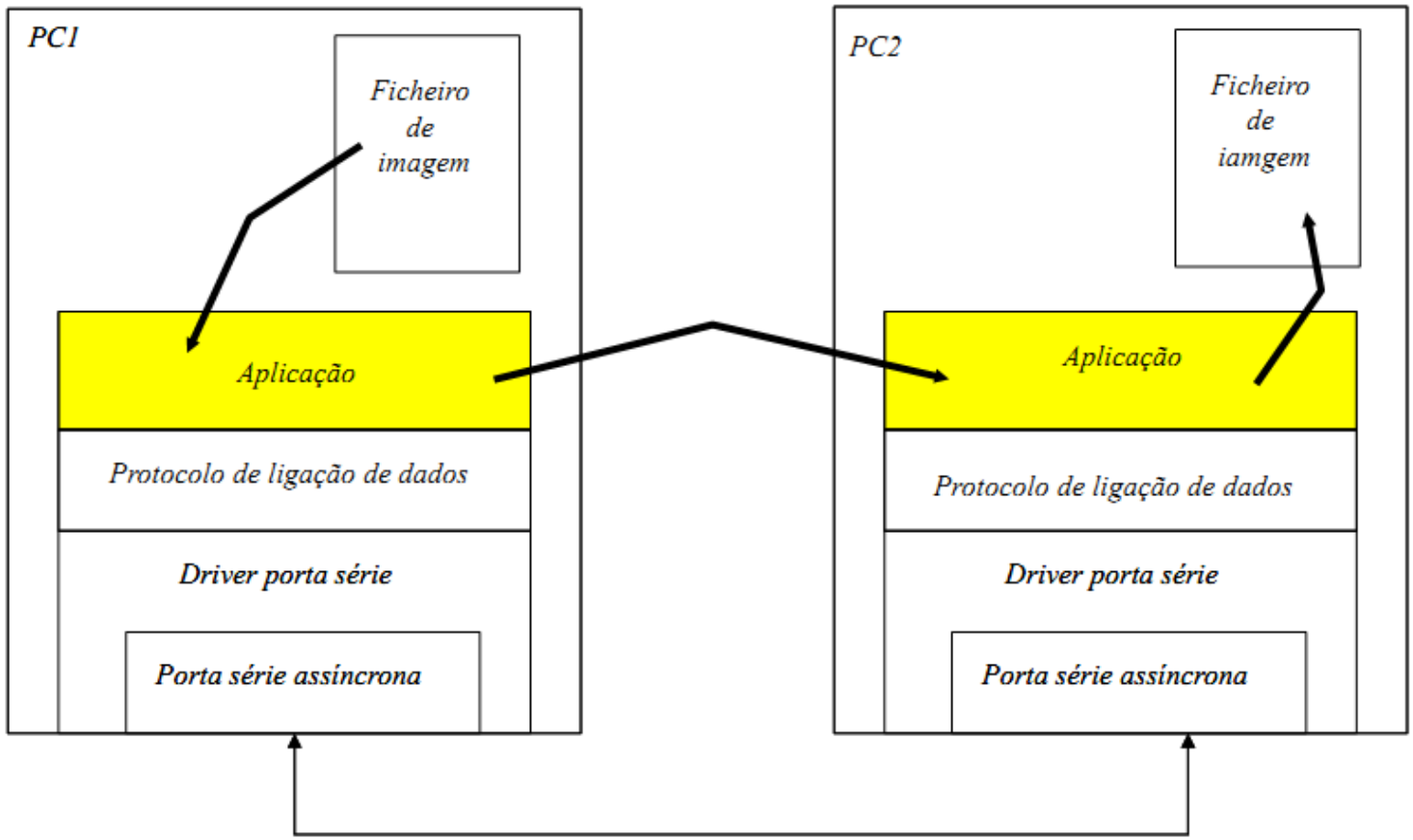
Data link protocol stages



Data link - retransmission



Application



Test application - specification

- Simple application protocol to support file transfer
- Two types of data packets
  - Signaling packets - begin/end of file transfer
  - Data packets – fragments of the file

Evaluation

- Implementation of the data link protocol 15%
- Implementation of the application 15%
- Code structure 20%
- Characterization of protocol efficiency 15%
- Demo 20%
- Report structure 15%
- If you deliver the report:
  - On the day after the deadline: - 10%; two days after: - 20%; d days after: - d*10%

Additional information in Moodle

- Planning
- Detailed lab script
- Report guidelines
- Virtual serial port
- Serial HowTo