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# ***Data Link Protocol***

## ***(1st Laboratory Assignment)***

## *Work description*

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- Objectives
  - » Implement a data link protocol
  - » Test protocol with file transfer application
  - » Measure the efficiency of the protocol
- Development environment
  - » PC with LINUX
  - » C language
  - » RS-232 serial ports

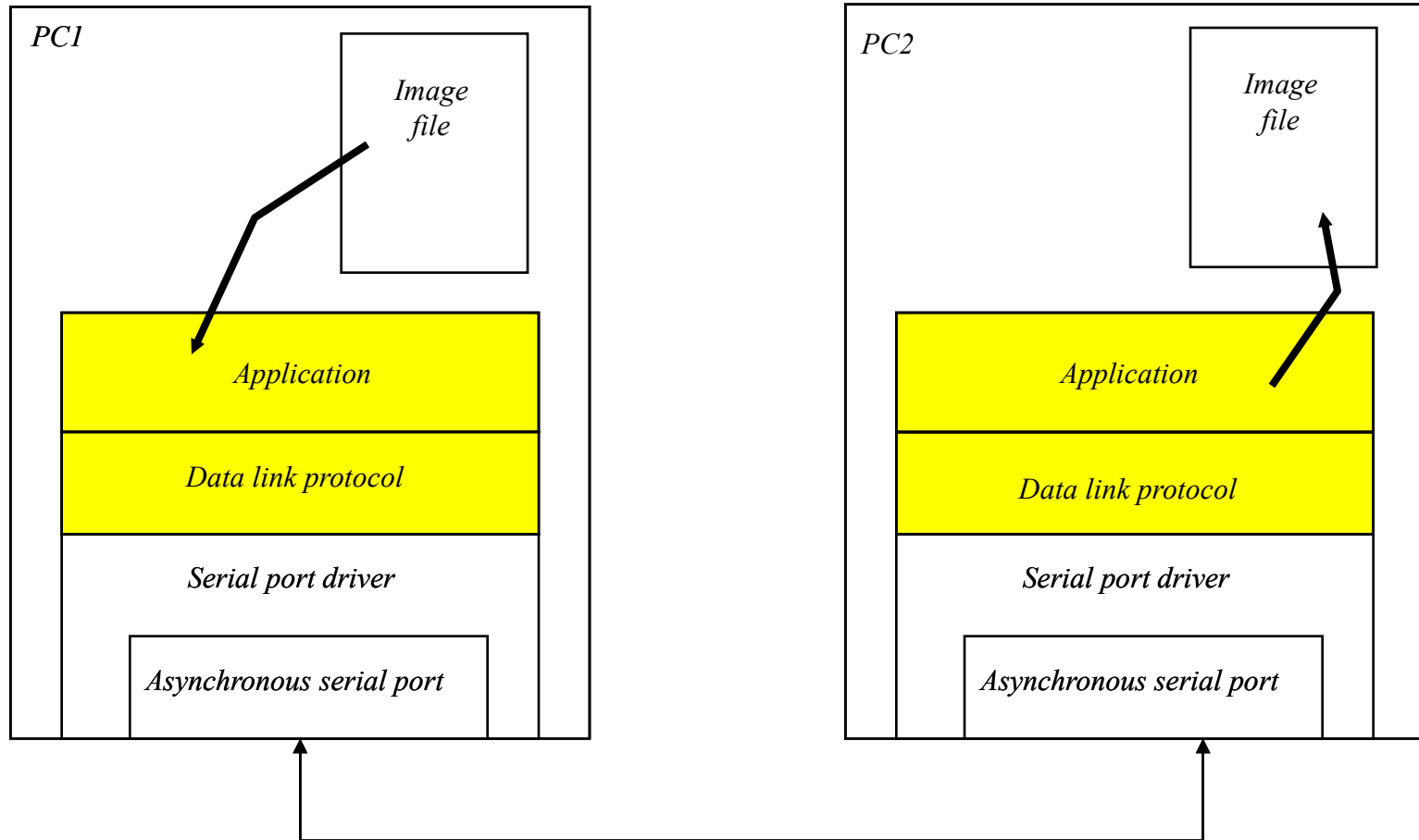
## *Development and evaluation*

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- Groups of 2 students
- Assessment elements
  - » Class participation
  - » Demonstration of work
  - » Quiz (15 min.)
  - » Final report

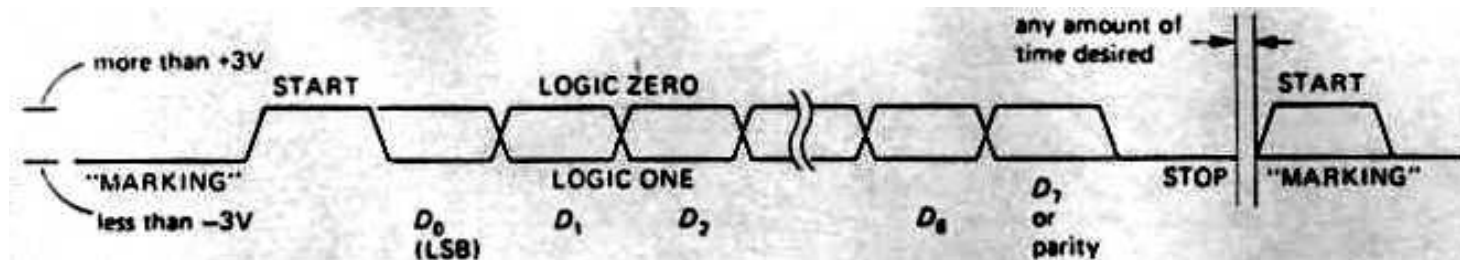
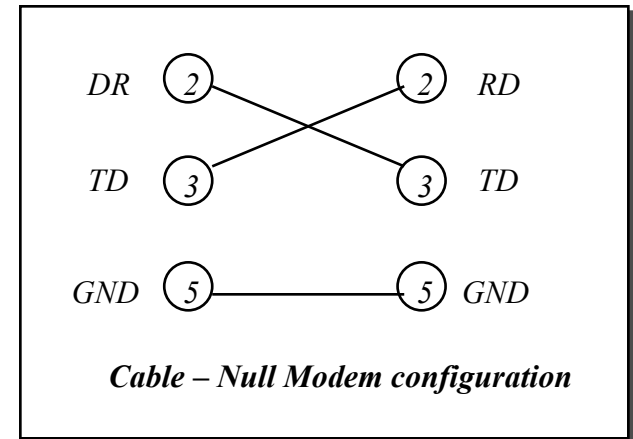
# *Communications System to be Developed*

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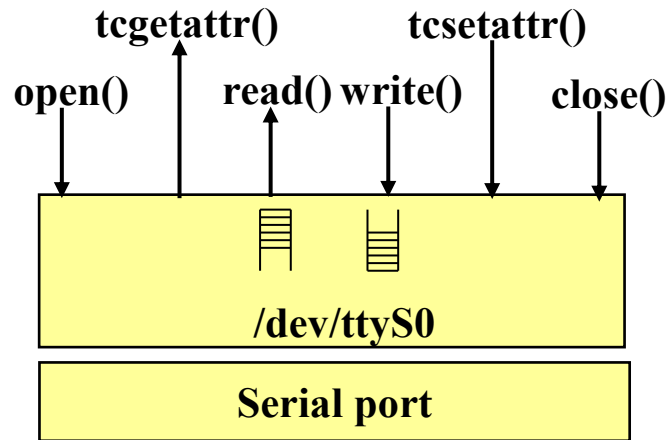
# Asynchronous serial transmission

- Byte-by-byte transmission
- Each byte transmitted bit by bit
- Byte (character) delimited by
  - » *Start* bit
  - » *Stop* bit
- Byte composed of 8 bits (D0 – D7)



## *Serial port driver – API*

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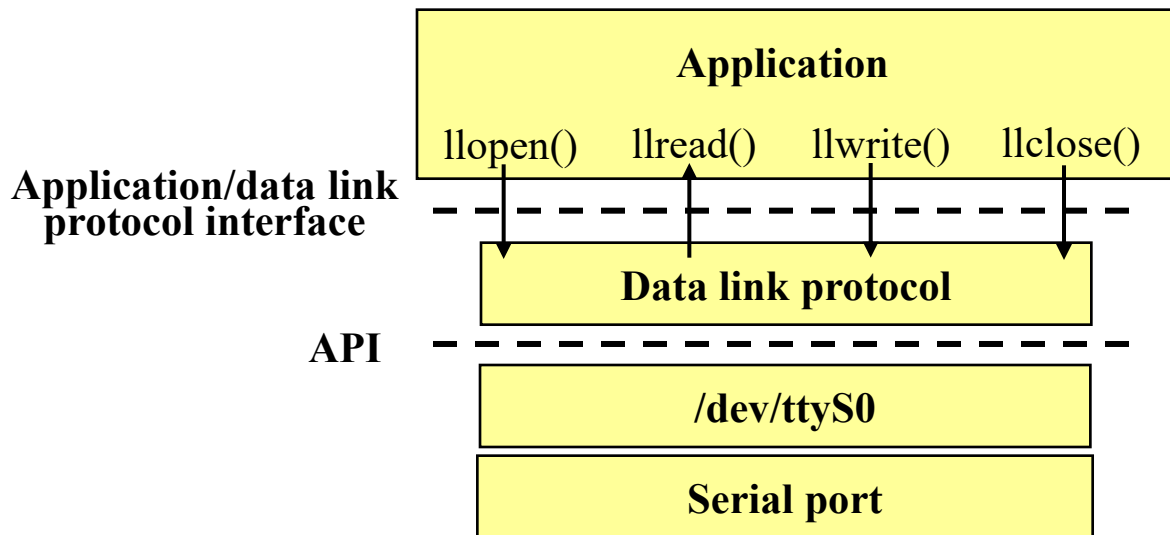


- In the base code provided, the serial port interface is abstracted in the following primitives:

```
int openSerialPort(const char *serialPort, int baudRate);  
int closeSerialPort(void);  
int readByteSerialPort(char *byte);  
int writeBytesSerialPort(const char *bytes, int numBytes);
```

# *Application/data link protocol interface*

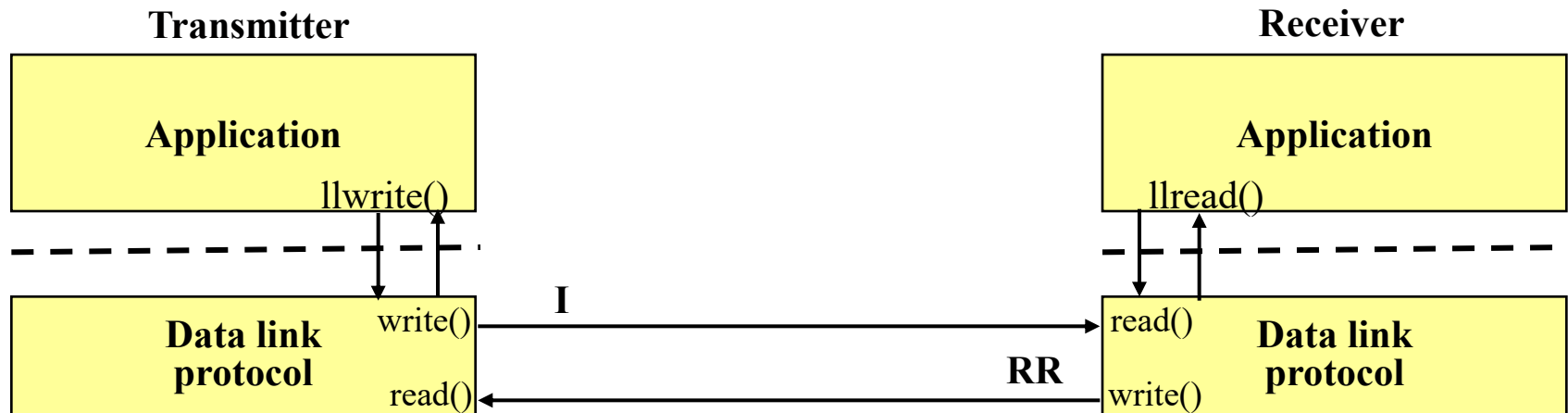
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# *Application/data link protocol interface – read/write*

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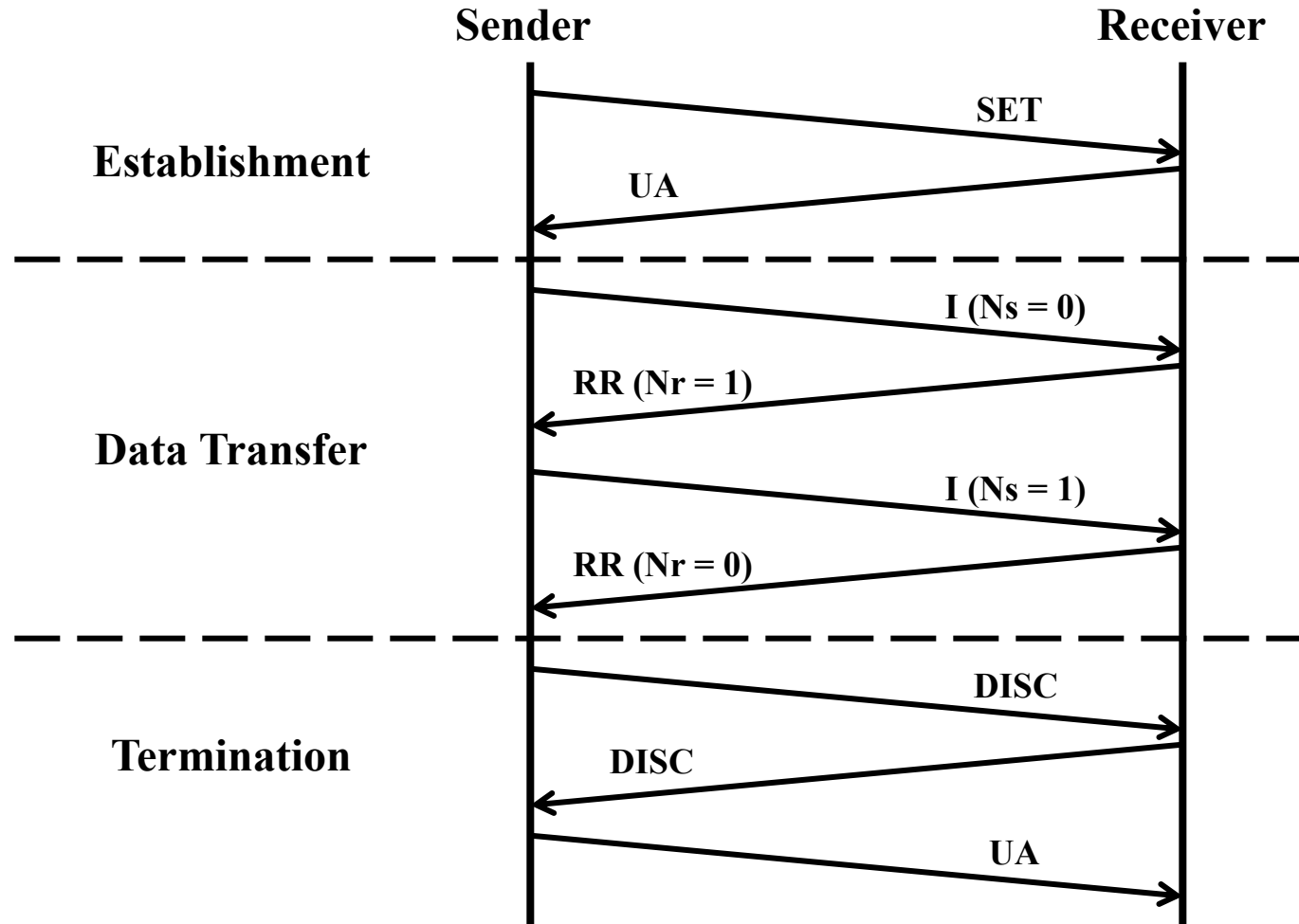
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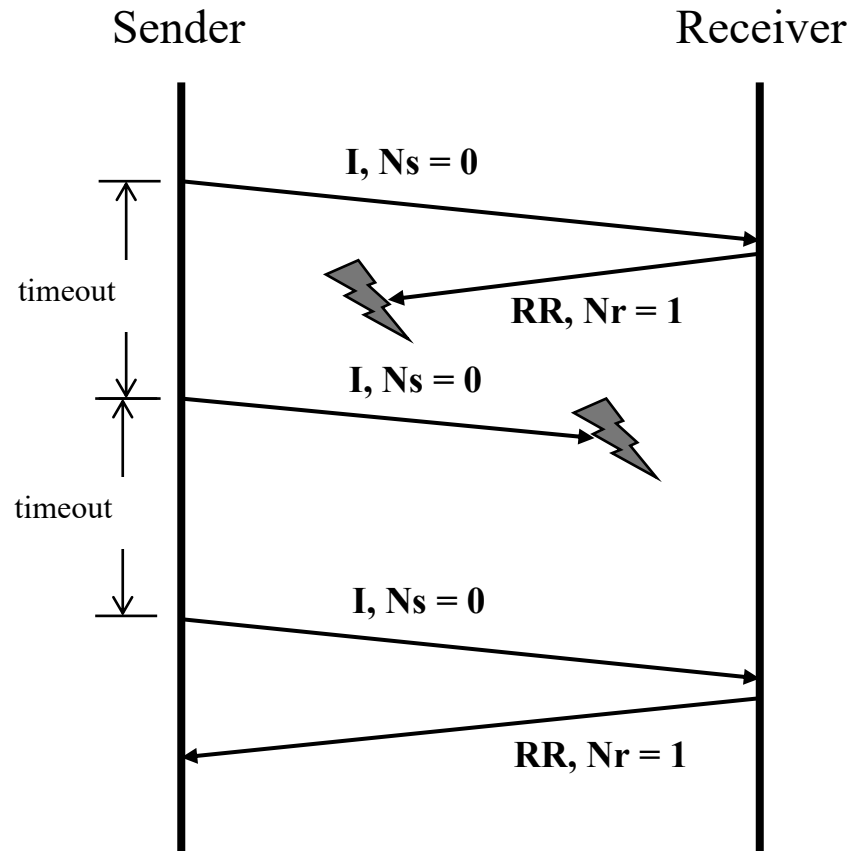
# *Phases of the Data Link Protocol*

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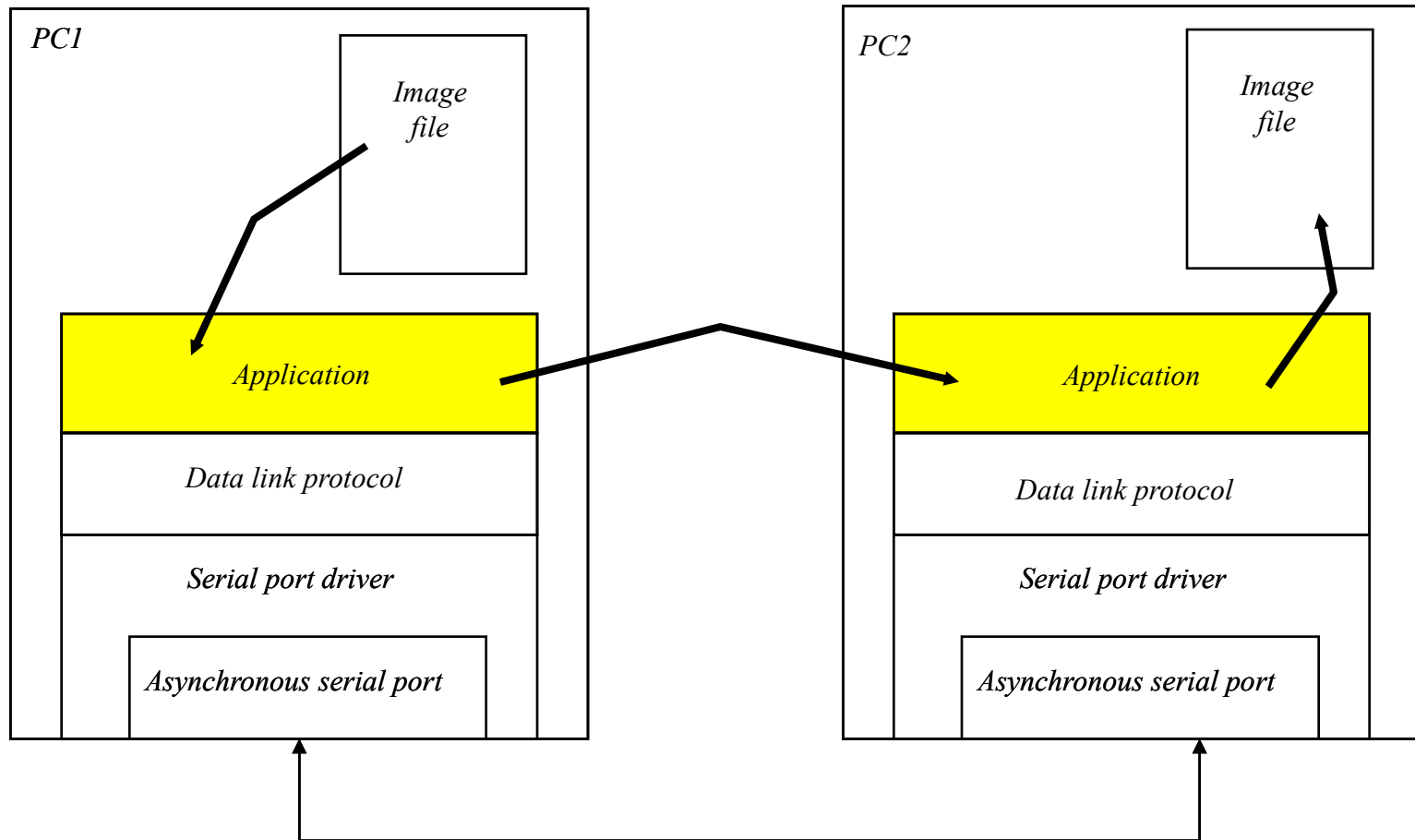
## *Data transfer – Retransmissions*

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# Application

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## *Application*

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- Simple application protocol for transferring a file
- The application uses two types of data packets
  - » Packets to indicate the start and end of the file transfer
  - » Packets containing fragments of the file

## *Evaluation elements*

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- Data link protocol
- Application protocol
- Code organization
- Demonstration
- Quiz
- Report (with characterization of protocol efficiency)
- Penalties
  - » Delays in demonstration and/or report delivery

# *Specifications*

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- Available in Moodle:
  - » Details about protocols, message formats, APIs
  - » Base code