# Test-Driven Development - Unity

SETR 24/25
Lab assignment 2

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# Assignment description (1)

**Goal: implement a C module that processes commands received via UART, one character at a time. The module is part of a smart sensor that allows to read temperature (-50ºC … 60ºC), relative humidity (0...100%) and $CO_2$ (400 … 20000 ppm).**

**Specifications:**

- Command structure:
  - **# CMD DATA CS !**
    - **#**: one byte, Start of Frame symbol
    - **!**: one byte, End of Frame symbol
    - **CMD**: one byte, command indication
    - **DATA**: variable size, command arguments
    - **CS**: one byte, checksum. Sum of numerical value of CMD and DATA[i] bytes
  - All communications in ASCII. E.g. if the temperature is +25ºC, the corresponding bytes are 43 ('+'), 50 ('2') and 53 ('5'). This way it will be possible to fully interact with the sensor via a terminal.

# Assignment description (2)

**Specifications (cont):**

- Supported commands:
  - **A:** reads the real-time values of the variables provided by the sensor
  - **P:** reads the real-time value of one of the sensors
  - **L:** returns the last 20 samples of each variable
  - **R:** resets the history

- Sensor emulation:
  - Since no sensor is used, the sensors' outputs shall be emulated. It is up to you to select a strategy, but note that random values (alone, at least) are not a good approach (why?).

# Assignment description (3)

**Work to carry out:**

1. Complete the protocol specification
2. Implement the code.
3. Define a set of tests
4. Implement the tests using Unity
5. Fix the bugs
6. Repeat steps 2 to 5 while necessary
7. Add missing functionality (if any) and validate it

- **Deliverables**:
  - Zip file with source code, test code and a makefile. A simple “make” command at the terminal should execute the tests.
  - Short report (3-4 pages) containing a cover page (identification of the group and assignment) and 2-3 pages of text describing the full protocol, functionality implemented and the rationale of the tests carried out.