

# Bachelor in Electronic Engineering

Hardware Engineering:

Hardware Engineering Lab

Exercise 5

02.06.2022

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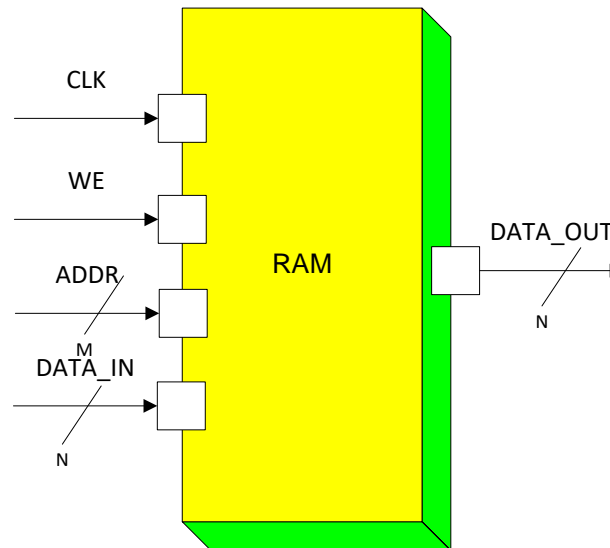
Room: L4.2-E02-370

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- ▶ Design the schematics of the Arduino board introduced in the lecture.
- ▶ Design the PCB-layout of the board using according to the instructions in the lecture.
  
- ▶ Note: Use the following tutorials:
  - ▶ <https://learn.sparkfun.com/tutorials/using-eagle-schematic>
  - ▶ <https://learn.sparkfun.com/tutorials/using-eagle-board-layout>

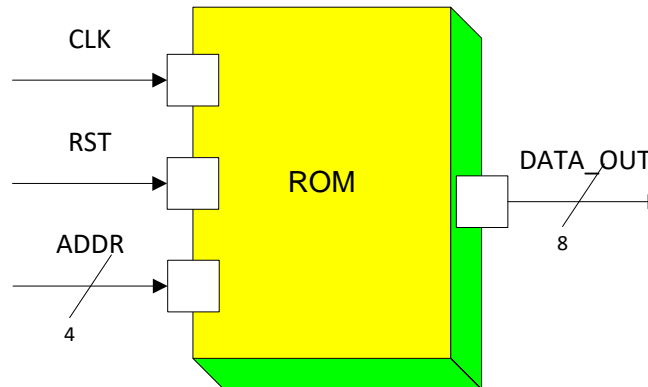
- ▶ Model the FSM of a 2-bit up and down counter.
- ▶ Design the VHDL model of your FSM using three-process-method.
- ▶ Write a suitable testbench to simulate the behavior of the circuit.

- Design a VHDL model of a RAM memory according to the following specification:



- Write a testbench for your model for the case of  $N = 8$  and  $M = 4$ .

- Design a VHDL model of a ROM memory according to the following specification:



- Write a testbench for your model.

**Thank you for your attention.**

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