Universität Stuttgart
Institut für Steuerungstechnik der Werkzeugmaschinen und Fertigungseinrichtungen

MEDIS – Module 2

Microcontroller based systems for controlling industrial processes

Lab 3.1: Digital I/O

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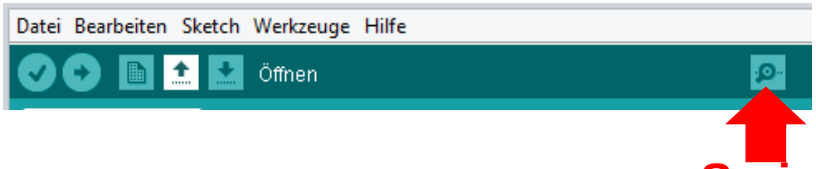
Aims of the lab

- Learn digital I/O-system of microcontroller
- Program digital I/O-system of microcontroller
- Use simulation system
- Build up simple electric circuits

Work orders

1. Write a sketch that reads a push button and presents the result to the serial monitor.



2. Check what happens if you read an input pin without wiring it.
3. Check the processing time of the function digitalRead() and digitalWrite(). Use the function millis() and/or micros() from the Arduino core library. Make a table which shows your results.

Work orders

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4. Use the simulation system of the water tank and automate it with the following function:
   Start the tank system with a push on a button.
   Empty the tank at first. Signal the empty tank to the user (via Serial Monitor).
   Another push on the button starts the filling procedure: fill the tank till filling level 2. If filling level 1 is reached start the mixer. After reaching filling level 2, the mixer stops and the tank is emptied.
   The user can now start another filling procedure.
   If the user pushes the button during the filling procedure, the tank is emptied immediately.

Conclusion

1. Know the programming of digital I/O-System
2. Know the usage of the simulation environment
3. Know the wiring of simple circuits