



FAKULTÄT
FÜR INFORMATIK

Faculty of Informatics

182.694 Microcontroller VU

FAKULTÄT FÜR **INFORMATIK**

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SS 2017

Featuring Today:
Recitation for Make-Up Exam

Registration for the Exam

- Do not forget to register for the exam, until Thursday 12:00, in myTI!
- You only need to register for the theory exam, the registration for the practical exam will be done automatically by us.
- The whole exam will last 2 hours.

There are enough slots for everyone,...

...but myTI will keep the number of slots as small as possible:
A new slot will only open when the previous one is full.

The screenshot shows a web interface for course management. At the top, there are tabs for 'Courses', 'Microcontroller VU', 'Dates', and 'Theory Exam 1'. The 'Theory Exam 1' tab is active, displaying the following information:

- Enrolment:** Enrolment is valid for both the theory exam and the practical exam. The exam duration is 2 hours.
- General:**
 - Date:** 2016-04-08 10:00 - 10:30
 - Type:** exam (written)
 - Use Time Slots:**
- Grading:**
 - Grading Type:** points
 - Maximum Points:** 12
- Enrolment:** You are already enrolled to this date. Enrolments can be cancelled until 2016-04-07 12:00.

At the bottom right of the exam details, there is a button labeled 'unenrol' with a plus sign icon.

Figure: Your Exam start-time. Please be sure to check to current exam, and not the previous ones!

Toilets/WC

While there is a toilet in the lab, we highly recommend to use the public toilets before the exam.

It is your working time.

- ① Be at the glass door in front of the lab **before** your timeslot starts!
- ② Keep your student-ID ready. We will check it multiple times!
- ③ A supervisor will fetch you there and bring you to the theory exam.
- ④ You will have approx. 25 minutes for the theory exam.
- ⑤ After that, a supervisor will bring you to the seminar room. There you will receive the exam paper with the task descriptions and have approx. 25 minutes of preparation time for the practical exam.
Please wait close to the building door, the group before you has to use the stairs!
- ⑥ Then a supervisor will bring you back to the lab for the practical exam (approx. 50 minutes working time, there will be a clock on the big screens in the lab).
The supervisor will assign you to a PC!
- ⑦ After you finished the practical exam you are only allowed to leave the room iff the supervisor **allows it!**

Cheating will not be tolerated!

- Usage of mobile phones/smart watches is forbidden until you leave the lab, i.e., throughout the entire exam!
- Talking to your colleague is **not allowed**.
- You are **not allowed** to use your own notes, paper, calculator, . . . during the exam.
 - Everything you need is provided by us.
 - You can, of course, use your own pen and bring something to drink.
 - If you need a dictionary, you can use one.

We will provide you with the following material during the ...

- theory exam and the preparation time: everybody will have a printed version of
 - BigAVR6 Schematic,
 - AVR Instruction Set Manual,
 - Atmega1280 Manual,
 - avr-libc Reference Manual, and
 - a simple calculator.
- practical exam: you have to share the printed version of the above manuals with a colleague, but the digital versions are available to you. Additionally, the digital version of “TinyOS Programming” is available to you.
- There will be **no** oscilloscope available during the test! But you can still use LEDs to debug your program.

- The questions are in English only!
- 8 questions/statements with 3 answers/statements each.
- Every answer can be checked either true or false.
 - If you checked correctly, you get 0.5 point.
 - If you checked incorrectly, you get -0.5 point.
 - You may also not check true or false (provide no answer), then you get 0 points.
- The grading is done cumulative, i.e., you can get between -1.5 and 1.5 points for a questions.
- Positive and negative points will be considered for the total points. But we will cap a negative total to 0 points.

What will be asked in the Theory Exam?

What will be asked

We will ask you questions about the microcontroller, C example code (similar to the 2nd exam), about our lab environment (avr-libc, ...), TinyOS, the lecture script, and the lecture slides.

What will not be asked

Details about ASM code.

What will come in the Practical Exam?

First Task

- Callback (function pointers!)
- Timer/ADC/...

Second Task

- Wiring
- Important TinyOS programming techniques.
- Partial Points:
 - 2.5pts for a correct wiring.
 - 2.5pts for a correct implementation.

Checker

There will be a tool linked in your applications which checks if you have only touched registers that need to be touched AND that you have only modified bits that need to be modified!

There will be one of the following outputs on the LCD

- Registers OK
- too many 1/0
- too many 1
- too many 0

The “too many” mean that, in all monitored registers, some bits are set incorrectly, and the majority of the wrong bit have the mentioned value. There is no information which register or bits are incorrect!

Warning

If your solution does not get an OK from that tool, your solution is considered incorrect \Rightarrow no points!

Default values

You **cannot** assume that any bit is in its default value!

You **have** to (re)set every bit you need on a certain value.

Guide

We provide a guide on the homepage which lists a few registers/control-bits which will be monitored. This guide is located in the Misc subdirectory.

Calculations

Use defines if you need to calculate some values.

Add parentheses, errors due to operator precedence are annoying and hard to find!

Timer values

We will check that you have the correct timer values (checker). Check that you understand how the values are calculated!

The values need to be exact!

Be sure to understand what the formulas calculate!

Pitfalls and Hints

avr-libc

The avr-libc is comprehensive. There are many helper functions defined (e.g., baudrate), and attributes available, which can help you implement the solution.

Check the hardware

This time you may need to set up some wiring on your own!

The supervisors may not have the time to check if every boards is set to the default settings!
Check the jumpers and switches!

Knowledge of Components

There are other components/modes of the microcontroller which have not been part of Application 1/2, but were used in the weekly training objectives and thus can be part of the exam!

Returning the Lab kit

The Lab kit can be returned to our technician (Mr. Odebrecht) on Mon – Tue, 09:00 – 12:00 and Wed – Thu, 13:00 – 16:00, until July, 4.

Furthermore, there will be special office hours on June, 30 while the exam is conducted. If the board is in working condition, you will receive your €100 security deposit back.

Application 2 and Outlook

- There were 24 submissions.
- We plan to finish the corrections mid July.
- For a viewing, just drop us an e-mail. Please, include some dates which work for you!
- The certificates will be issued about 2 weeks after the grades have been announced.

- We are interested in your feedback!
- We would be happy if you could return our questionnaire to us!
- The course evaluation in TISS is open until the 14.7.
- You can also write us an E-Mail or send a (anonymous) feedback over TISS at any time!

Questions?