

ELT-21306 Microcontrollers

I/III Exam 3.5.2019 Lecturer: Jukka Vanhala

Answer either in English or in Finnish.

1. Explain shortly the following terms. No need for long stories (0,5p/term)
 - ALU
 - .h -file
 - Layout
 - Sleep-mode
 - Register
 - Input capture
 - Simulator
 - Prescaler
 - Via
 - Polling
 - Embedded system
 - AD-converter reference
2. Short essay (i.e. not a list of bullet points) on the subject: The phases of the design and implementation of an embedded system (system with about the complexity of the course project). Good approximate length for the answer is about two pages of text + figures. (6p)
3. Design at a high level a device, which uses a microcontroller to read a value from a potentiometer and lights up a corresponding number of LEDs of a LED bar (array of LEDs). Design and write a program, which reads the value using an AD-converter and lights up the LEDs. Then the controller waits in a sleep mode a while before a new cycle. Describe the structure of the program as a block diagram. Explain the initialization of each functional block. Write the pseudo code. More important are the overall structure of the program and the explaining comments than details of the code (like register names or the syntax of the c-code). (6p)
4. Extra question: How this course should be developed? Very good answers here will give one extra point. (1p)