Poul Vaeggemose : IT-CAO1X-A20, 26.08.2020.

Lections	Date	Teori	Exercises/Assignments
L1	31/08	Boolean Logic and Boolean arithmetic and breadboard – Boolean values – Boolean operations – Truth table and Boolean functions – Boolean algebra – Binary numbers – Breadboard – Exercise	Falstadt logic circuit simulator http://www.falstad.com/circuit/ Falstadt simulation http://tinyurl.com/y6txyf9t Resistor color code https://www.electronics-tutorials.ws/resistor/res_2.html Breadboard with SN74HCT00N gate http://www.ti.com/lit/ds/symlink/sn74hct00.pdf Exercise: Boolean Logics (NAND gates, OR gate and XOR gate)
L2	7/9	Boolean Arithmetic and ALU – Convert truth-table to function and visa versa – Reducing boolean functions – Half adder – Full adder – Multibit adder – Multiplexer and demultiplexer – The Arithmetic Logic Unit (ALU) – Exercise	Falstadt simulation http://tinyurl.com/y2o7tdex Falstadt simulation http://tinyurl.com/y3brwtf4 Watch this video https://www.youtube.com/watch?v=0as464WmfCo Exercise: Boolean Aritmetic
L3	14/9	Sequential logic – Time independent Logic – Clock – Flipflop – 1-bit register – Memory units – Big Endian and Little Endian	Falstadt logic circuit simulator http://tinyurl.com/yxkd8mj7 View CPU animation http://courses.cs.vt.edu/~csonline/MachineArchitecture/Lessons/CPU/ Exercise: Sequential logic

		– Counters – Exercise	
L4	21/09	Boolean Arithmetic and ALU – CPU - ALU - Registers - Program - Counter - Control unit – CPU cycle – Computer Architecture – Instruction set – Hand in	How CPU works (example Scott CPU) https://www.youtube.com/watch?v=cNN_tTXABUA Mandatory assignment 1: Boolean Arithmetic and Sequential Logics knowledge Hand-in date: 30.09.2019 at 23:45 o'clock
L5	28/09	Machine language (assembly language) – Computer Architecture – Instruction set is limited – Computers are flexible – Assembly language – Exercise	ATmega2560 instruction set Assembly language to binary code Assembly code Watch this video https://www.youtube.com/watch?v=zltgXvg6r3k
L6	05/10	AVR introduction – The general purpose registers of the CPU – Data memory – Data memory instructions – IN and OUT – Status register (flags) – Data formats – Assembly language	Exercises from book Install and run Atmel Studio Connect Arduino 2560 board to PC and to LED Programming Arduino with Atmel Studio Turn on LED's connected to 2560 board port A0 Exercise: Machine Language
	Week 42 vacation		

L7	19/10	Branch, Call and time delay Loop – Branch – Looping – Call – Call vs Jump – Execution time – Time delay	Make LED's blink with 1 Hz Make the external LED blink with 0.1 Hz Exercise: Branch, Call and Time Delay
L8	26/10	Pin, Port, Bit manipulation, Calculations – PIN and PORT – I/O Port programming – Bit manipulation – Calculations – 1's and 2's complement – Multiplications – Hand-in	Read switch value (take care of the switch prel) **Mandatory assignment 2:** **AVR architecture knowledge,** **LED 10 Hz blink frequency,** **Add 2 values and send result to port B** **Hand-in date: 10.11.2019 at 23:45 o'clock**
L9	2/11	VIA calling convention - Call setup - Call Site - Saving working registers - Retrieving input values - Implementing function body - Saving output value - Restoring working register - Return from function - Retrieving output value	Exercise: VIA calling convention
L10	9/11	Floating Point motivation The word is Not just Inters Floating-Point Numbers Floating-Point Representation	Exercise 10

		IEEE 754 Floating-Point standard Normalized Floating-Point Biased Exponent Representation Single Precision Float Double Precision Float Largest Normalized Float Smallest Normalized Float Zero, Infinity and Not a Number Rounding Examples	
L11	16/11	Practice makes perfect	Exam exercise
L12	23/11	Review session	Syllabus repetition

Editor: POV@VIA.DK