**Week 8 - Embedded programming**

**Group Assignment**

Compare the performance and development workflows for other architectures

Individual assignment

read a microcontroller data sheet

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**---Description---**

I will use attiny 44A for my fab ISP but I will try to compare all of the attiny 44,45,84,85 and the atmega328p that we already have in the FabLab

**---Misconceptions---**

An integrated circuit (IC) doesn’t necessarily means a microcontroller (MCU) an IC may be a voltage regulator or an signal amplifier.

**----SLANG----**

\*VCC, VDC---Voltage on continuos current or voltage on direct current

\*GND--- Ground

\*ADC---Analog to digital converter

\*SOIC--- Small Outline Integrated Circuit

\*PDIP---Dual In-line Package

\*QFN--- Quad Flat No-leads package

\*TQFP---Quad Flat Package

\*AREF---Analog reference

\*PCINT--- Pin Change INTerrupt

\*CLK---CLocK (internal oscillator of the MCU)

\*SCL,SCK--- Serial clock but one is for SPI communication and the other for I2C communication.

\*XTAL1,XTAL2---- Crystal (external component to make more accurate time/count measurements)

\*AIN--- Analog input

\*MOSI--- Master Out Slave In (for SPI communication)

\*MISO---Mater In Slave Out(for SPI communication)

\*TX--- transmitter (for USART communication)

\*RX---receiver (for USART communication)

\*SDA--- Signal Data (for I2C communication)

\*PWM--- pulse width modulation

\*TOSC1,TOSC2---Timer Oscillator

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IC | Programmable Flash Memory | EEPROM / SRAM | 8 bit Timer / Counter | 16 bit Timer / Counter | PWM channels | High frecc pwm channels | 10 bit  ADC | SPI compatible | I2C compatible | USART compatible |
|  | Byte | Bytes | pin | pin | pin | pin | pin |  | | |
| Attiny44 | 4k | 256 | 1 | 1 | 4 | 0 | 8 | X | X |  |
| Attiny84 | 8k | 512 | 1 | 1 | 4 | 0 | 8 | X | X |  |
| Attiny45 | 4k | 256 | 1 | 0 | 2 | 2 | 4 | X | X |  |
| Attiny85 | 8k | 512 | 1 | 0 | 2 | 2 | 4 | X | X |  |
| Atmega328P | 32k | 1k | 2 | 1 | 6 | 0 | 6 | X | X | X |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

**---References---**

**---Where to buy?---**

Attiny 44

<https://www.digikey.com.mx/products/es?keywords=attiny44a-ssfrct>

Attiny 45

<https://www.digikey.com.mx/product-detail/es/microchip-technology/ATTINY45-20SU/ATTINY45-20SU-ND/735466?utm_source=FindChips&utm_medium=buyNow>

Attiny 84

<https://www.digikey.com.mx/products/es?keywords=ATTINY84A-SSFRCT>

Attiny 85

<https://www.digikey.com.mx/product-detail/es/microchip-technology/ATTINY85-20SU/ATTINY85-20SU-ND/735470>

Atmega 328p

<https://www.digikey.com.mx/products/es?keywords=ATMEGA328P-ANRCT>

**---Datasheet---**

Attiny 44

<http://ww1.microchip.com/downloads/en/DeviceDoc/doc8183.pdf>

Attiny45

<http://ww1.microchip.com/downloads/en/DeviceDoc/Atmel-2586-AVR-8-bit-Microcontroller-ATtiny25-ATtiny45-ATtiny85_Datasheet.pdf>

Attiny 84

<http://ww1.microchip.com/downloads/en/DeviceDoc/doc8183.pdf>

Attiny 85

<http://ww1.microchip.com/downloads/en/DeviceDoc/Atmel-2586-AVR-8-bit-Microcontroller-ATtiny25-ATtiny45-ATtiny85_Datasheet.pdf>

Atmega328p

<http://ww1.microchip.com/downloads/en/DeviceDoc/ATmega48A-PA-88A-PA-168A-PA-328-P-DS-DS40002061A.pdf>

**---SLANG----**

Quad Flat Package

<https://es.wikipedia.org/wiki/Quad_Flat_Package>

Quad Flat No-leads package

<https://en.wikipedia.org/wiki/Quad_Flat_No-leads_package>

Small outline integrated circuit

<https://en.wikipedia.org/wiki/Small_outline_integrated_circuit>

Dual in-line package

<https://es.wikipedia.org/wiki/Dual_in-line_package>

Microcontroller

<https://en.wikipedia.org/wiki/Microcontroller>

PCINT vs. INT

<https://www.avrfreaks.net/forum/whats-functional-difference-between-int-and-pcint>

SLC vs. SCK

<https://www.reddit.com/r/AskElectronics/comments/8g21wf/what_is_the_difference_between_scl_and_sck/>

OC0A,OC1A

<https://electronics.stackexchange.com/questions/92297/toggle-oc1a-oc1b-and-oc1c-using-timer-in-ctc-mode>

what is an analog input?

<https://labjack.com/support/faq/what-is-analog-input>

SPI communication

<https://es.wikipedia.org/wiki/Serial_Peripheral_Interface>

I2C communication

[https://es.wikipedia.org/wiki/I%C2%B2C](https://es.wikipedia.org/wiki/I%25C2%25B2C)

UART comunication

<https://cursos.mcielectronics.cl/2019/06/18/senales-tx-y-rx/>