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EMBEDDED SYSTEMS



EMPOWERING INTELLIGENCE AT THE EDGE



INTRODUCTION

Definition

a specialized computer system designed to perform a specific task within a larger device or system.



Computer System

Processor

Memory

I/O peripherals

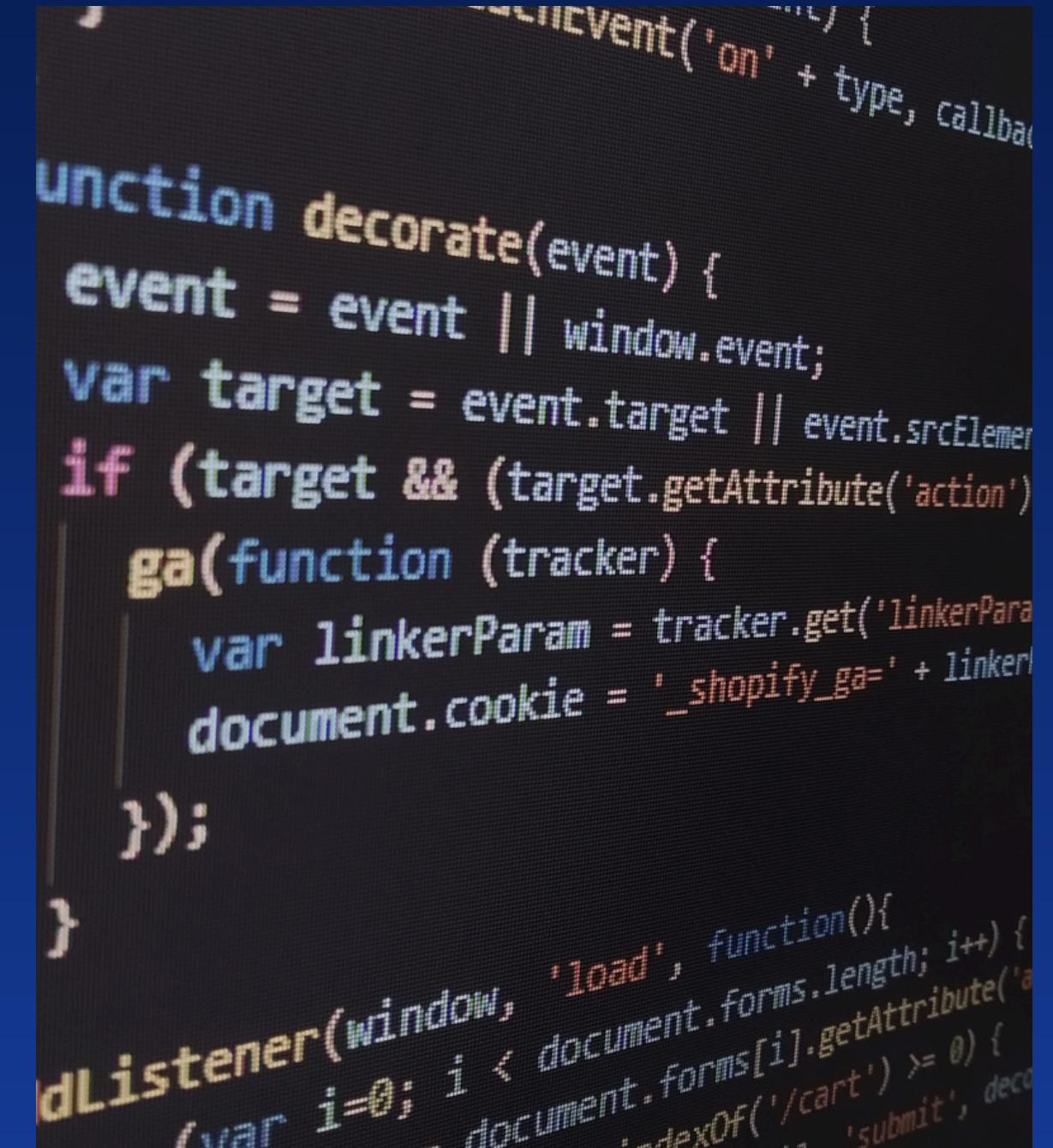
EMBEDDED SYSTEMS PRE-REQUISITES

Bascis of Digital logic & Electronics

Familiarity to Arduino

Programming (C language)

Microcontroller/
Microprocessor
Concepts



```
function decorate(event) {
  event = event || window.event;
  var target = event.target || event.srcElement;
  if (target && (target.getAttribute('action') === 'POST')) {
    ga(function (tracker) {
      var linkerParam = tracker.get('linkerParam');
      document.cookie = '_shopify_ga=' + linkerParam;
    });
  }
}

window.addEventListener('load', function(){
  for (var i=0; i < document.forms.length; i++) {
    if (document.forms[i].getAttribute('action') === 'POST' && document.forms[i].indexOf('/cart') >= 0) {
      document.forms[i].submit();
    }
  }
});
```



CORE PRINCIPLES



ES Concepts

MCU Fundamentals

MCU Interrupts

Interfacing

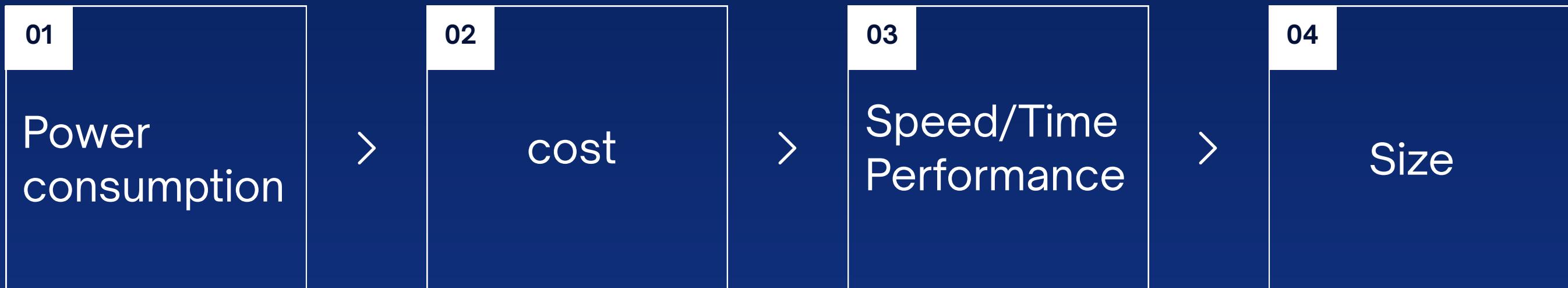
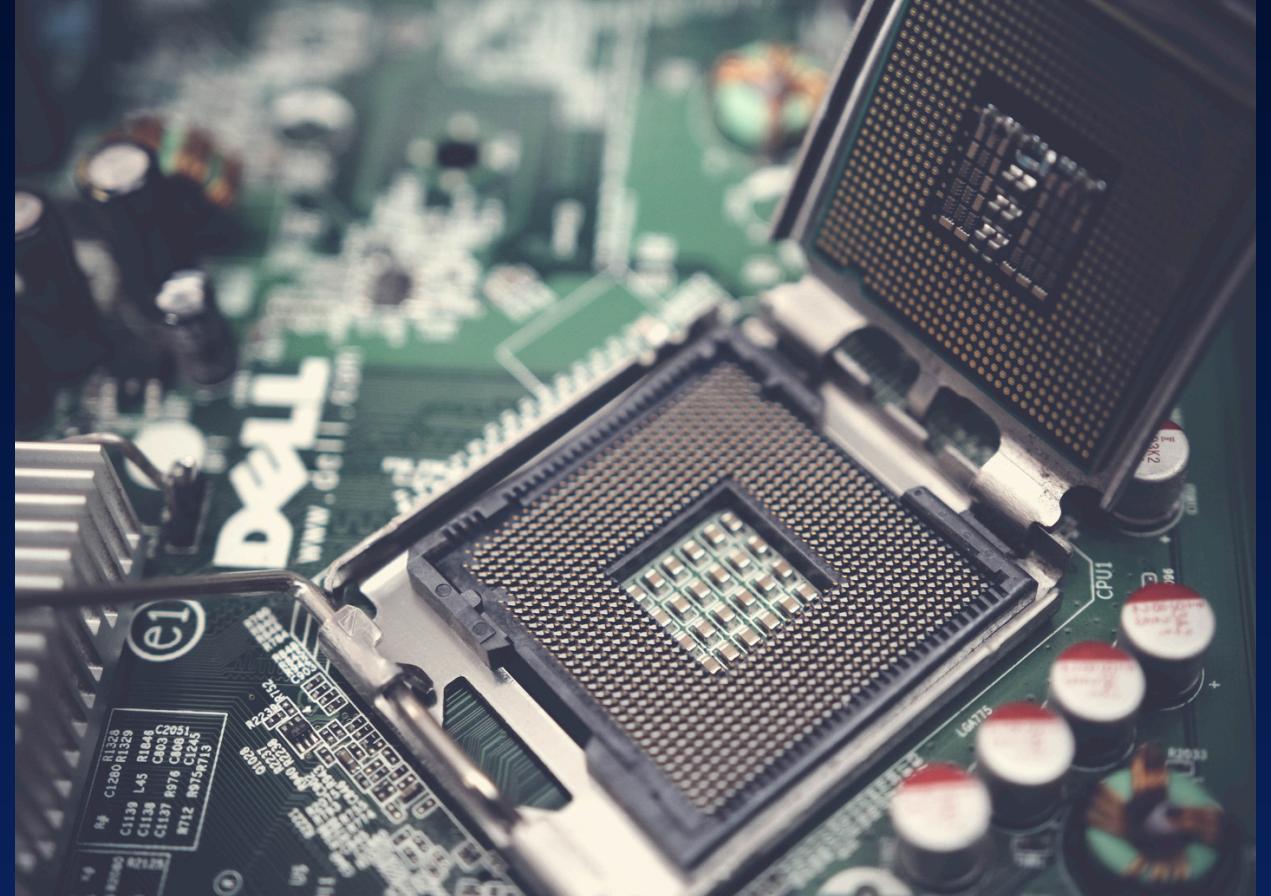
Communication
Protocols

RTOS

Testing



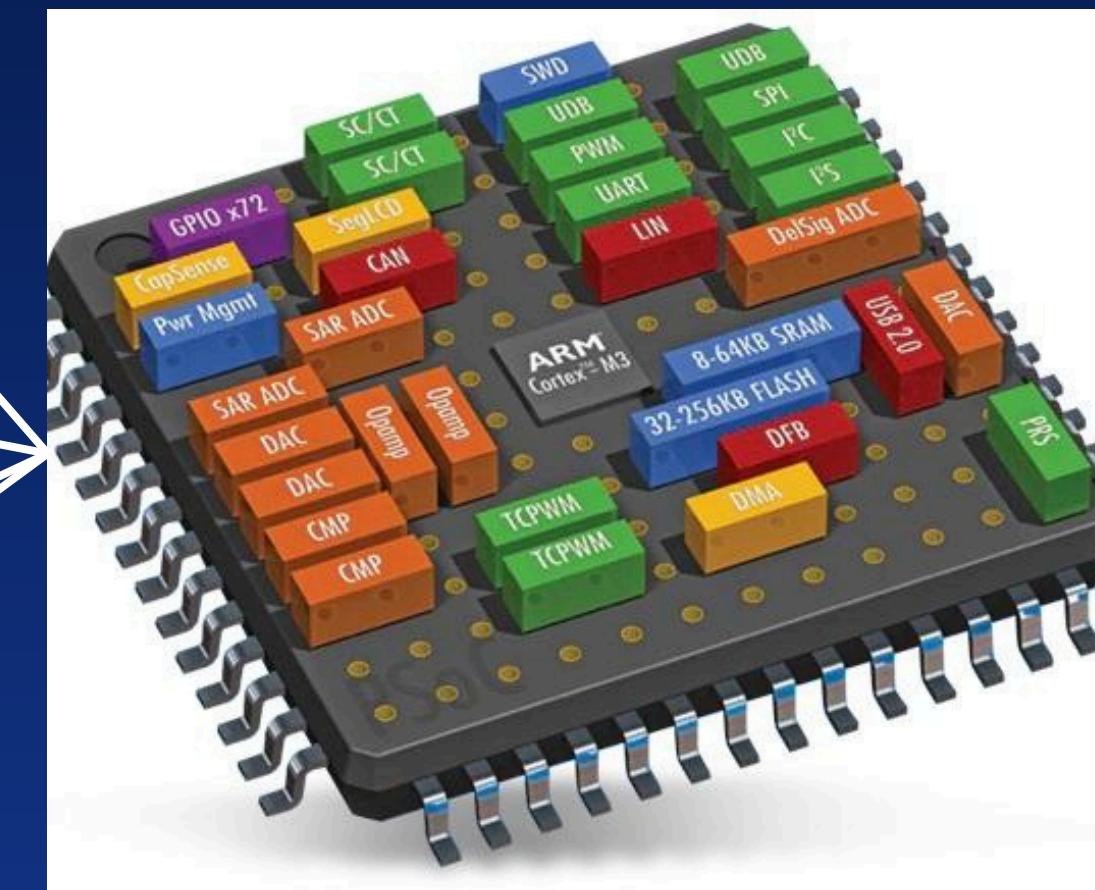
EMBEDDED SYSTEM CONSTRAINTS



SOB



SOC



Power consumption

cost

Speed/Time Performance

Size

Configurability



ALU

Arithmetic Logic Unit
(Instruction execution)

CU

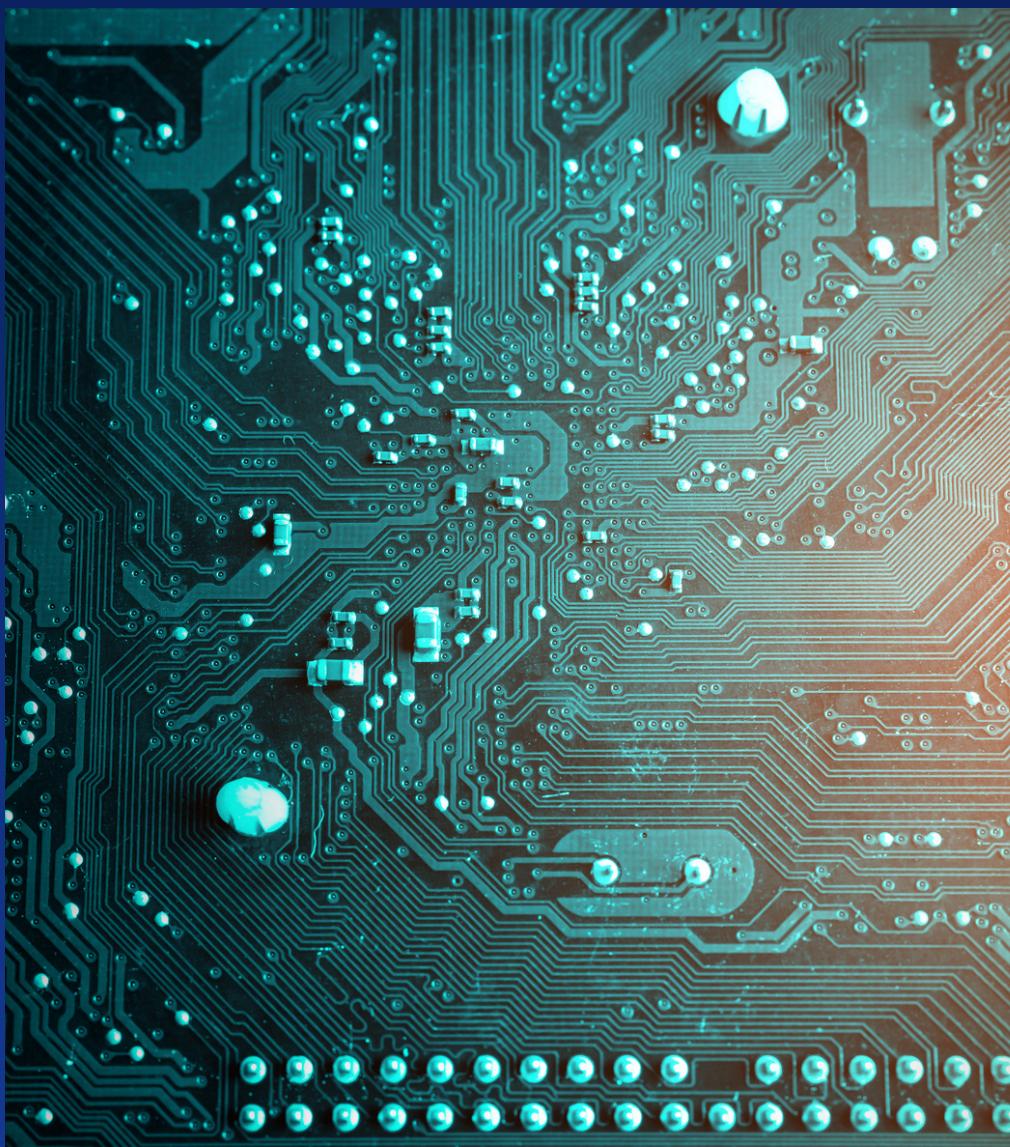
Control Unit
(Instruction fetch
& decode)

Reg. Files

Register Files

PROCESSOR

INSTRUCTION SET ARCHITECTURE



RISC

Hard-wired



CISC

Memory-mapped

REGISTER FILE

GPR

Data storage
(Temporary)

SR / FR

Program Counter

Stack Pointer

Instruction Register



MEMORY

consists of
locations (bits)

Memory word
might be 8-bit,
16, 32, 64 or
either



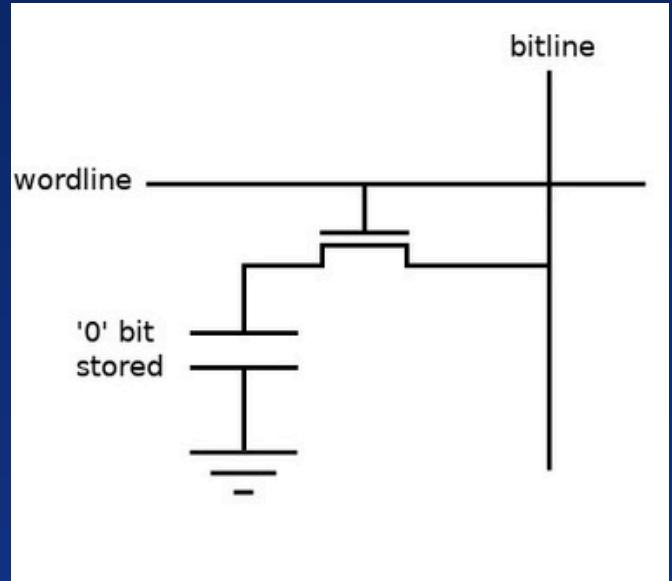
Volatile (RAM)

Non-volatile
(ROM)

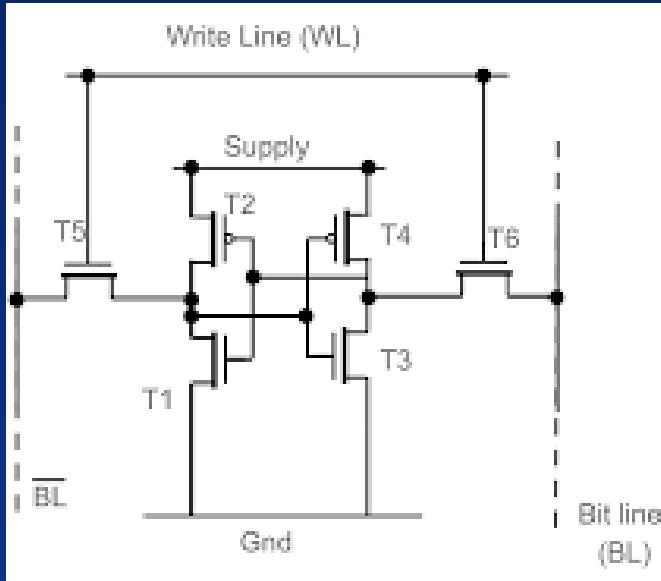
Hybrid

RAM

DRAM

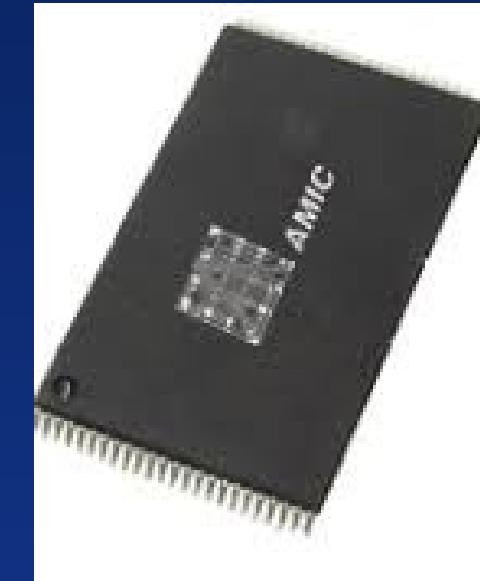


SRAM

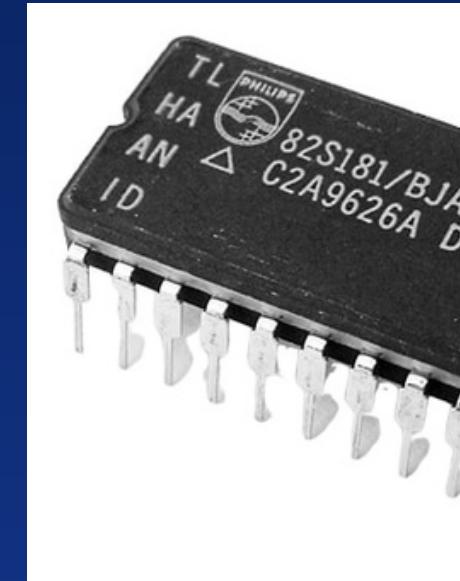


ROM

MPR



PROM

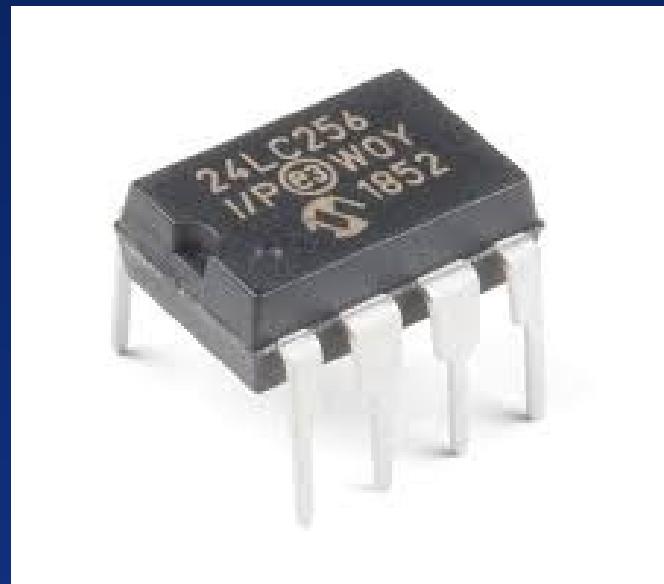


EPROM

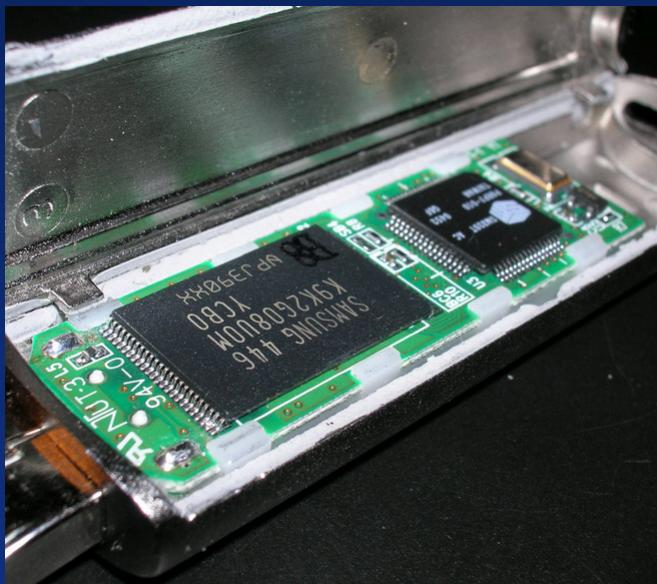


HYBRID

EEPROM



FLASH



NVRAM





THANK YOU

