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Assignment: 1

Different microcontroller families, brands, And Comparison between the pic16f877 microcontroller and tm4c123f microcontroller

- **Different Microcontrollers Families and brands**

    1. **AVR Family (Atmel/Microchip):**

        There architecture is 8-Bit RISC and they are produced by Atmel Corporation. They are widely used in hobbyist and industrial applications. As their popularity in their low power consumption, high performance, and ease of use.

    2. **PIC Family (Microchip Technology):**

        There architecture is 8-bit, 16-bit, and 32-bit versions, they are produced by Microchip Technology and are used in a wide range of applications, including automotive, industrial, and medical. They are known for their low cost, low power consumption, and ease of use.

    3. **ARM Cortex-M Family (ARM Holdings):**

        There architecture is ARM 32-bit ARM Cortex-M cores, they are produced by ARM Holdings and are widely used in mobile devices, embedded systems, and other applications. They are known for their

high performance, low power consumption, and versatility.

4. **STM32 Series (STMicroelectronics):**

   There architecture is ARM Cortex-M cores (32-bit), they are produced by STMicroelectronics and are used in a wide range of applications, including industrial automation, consumer electronics, and automotive. They are known for their high performance, low power consumption, and extensive range of peripherals.

5. **MSP430 Series (Texas Instruments):**

   There architecture is 16-bit RISC, they are produced by Texas Instruments and are used in a wide range of applications, including portable devices, medical equipment, and industrial automation. They are known for their low power consumption and high performance.

6. **NXP LPC Series (NXP Semiconductors):**

There architecture is 32-bit ARM Cortex-M cores, they are produced by NXP Semiconductors. These microcontrollers are widely used in applications such as consumer electronics, automotive systems, and industrial automation. They are known for their efficiency, high performance, and a strong balance between power consumption and processing capabilities, making them ideal for both low-power and high-demand applications.

7. **8051 microcontrollers**:

The 8051 microcontrollers are based on an 8-bit architecture and were originally developed by Intel. These microcontrollers are commonly used in embedded systems such as home appliances, automotive systems, and industrial control systems. They are known for their simplicity, robustness, and widespread availability, making them a popular choice for basic control applications. The 8051 architectures have been

adapted by various manufacturers over the years, providing flexibility and extended functionality for diverse uses.

- **Comparison between the pic16f877 and tm4c123f:**

Property	pic16f877	tm4c123f
RAM	368 Bytes	32 KB
Flash Memory	14 KB	256 KB
Interrupts	up to 15 interrupt sources with basic interrupt system	Nested Vectored Interrupt Controller (NVIC) supports up to 78 interrupts
Architecture	8-bit RISC	32-bit ARM Cortex-M4
Power Consumption	Very Low	Higher, with low power modes
Peripherals	**ADC:** 10-bit, 8 channels **PWM**: 2 channels **Communication Interfaces**: 1x SPI, 1xI2C, 1x USART **Digital I/O**: 33pins	**ADC**: 12-bit, up to 12 channels **PWM**: 6 channels **Communication Interfaces**: Multiple (e.g., 4x UART, 2x I2C, 2x SPI, USB) **Digital I/O**: Up to 43 pins
Applications	Simple control systems, appliances	real-time control systems and complex embedded applications