



Assignment 1

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B.No: 7

A. Different Microcontroller Families and Brands:

1. AVR

- **Brand:** Atmel Corporation
- **Architecture:** 8-bit RISC, Harvard architecture
- **Common Series:** ATmega, ATtiny, ATxmega
- **Features:**
 - Internal, self-programmable instruction flash memory up to 256 KB
 - On-chip debugging support through JTAG or debugWIRE
 - Multiple power-saving sleep modes
 - Supports USB and Ethernet
 - Has SPI and I2C interfaces

2. PIC

- **Brand:** microchip technology
- **Architecture:** 8-bit, 16-bit, 32-bit RISC, Harvard architecture
- **Common Series:** PIC10, PIC12, PIC16
- **Features:**
 - Flash memory, SRAM and EEPROM
 - Low Cost
 - Sleep mode
 - Low power consumption
 - Watchdog timer

3. MSP430

- **Brand:** Texas instrument
- **Architecture:** 16-bit RISC, von-Neumann architecture
- **Common Series:** MSP430G2, MSP430F5
- **Features:**
 - Low power consumption
 - Wide range of integrated peripherals

4. ESP32

- **Brand:** Espressif Systems
- **Architecture:** 32-bit RISC
- **Common Series:** ESP32-S2, ESP32-S3
- **Features:**
 - Integrated Wi-Fi and Bluetooth
 - Low power consumption
 - Peripheral interfaces (I2C and SPI)
 - Security

5. RX

- **Brand:** Renesas Electronics
- **Architecture:** 32-bit CISC, Harvard architecture
- **Common Series:** RX100, RX200, RX600
- **Features:**
 - Excellent Power Efficiency
 - high-speed flash memory
 - Fast Interrupt Response Performance
 - Better Code Efficiency
 - Comprehensive Peripheral Functions (USB and Ethernet)
 - Hardware Safety Functions

6. STM32

- **Brand:** STMicroelectronics
- **Architecture:** 32-bit ARM Cortex-M
- **Common Series:** STM32F0, STM32F1, STM32L4
- **Features:**
 - Real-time performance
 - Low power consumption
 - Advanced, innovative peripherals
 - Optimized integration

B. Cortex-M4 vs PIC16F877A:

Property	Cortex-M4	PIC16F877A
Architecture	A 32-bit microcontroller with ARMv7E-M architecture	An 8-bit microcontroller with a simpler RISC architecture
Memory	Has more memory	Limited to 368 bytes of RAM and 8K words of Flash
Peripherals	Has Rich set of peripherals including (CAN, USB) and more GPIO pins	Has essential peripherals including ADC, USART, SPI, and I2C
Power efficiency	Advanced power management features with multiple sleep modes	Low power consumption with basic power-saving modes
Usage	Designed for complex computations and real-time applications.	Designed for less computationally tasks.

C. References:

- [AVR microcontrollers - Wikipedia](#)
- [PIC microcontrollers - Wikipedia](#)
- [MSP430 Ultra-Low-Power Microcontrollers Brochure 2H 2006 \(Rev. L\)](#)
- [ESP32 - Wikipedia](#)
- [RX 32-Bit MCUs Family Features | Renesas](#)
- [Releasing your creativity Discover the STM32 family of microcontrollers & microprocessors](#)