Polytechnic University of the Philippines

Paranaque Campus

Bachelor of Science in Computer Engineering

Case Study 1:

Microprocessors vs. Microcontrollers

CMPE 30184

Microprocessors

Submitted to:

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Executive Summary

Embedded microcontrollers and microprocessors are now commonplace. Due to their vast range of applications, which range from little toys to deep space devices, they are rapidly gaining popularity. Most of the electronic systems are centred on embedded systems with microprocessors, microcontrollers and sensors. Millions of devices that are connected in the IoT environment are also embedded with a microcontroller/microprocessor. The performance of these embedded systems are greatly defined by the digital data processing capability of the microprocessors. Hence, it is very important to emphasize the importance of Microprocessors and microcontrollers to the young aspirants and help them in building the necessary skills required to make them industry ready.

Background

Although the names microcontroller and microprocessor appear to be interchangeable, there is a significant distinction between these two integrated circuits. Microprocessors, like most Intel processors, just have the CPU on the chip, whereas microcontrollers also feature RAM, ROM, and other peripherals. Both ICs have various uses and their own set of benefits and drawbacks. In terms of applications, structure, internal characteristics, power consumption, and cost, they can be distinguished. The microprocessor is utilized in an application where the task is assigned by the user rather than being predetermined. The microcontroller is built for a specific duty, and once the

software is embedded on the MCU chip, it cannot be readily changed, and reburning it may require special instruments.

Case Evaluation

In the most intensive processes, the microprocessor is used. Although it simply comprises a CPU, several other components are required to finish a task. All of the other components are externally connected. Internally, the microprocessor chip does not contain all of these components. The number of exterior elements and their dimensions are determined by the application. Microcontrollers are used to perform the same task again and over again. As a result, the number of I/O ports and memory required are lower than for a microprocessor. As previously said, external parts are combined with the CPU in a single chip in microcontrollers, and as a result of this integrated structure, the overall size of the microcontroller is lower than the microprocessor.

Proposed Solution

Internal parameters such as clock speed, memory, peripheral interface, and so on differ between the two ICs. Microprocessors are typically coupled to memory elements such as RAM and ROM, as well as I/O ports, timers, and serial interfaces. The microprocessor has the advantage of having a flexible construction. It implies you can choose the size of RAM, ROM, and I/O ports, as well as adjust all externally attached components based on the program. The size of RAM, ROM, and other components of a microcontroller cannot be changed. The structure of a controller is fixed once it is designed. As a result, the microcontroller's construction is rigid. So, let's be clear about the distinction between a microprocessor and a microcontroller.

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