

# Mechatronics System Integration (MCTA3203)

Week 7: Exploring software and hardware considerations when interfacing with embedded systems.

## Introduction

An embedded system is a specialized computing system designed to perform specific functions or control dedicated devices. It is embedded as part of a larger system and is often optimized for a particular task or set of tasks. Embedded systems can be found in a wide range of applications, from consumer electronics (e.g., microwave ovens, washing machines) to industrial control systems, automotive applications, and IoT devices. An embedded system typically consists of a microcontroller or microprocessor, memory, and various peripherals.

Key differences between interfacing, system integration and embedded system:

### Scope:

- **Interfacing:** Focuses on the connections and communication between individual components within a system.
- **System Integration:** Encompasses the overall process of combining and coordinating different subsystems or components into a unified system.
- **Embedded System:** Refers to the entire dedicated computing system designed for a specific application or task.

### Objective:

- **Interfacing:** Aims to enable communication and interaction between components within a system.
- **System Integration:** Aims to create a seamless and functional whole by coordinating interactions between different subsystems.
- **Embedded System:** Aims to perform specific functions within a larger system or device.

### Level of Detail:

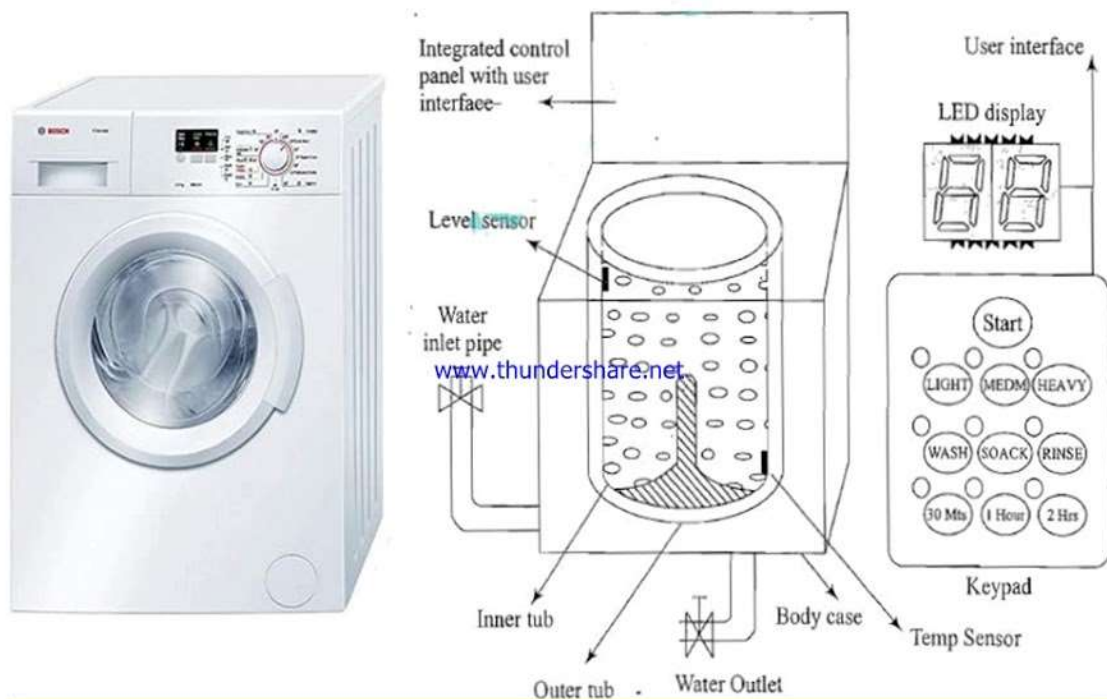
- *Interfacing:* Deals with the specifics of connecting and communicating between hardware or software components.
- *System Integration:* Considers the overall architecture, functionality, and behavior of the integrated system.
- *Embedded System:* Encompasses the entire dedicated computing system, including hardware, software, and peripherals.

## The Task

The objective of this lab is to design and build a basic washer machine (**Fig. 1**) prototype using Arduino. This exercise will provide students with insights into the system requirements, hardware components, and programming necessary for creating a simple embedded system device.

### Instructions:

- Identify the equipment, components and materials.
- Create the experimental procedure.
- Construct the system prototype.
- Discuss the finding and conclusion.
- Future plan with IOT application.



**Fig. 1:** Basic Washer Machine System