



Embedded systems

Lecture two

Layered Architecture

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Software Architecture

Imagine having a source code file contains 10 thousands lines of code. If you have a **bug** in this code, how complex is finding the **bug** ... ?

This is what's called the **Spaghetti Code**, which is the code that **unstructured** and **difficult to maintain**.

Spaghetti Code

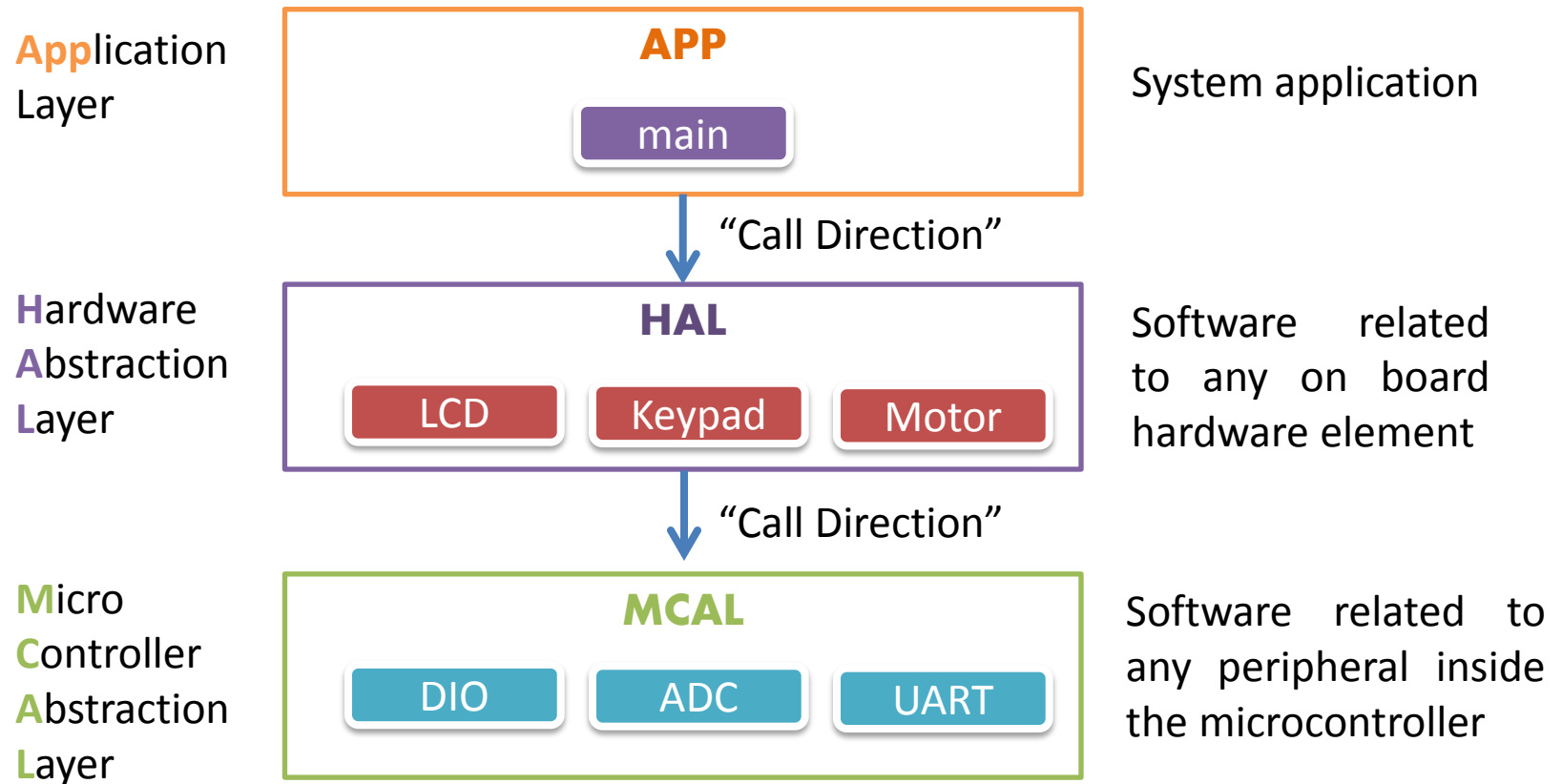


Software Architecture Definition

The software architecture is a structuring way used to define software elements and relationships between them. In Embedded Systems we use a major type of software architecture called Layered Architecture.

In the layered architecture the software is divided into small parts called **software components** (SWC). Software components related to each other are organized in a horizontal layer. Each layer is performing a specific role

Embedded Systems Layered Architecture



Advantages of Layered Architecture

1- Modularity

In a Layered architecture we separate the user application from the hardware drivers from the microcontroller specific drivers.

2- Portability

Changing any part of the software part would change its layer only. For example, if we need the same application with a new microcontroller, we shall only change the MCAL.

3- Reusability

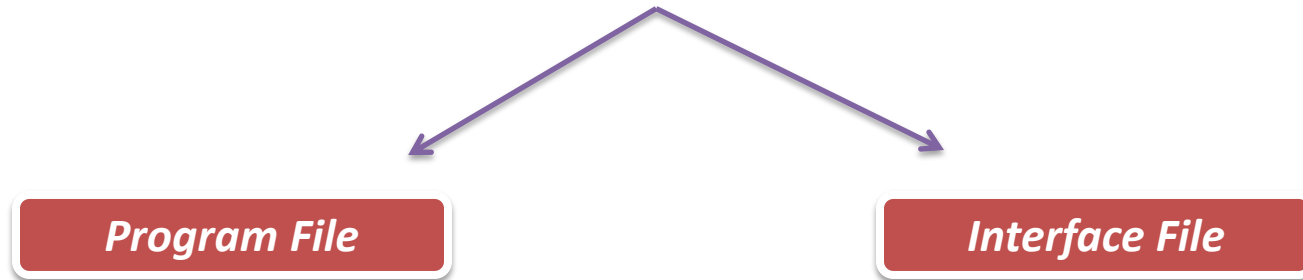
Code could be easily *reused* in different applications and systems.

4- Maintainability

Debugging and *Testing* is now much easier in small parts of the software instead of having a very long and complex one.

Building DIO Driver

The Simplest driver consists of only 2 files



C file contains the implementations of the functions provided by the driver

ex: DIO_prg.c

Header file contains the prototypes of the functions provided by the driver to be used by other SWCs that need to use this driver

ex: DIO_int.h

Let's Create the DIO driver for our Microcontroller *Atmel AVR Atmega32*

Time To Code



The End ...





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