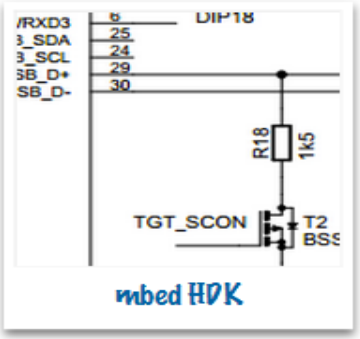
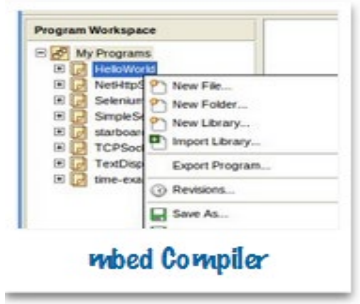
Introduction to the mbed Platform

Introduction to mbed

- What is mbed?
  - mbed is a platform used for easy prototyping and development of applications and systems based on ARM Cortex-M-based microcontrollers
- mbed platform provides
  - Open software libraries
  - Open hardware designs
  - Open online tools for professional rapid prototyping of products based on ARM-based microcontrollers
- mbed platform includes
  - A standards-based C/C++ Software Development Kit (SDK)
  - A microcontroller Hardware Development Kit (HDK) and supported development boards
  - Integrated Development Environment (IDE), including an online compiler and online developer collaboration tools





mbed

ARM

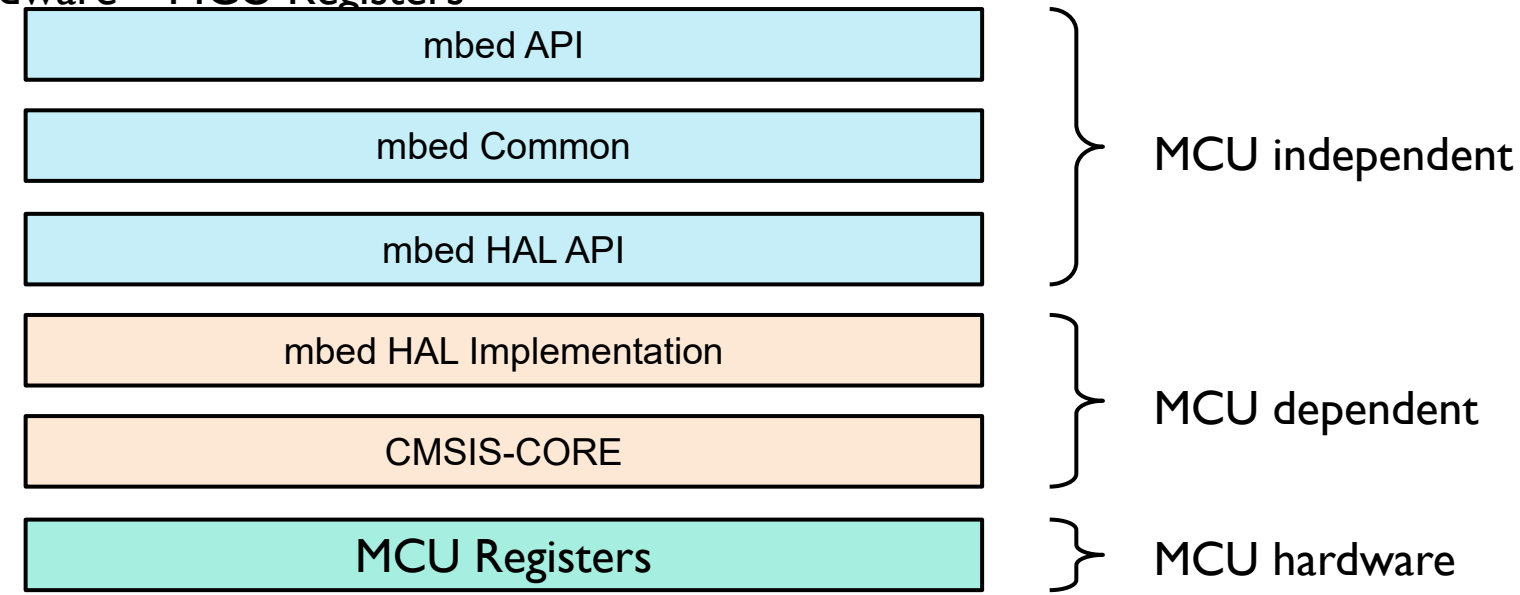
mbed Software Development Kit

- mbed Software Development Kit (SDK) includes:
  - Software libraries
  - Official C/C++ software libraries
  - Start-up code, peripheral drivers, networking, RTOS and runtime environment
  - Community-developed libraries and codes
  - Cookbook of hundreds of reusable peripheral and module libraries have been built on top of the SDK, which can be used to build your projects faster
  - Software tools, such as build tools, test and debug scripts

- Other features
  - Licensed under the permissive Apache 2.0 licence – all codes can be used in both commercial and personal projects with confidence
  - Compatible with different hardware platforms
  - Support for multiple tool chains
  - Details on how to use the SDK will be introduced in later modules

mbed SDK Library Structure

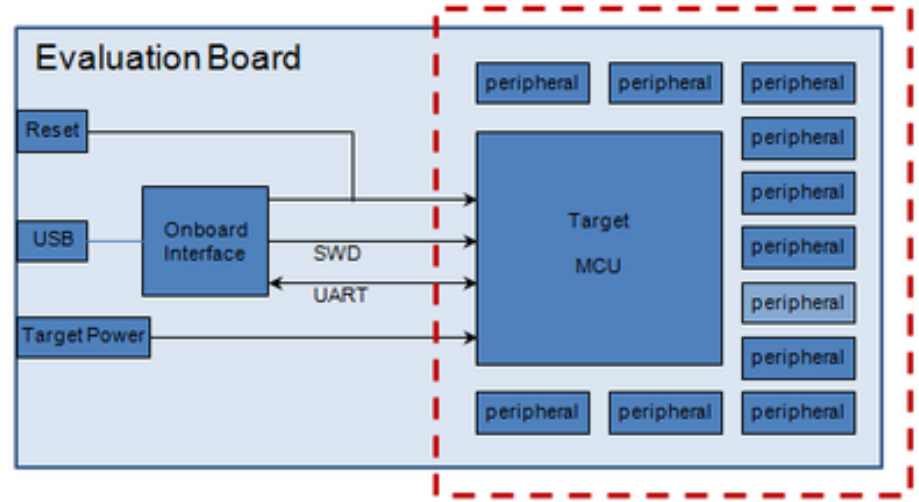
- The mbed SDK library provides abstractions for:
  - MCU independent layer – mbed API, mbed common, and mbed HAL API
  - MCU dependent layer – mbed HAL Implementation and CMSIS-CORE
  - MCU hardware – MCU Registers



mbed Hardware Development Kit

- The mbed Hardware Development Kit (HDK) provides
  - Recipes to build custom hardware devices
  - Microcontroller sub-system design files and firmware
  - Specifications of all support components and circuits
  - mbed hardware platforms, off-the-shelf development boards

- Benefit of the HDK
  - Quick design short-cut using ready-made schematics
  - Provide easy-to-use USB and debugging support
  - Compatible with mbed SDK



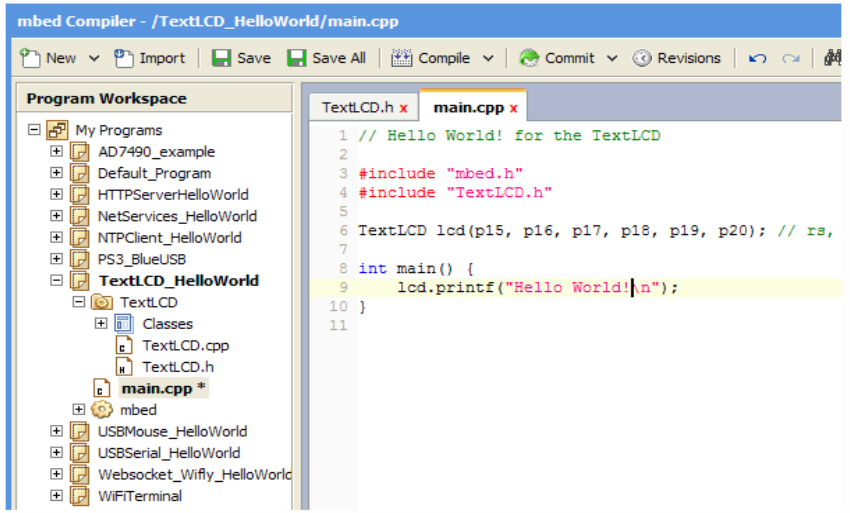
An example of how a microcontroller sub-system might be used to build an evaluation board

Integrated Development Environment

- The mbed IDE provides an mbed online compiler and toolchain for rapid application development
  - Lightweight tools
  - Online web-based IDE – your project can be accessed from anywhere
  - No installation needed, only web browser needed
  - Free-of-charge
  - Convenient code sharing
  - Everyone can Import

    codes/libraries from others
  - Everyone can export

    codes/libraries to the community



Online mbed IDE

Examples of mbed Hardware Platforms

- mbed hardware platforms are already manufactured development boards that are:
  - Based on the mbed HDK
  - Quickest way to get started with the mbed platform
  - Specifically optimised for flexible rapid prototyping
  - Available from distributors worldwide, examples are:

mbed and Internet of Things (IoT)

- One major role of IoT is to connect the world's objects in an interoperable standards-based way
- To build these standards, mbed provides tools and facilities to rapidly prototype these things to build working proof-of-concepts
- Apart from the fast prototyping tools/platforms, mbed also provides special features for IoT development, including:
  - Support for HTML5 web standards – a new protocol in HTML version 5 that supports easy real-time data links from any source to any destination
  - ARM Sensinode NanoService™ – provides end-to-end software products that bring IP and web services to the end node
  - mbed world-wide community – a huge open source repository of codes and libraries shared among developers worldwide

sensinode