arm Education

Embedded Systems Essentials with Arm: Getting Started

Module 1

TP (1): Thinking point

"I think there is a world market for maybe five computers." This quote is attributed to Thomas Watson, president of IBM in 1943. With the benefit of hindsight, we can see how mistaken he was. Watson thought computers had to be made from thermionic valves, be as big as a house, use vast amounts of electric power, and carry out laborious mathematical calculations of interest only to scientists or accountants.

How times have changed! Now we have semiconductors, low-cost computers smaller than a fingernail, and complex programs which can run everything from amazing video games to complex calculations.

Watson didn't foresee that computers would start hiding inside other products and taking over their control. We call these products embedded systems, and we usually call the small computer inside a microcontroller. Watson also didn't foresee that computers would start communicating directly with each other, ultimately forming the giant network we call the world wide web. Put these two things together, embedded systems and the internet, and we come up with something called the Internet of Things or IoT: a massive interconnected network of computers, devices and embedded systems, exchanging data and control information with each other in stupendous quantities.

Instead of just the five computers Watson anticipated, one estimate in the year 2020 is that there are around 50 billion, and growing fast. You could say he was just a factor of 10 billion out!

Arm has been part of the global movement to push forward computer development for over 40 years, and now designs many of the processors inside mobile phones, selling its designs as intellectual property. Some years back, Arm foresaw the coming IoT surge and designed a platform called Mbed that accelerated and simplified the process of deploying Cortex-M microcontrollers into the world of IoT.

This course introduces you to the mysteries of embedded systems, how you can design circuits and products containing a microcontroller, and how these can network with other devices. What better way to learn about this, than in the company of Arm and the Mbed platform?

Take a walk around your house or apartment, and make a list of everything you think might contain a microcontroller. Look in the kitchen, your home office, your personal effects, your car or bike, and the heating or air conditioning system. You may be surprised with the length of your list!