C.1 Embedded Systems

Return to Hardware Architectures

An **Embedded System** is a computer custom built to serve a specific purpose. Some examples of special purpose computers are cash registers, calculators, smart thermostats, and engine monitors in vehicles. A general purpose computer is one designed to perform general tasks: e.g., tablets, laptops, desktops, workstations and servers. Recently, smart phones have crossed over from being special purpose computers to general purpose computers, performing lots of tasks such as browsing the internet, playing songs, watching films, gaming and taking photos. They are no longer limited to making and receiving phone calls.

Although the general purpose computers are almost ubiquitous and can solve many problems associated with embedded computer, the need for specialized microprocessors has increased dramatically. General purpose computers are not necessarily best when it comes to specialized needs. They are often cumbersome, expensive and not well suited to handle specific needs. For example, a smart thermostat, a calculator or security sensors are best left to specialized computers.

Embedded systems can be classified into three categories:

- C.1.1 Embedded Subsystem
- C.1.2 Standalone Embedded Systems
- C.1.3 Networked Embedded Systems

Often these systems use a Microcontroller or microprocessor.

A microcontroller is a chip optimized to control electronic devices. It is stored in a single integrated circuit which is dedicated to performing a particular task and execute one specific application. It is specially designed circuits for embedded applications and is widely used in automatically controlled electronic devices. It contains memory, processor, and programmable I/O.