# **Embedded Systems Essentials with Arm: Get Practical with Hardware**

## Module 3

## KV2: Real-Time Operating System (RTOS)

Previously, we learned that operating systems such as Windows, Linux, Android or iOS run multiple programs simultaneously and make devices like our phones and laptops easy and enjoyable to use. Now that we know what an operating system entails, we can look in more detail at how operating systems within the embedded environment differ.

As we’ve learned, in an embedded environment, the resources and user interface are limited, and the timing of tasks is very important.

So a special operating system is needed that is specifically designed to deliver results according to clear timing deadlines. This is called a Real-Time Operating System or RTOS.

An RTOS processes tasks and data in real time, as the data comes in. The operating system can manage deadlines and priorities so that the task is executed exactly in time.

The “Real-Time” in RTOS signifies the importance of prioritizing its activities or functions. These activities are called “tasks" or “threads,” as mentioned in the previous lesson. ​We’ll delve more into tasks and multi-tasking in the next knowledge video, but the important thing to remember is that the tasks and their timing are fundamental to RTOSs.

Therefore, a useful definition of real time is:​

* A system operating in real time must be able to provide the correct results by the required time deadlines. ​

An RTOS is an OS that meets this real-time requirement.​

Understanding RTOSs is just the beginning. With this course, we will widen our knowledge and expertise into the different uses and characteristics of RTOSs, and applying the Mbed RTOS.​

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