In this chapter, we will illustrate a formal method for testing. Because embedded systems are deployed in safety-critical systems, we need to be rigorous in our methods that evaluate if the deployed system performs its tasks as required. Embedded systems not only need to arrive at the correct answer, they need to arrive at it at the correct time. We will introduce a simple hardware counter that we can use to measure time. The testing method we will develop in this chapter will be to create a data logger to store when and what our system is doing.

Learning Objectives:

- Understand the concept of minimally intrusive debugging
- Learn how the SysTick counter works
- Learn about arrays
- Learn how to use indexing to access arrays
- Understand precision, length and origin
- Learn how to create a debugging dump
- Understand that a formal method to verify program correctness
- Learn how to use the dump to collect debugging information in real time