

# Alf Tutorial 3: Stopwatch

This tutorial you will construct a state machine model for a simple stopwatch that increments by 1 every second. This model is a version of the stopwatch model used in the [tutorial for Magic Model Analyst \(MSI\)](#). However, unlike in the MSI toolkit, Behaviors will be defined using Alf, rather than Activity diagrams.

## The stopwatch structure

The structure of the stopwatch model in this tutorial is very simple. It only contains a *time* property, which is typed as *Integer*. The *time* property records the elapsed time once the stopwatch receives a starting Signal. Therefore, the structure of the stopwatch system contains a *StopWatch* class that has the *time* property.

## The stopwatch behavior

The tutorial uses a State Machine diagram to describe the main behavior of the stopwatch. The State Machine consists of four States:

1. *ready* – The State in which the stopwatch is ready to start.
2. *running* – The State that the stopwatch enters once it receives a *Start* signal. The stopwatch runs and the timer starts. The stopwatch is triggered by a Time Event to increment the *time* value by 1 each second.
3. *paused* – The State in which the stopwatch is paused and waiting for the user to restart it.
4. *stopped* – The State in which the stopwatch stops running.

The tutorial consists of the following steps:

- [Creating the StopWatch structure](#)
- [Creating the StopWatch state machine](#)
- [Defining the Stopwatch operations using Alf](#)
- [Defining the Ready and Running behaviors using Alf](#)
- [Running the Stopwatch model](#)