

# Stateflow for Logic-Driven System Modeling

## Training Objectives

This course shows how to implement complex decision flows and finite-state machines using Stateflow®. The course focuses on how to employ flow charts, state machines, truth tables, and state transition tables in Simulink® designs. Topics include:

- Flow charts
- State machines
- Hierarchical state machines
- Parallel state machines
- Events in state machines
- Functions in state machines
- Truth tables
- State transition tables
- Component-based modeling

## Prerequisites

*MATLAB Fundamentals* and *Simulink Fundamentals*

## Products

- Simulink
- Stateflow

## Course Outline

### Day 1 of 2

#### Modeling Flow Charts (2.0 hrs)

**Objective:** Implement decision flows with flow charts.

- Junctions and transitions
- Flow chart behavior
- Stateflow interface
- Conditions and condition actions
- Chart data
- Common patterns

#### Modeling State Machines (2.0 hrs)

**Objective:** Implement state machines with state transition diagrams.

- State machine behavior
- State and transition actions
- Chart initialization
- Action execution order
- Flow charts within states
- Mealy and Moore charts

#### Hierarchical State Diagrams (1.5 hrs)

**Objective:** Implement hierarchical diagrams to improve the clarity of state machine designs.

- Superstates and substates

- State data
- History junction
- Transition priority
- Action execution order

### **Parallel State Diagrams (1.5 hrs)**

**Objective:** Implement parallel states to model multiprocessing designs.

- Benefits of parallel states
- Chart/state decomposition
- Parallel state behavior

### **Day 2 of 2**

### **Using Events in State Diagrams (2.0 hrs)**

**Objective:** Use events within a Stateflow diagram to affect chart execution.

- Using events in state diagrams
- Broadcasting events
- Behavior of state diagrams that contain events
- Implicit events
- Temporal logic operators

### **Calling Functions from Stateflow (1.5 hrs)**

**Objective:** Create functions in a Stateflow chart out of Simulink blocks, MATLAB code, and flow charts.

- Types of functions
- Simulink functions
- MATLAB functions
- Graphical functions

### **Truth Tables and State Transition Tables (1.5 hrs)**

**Objective:** Create flow charts and state transition diagrams in tabular form.

- Truth tables
- Conditions, decisions, and actions
- State transition tables
- States, transitions, and actions

### **Component-Based Modeling in Stateflow (2.0 hrs)**

**Objective:** Prepare Stateflow designs for component reuse and interact with structured Simulink data.

- Bus signals
- Data types
- Atomic subcharts
- Data mapping
- Chart reuse