State flow with Simulink

Part 2

The state flow machine

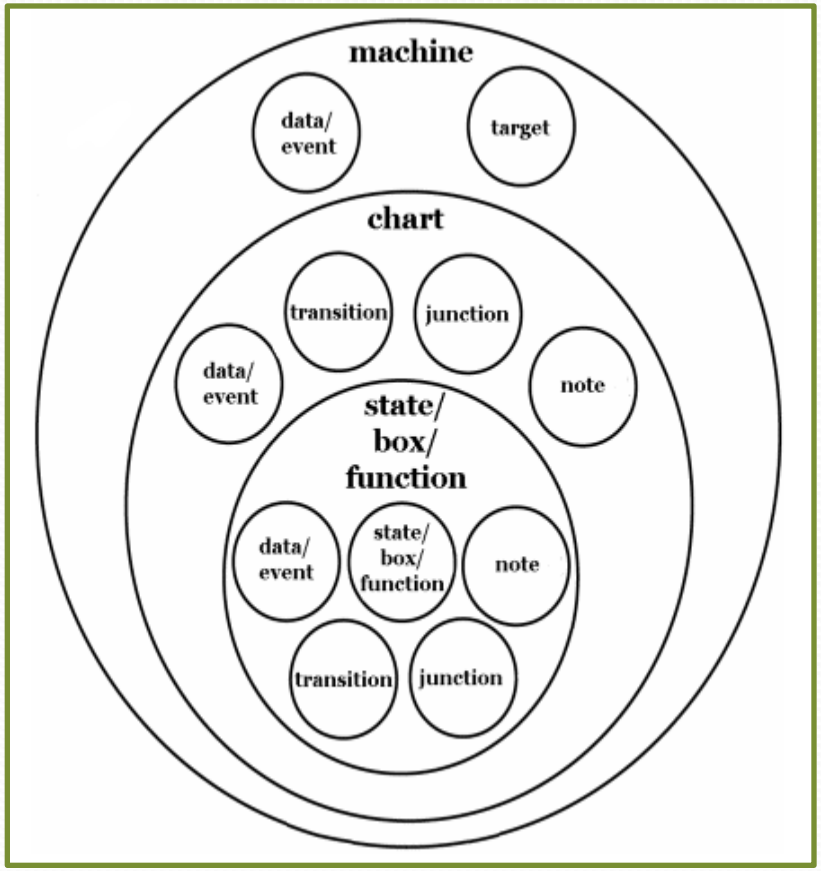
The Stateflow machine is the collection of Stateflow blocks in a Simulink model. The Simulink model and the Stateflow machine work seamlessly together. Running a simulation automatically executes both the Simulink blocks and the Stateflow charts of the model.

The state flow machine

The highest object in Stateflow hierarchy is the Stateflow machine.

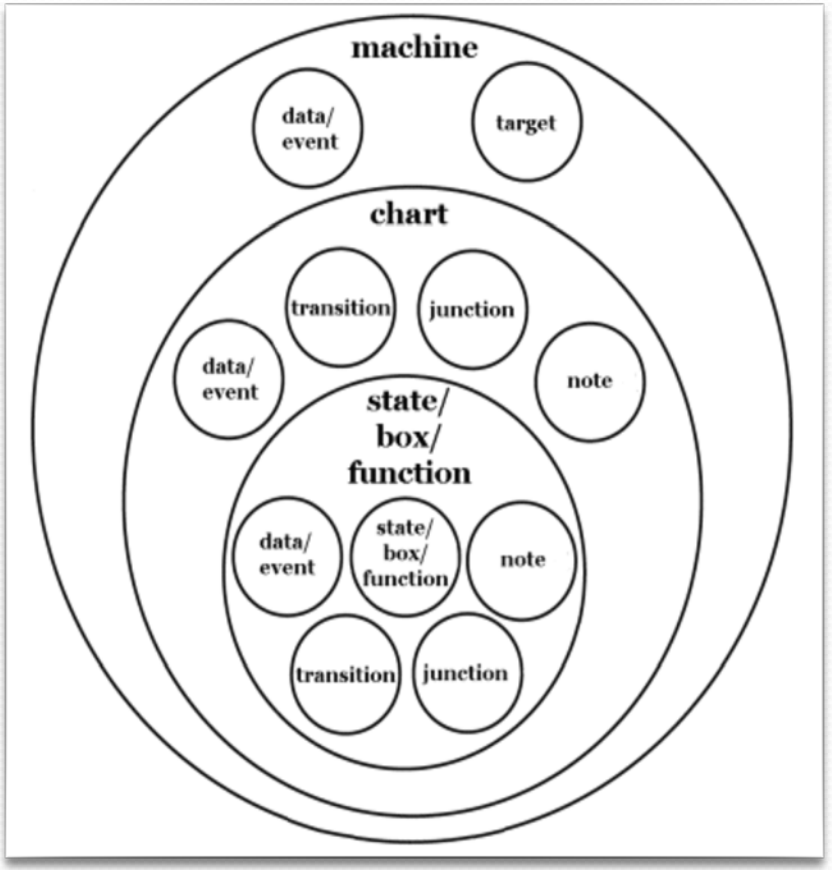
This object contains all other Stateflow objects in a Simulink model.

The Stateflow machine contains all the charts in a model. In addition, the Stateflow machine for a model can contain its own data and target objects.



The chart

A chart consists of graphical objects (states, boxes, functions, notes, transitions, connective junctions, and history junctions) and non-graphical objects (events, data, and targets).



Graphical objects

The table given in the right-had side lists each type of graphical object you can draw in a chart and the toolbar icon to use for drawing the object.

Type of Graphical Object	Toolbar Icon
State	
Transition	Not applicable
History junction	
Default transition	
Connective junction	
Truth table function	
Graphical function	
MATLAB® function	
Box	
Simulink function	

Non graphical objects: Data objects

To add data using the Stateflow Editor, follow these steps:

- In the Stateflow Editor, select **Add** > **Data**.
- In the context menu, select a scope for the new data object.
- See scope for a description of each type of scope.
- Selecting scope adds a default definition of the new data object to the Stateflow hierarchy and displays the Data properties dialog box.
- Specify properties for the new data object in the Data properties dialog box.

Data objects: Sharing input/output data with Simulink

Data flows from Simulink into a chart via input ports on the Stateflow chart block.

To add input/output data to a chart:

1. Add a data object to the chart;

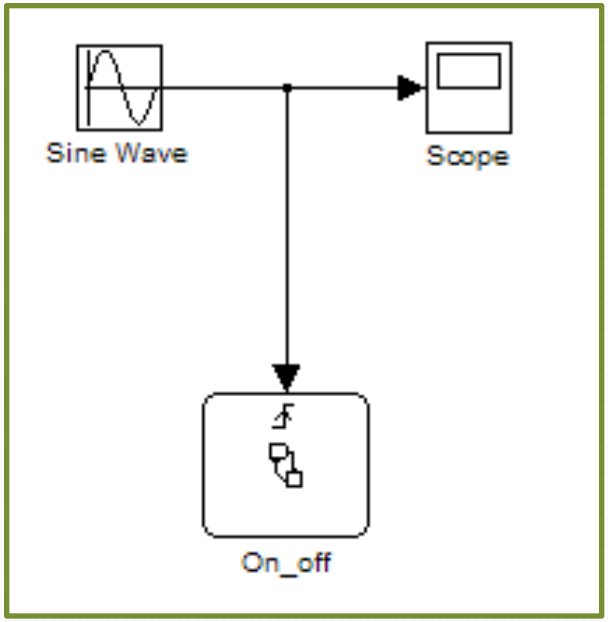
2. Open the Data properties dialog box and then, set the scope property to “Input/Output.” An input/output port appears on the Stateflow chart block in the model;

3. Set the type of the input/output data, and then, the size of the input/output data.

Non graphical objects: Event objects

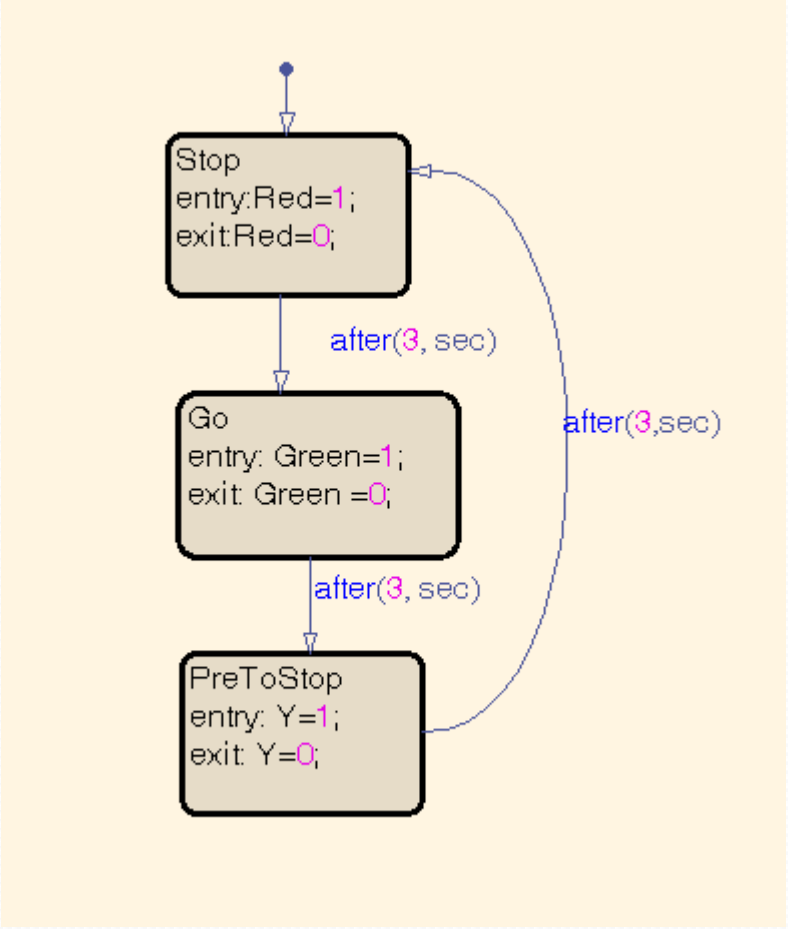
An event is a Stateflow object that can trigger a whole Stateflow chart or individual actions in a chart.

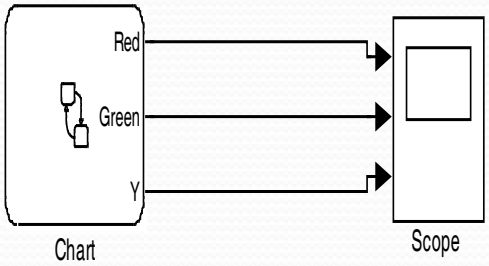
Because Stateflow charts execute by reacting to events, you specify and program events into your charts to control their execution.



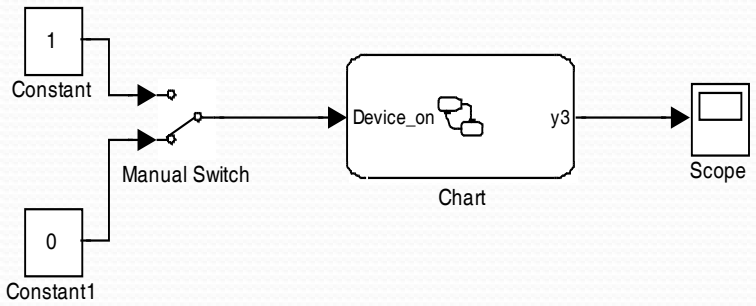
Simulink model

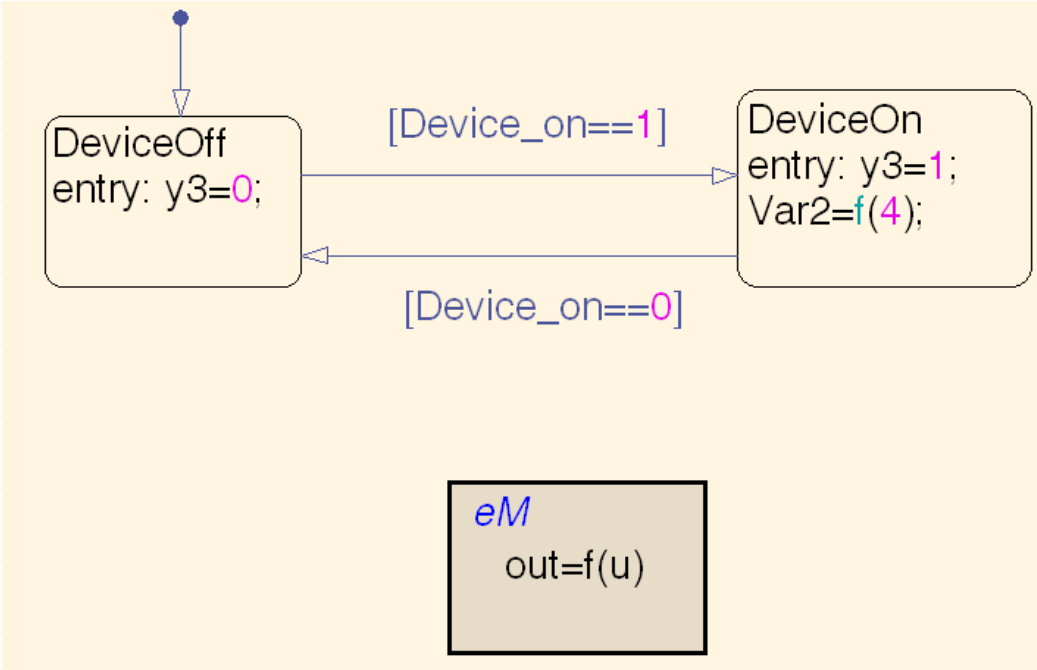
Traffic light – 3-states machine



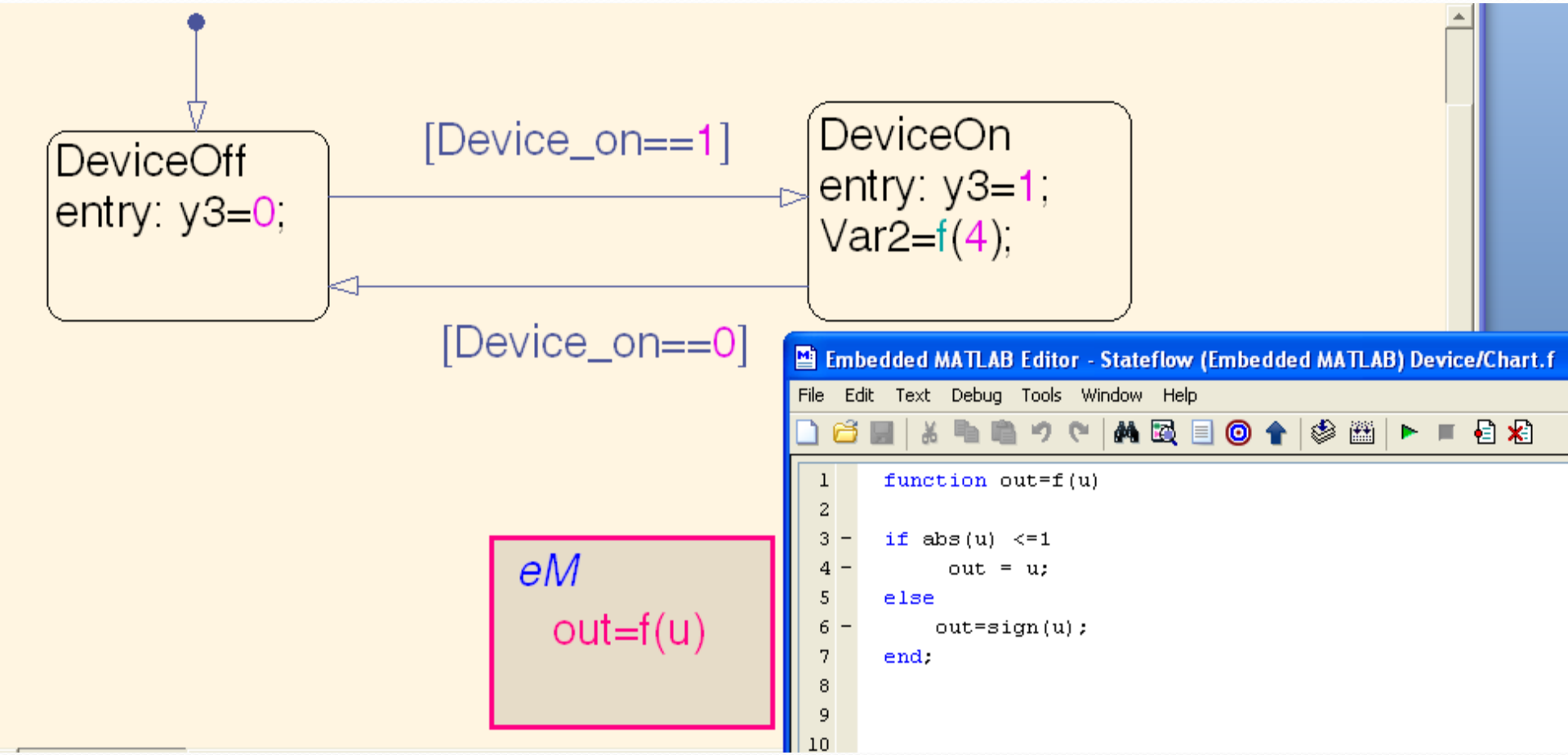


Simulation of on/off state device with a call of emebedded-Matlab code

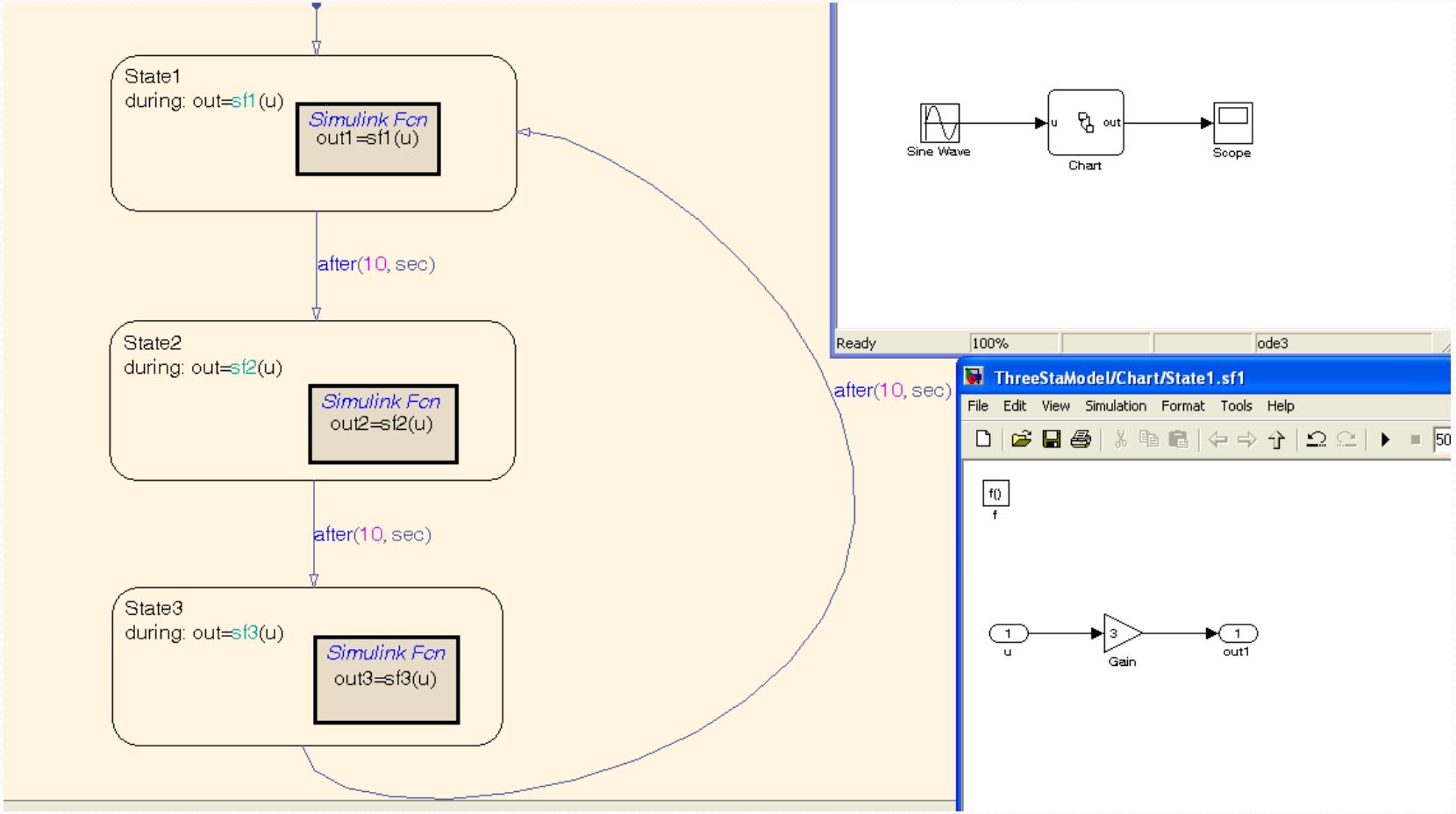




The Chart – On-off device - continued



Adding simulink files to the chart



Graphical functions