State Diagrams

The following elements are available in a state diagram.

- State
- Submachine State
- Initial State
- Final State
- Junction Point
- Choice Point
- Shallow History
- Deep History
- Synchronization
- Flow Final
- Transition
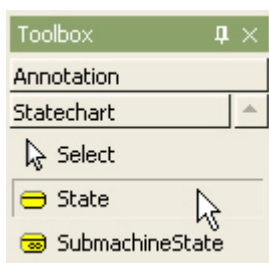- Self Transition

State

Semantics

A state is a condition during the life of an object or an interaction during which it satisfies some condition, performs some action, or waits for some event.
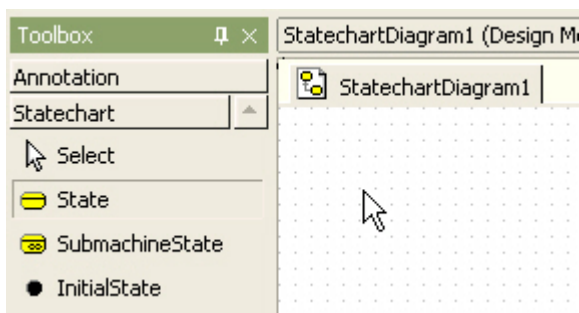
Procedure for creating state

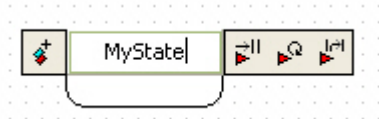In order to create State,

1. Click **[Toolbox] -> [Statechart] -> [State]** button.

2. And click at the position where State will be placed in the **[main window]**.

3. A state is created and quick dialog appears. Enter the state name at the quick dialog .
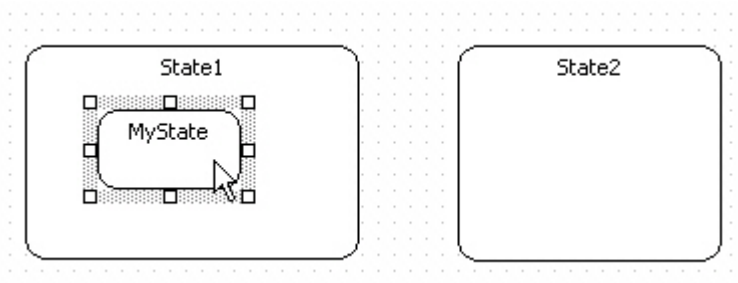
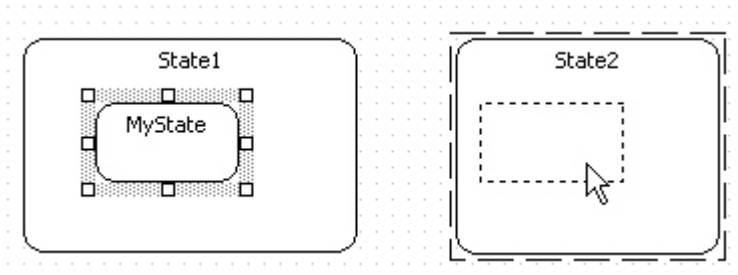4. And press **[Enter]** key to have done this procedure.

Procedure for moving state into another state
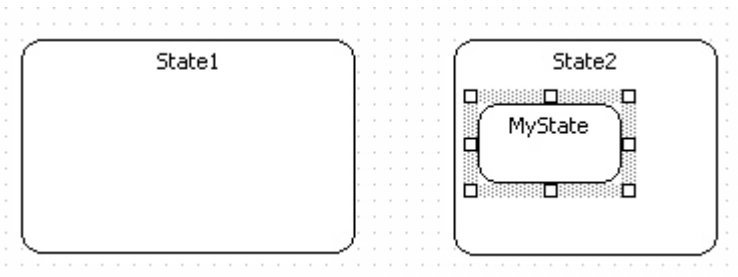
In order to move a state into another state,

1. Click a state that is contained in some state.


2. Drag it into another state.

3. The selected state is move into another state.

Procedure for transiting to multiple states at once

In order to create states with incoming or outgoing transition from selected state at once, use shortcut creation syntax.

1. Double-click state. Then quick dialog is shown. At the quick dialog, After "->" string(or "<-" string for incoming), enter target state names, and separate state names by "," character.
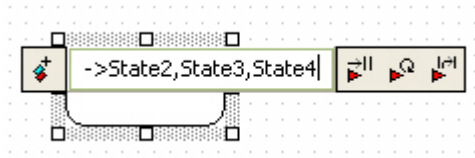
2. And press **[Enter]** key. Several states outgoing(incoming) from selected state are created and arranged automatically.
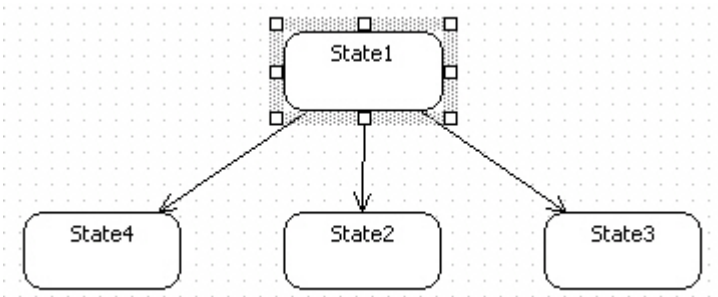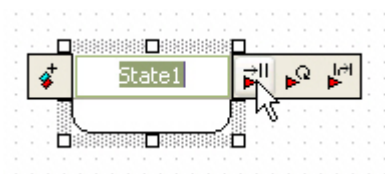

Procedure for adding entry/do/exit action
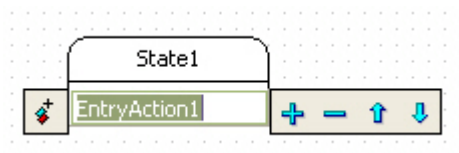
There are three way to add action to state.

- using quick dialog
- using model in the **[main window]** or the **[model explorer]**
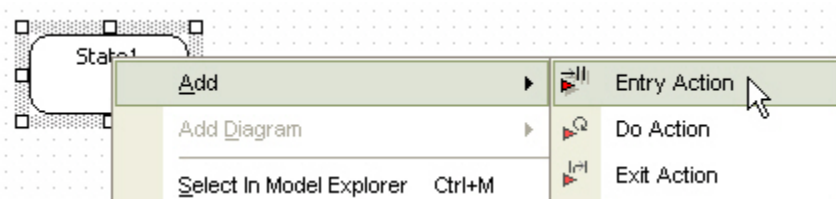- using **[collection editor]**

In the case of using quick dialog,

1. Double-click state.

2. At the quick dialog, press **[Add Entry/Add DoAction/Add ExitAction]** button at the quick dialog.
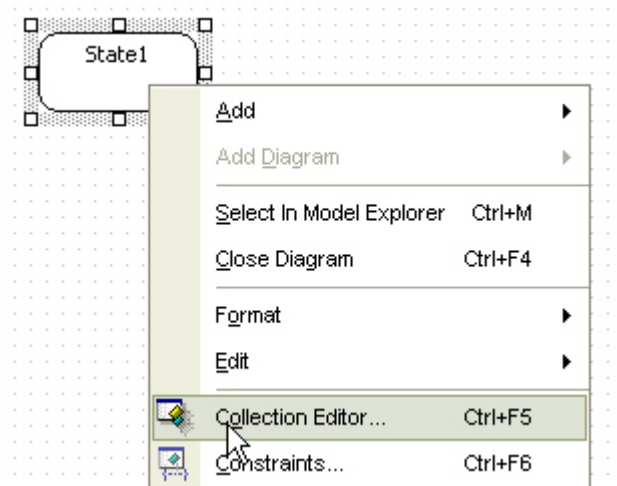

3. And you can add action.

In the case of using model, select state in the **[main window]** or in the **[model explorer]**. Right-click the selected state, select **[Add] -> [Entry/Do/Exit]** popup menu. And you can do.
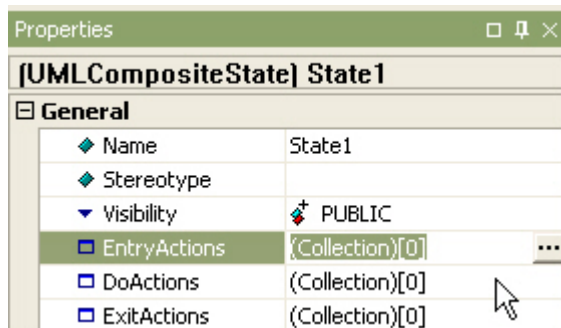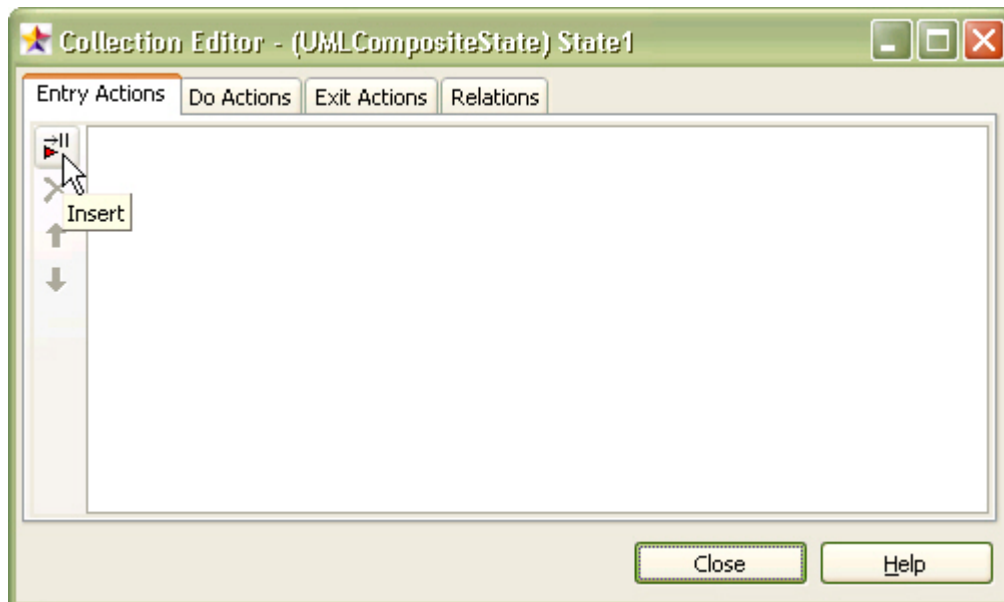

In the last case,

1. select **[Collection Editor...]** popup menu of state.

2. Or click [...] button in **[EntryActions/DoActions/ExitActions]** property on properties window.

3. At **[Entry Actions/Do Actions/Exit Actions]** tab of the **[collection editor]**, you can add action by using [button] button.
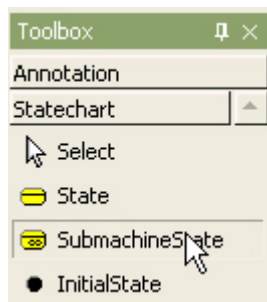
Submachine State

Semantics

A submachine state is a syntactical convenience that facilitates reuse and modularity. It is a shorthand that implies a macro-like expansion by another state machine and is semantically equivalent to a composite state.
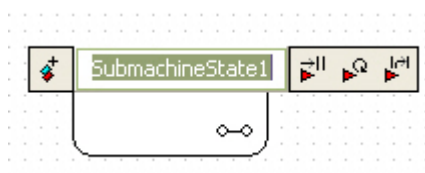
Procedure for creating submachine state

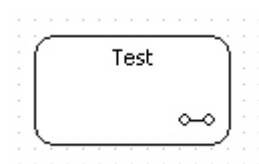In order to create SubmachineState,

1. Click **[Toolbox] -> [Statechart] -> [SubmachineState]** button.

2. And click at the position where SubmachineState will be placed in the **[main window]**. A submachine state is created and quick dialog is opened.

3. At the quick dialog, enter the submachine state name and press **[Enter]** key.
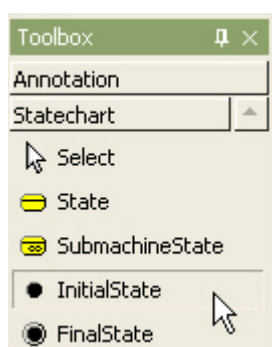

Initial State

Semantics

An initial is a kind of pseudostate that represents the starting point in a region of a state machine. It has a single outgoing transition to the default state of the enclosing region, and has no incoming transitions. There can be one (and only one) initial state in any given region of a state machine. It is not itself a state but acts as a marker.

Procedure for creating initial state

In order to create InitialState,

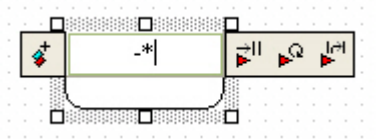1. Click **[Toolbox] -> [Statechart] -> [InitialState]** button.

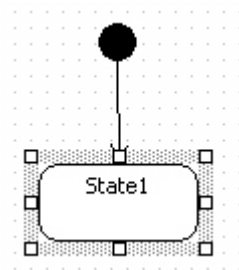2. And click at the position where InitialState will be placed in the **[main window]**.

Procedure for creating initial state from state

In order to create initial state with outgoing transition to selected object, use shortcut creation syntax.

1. Double-click state. At the quick dialog, After "-*" string, enter initial state name or none.

2. Press **[Enter]** key and initial state with outgoing transition to selected state is created.
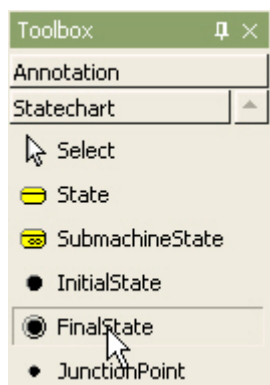

Final State

Semantics

A final state represents the last or "final" state of the enclosing composite state. There may be more than one final state at any level signifying that the composite state can end in different ways or conditions. When a final state is reached and there are no other enclosing states it means that the entire state machine has completed its transitions and no more transitions can occur.

Procedure for creating final state

In order to create FinalState,

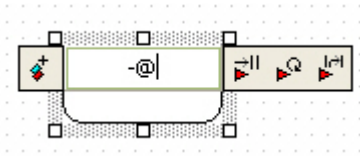1. Click **[Toolbox] -> [Statechart] -> [FinalState]** button.

2. And click at the position where FinalState will be placed in the **[main window]**.
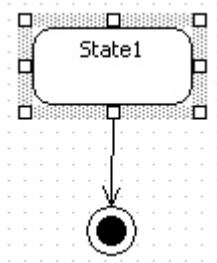
Procedure for creating final state from state

In order to create final state with outgoing transition from selected object, use shortcut creation syntax.

1. Double-click state. At the quick dialog, After "-@" string, enter final state name or none.

2. Press **[Enter]** key and final state with ingoing transition from selected state is created.
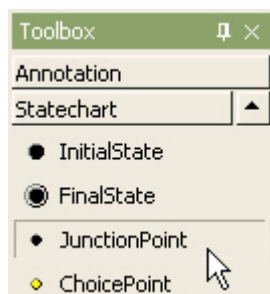
Junction Point

Semantics

A junction point chains transitions into a single run-to-completion path. May have multiple input and/or output transitions. Each complete path involving a junction is logically independent and

only one such path fires at one time. May be used to construct branches and merges.

Procedure for creating junciton point

In order to create JunctionPoint,

1. Click **[Toolbox] -> [Statechart] -> [JunctionPoint]** button.

2. And click at the position where JunctionPoint will be placed in the **[main window]**.
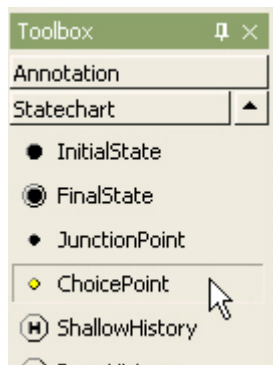
Choice Point

Semantics

A choice point splits an incoming transition into several disjoint outgoing transitions. Each outgoing transition has a guard condition that is evaluated after prior actions on the incoming path have been completed. At least one outgoing transition must be enabled or the model is ill formed.

Procedure for creating choice point

In order to create ChoicePoint,

1. Click **[Toolbox] -> [Statechart] -> [ChoicePoint]** button.

2. And click at the position where ChoicePoint will be placed in the **[main window]**.
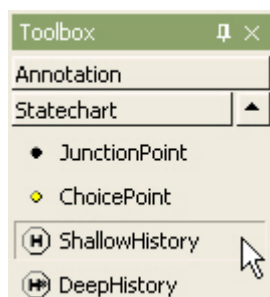

Shallow History

Semantics

When reached as the target of a transition, shallow history restores the state within the enclosing composite state that was active just before the enclosing state was last exited. Does not restore any substates of the last active state.

Procedure for creating shallow history

In order to create ShallowHistory,

1. Click **[Toolbox] -> [Statechart] -> [ShallowHistory]** button.

2. And click at the position where ShallowHistory will be placed in the **[main window]**.
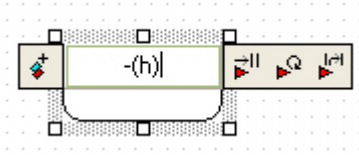

State History State:
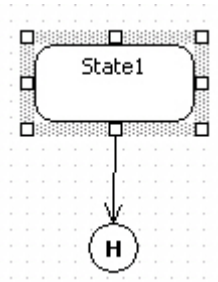
Procedure for creating final state from state

In order to create history with outgoing transition from selected object, use shortcut creation syntax.

1. Double-click state. At the quick dialog, enter one of "-(h)", "-(H)", "-(h*)", "-(H*)" string.

2. Press **[Enter]** key and history with outgoing transition from selected state is created.
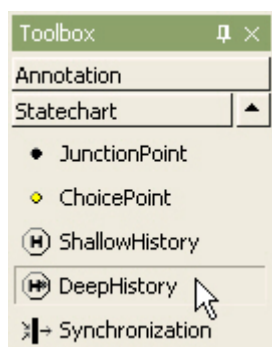

Deep History

Semantics

When reached as the target of a transition, deep history restores the full state configuration that was active just before the enclosing composite state was last exited.

Procedure for creating deep history

In order to create DeepState,

1. Click **[Toolbox] -> [Statechart] -> [DeepState]** button.

2. And click at the position where DeepState will be placed in the **[main window]**.
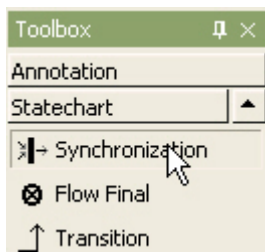

Synchronization

Procedure for creating synchronization bar

In order to create Synchronization,

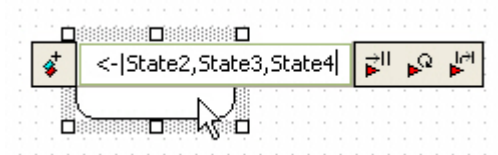1. Click **[Toolbox] -> [Statechart] -> [Synchronization]** button.

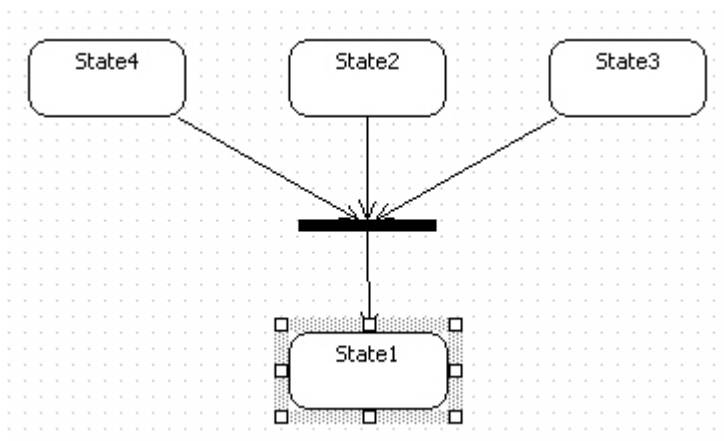2. And click at the position where Synchronization will be placed in the **[main window]**.

Procedure for creating join

In order to create incoming join transition to selected object, use shortcut creation syntax.

1. Double-click state. At the quick dialog, enter "<-|" and state names to be joined, and separate state names by "," character.
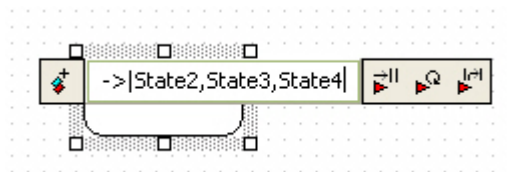

2. Press **[Enter]** key and states joined to selected state is created and arranged automatically.
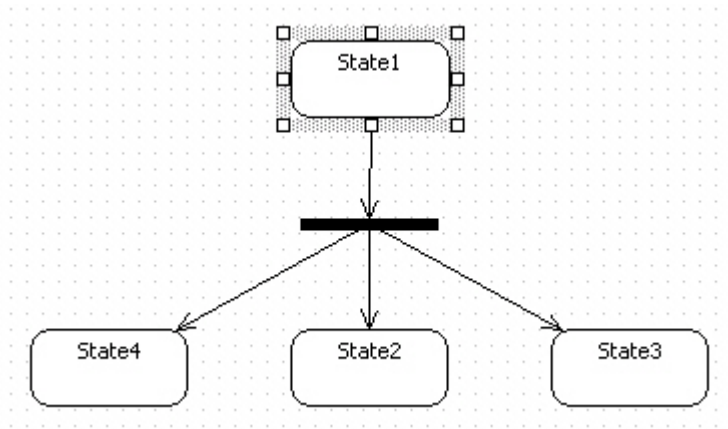

Procedure for creating join

In order to create outgoing fork transition to selected object, use shortcut creation syntax.

1. Double-click state. At the quick dialog, enter "->|" and state names to be forked, and separate state names by "," character.

2. Press **[Enter]** key and states forked from selected state is created and arranged automatically.
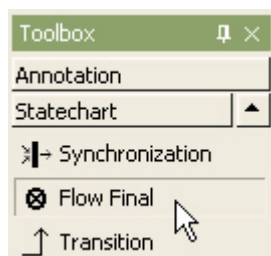
Flow Final

Procedure for creating flow final

In order to create Flow Final,

1. Click **[Toolbox] -> [Statechart] -> [Flow Final]** button.

2. And click at the position where Flow Final will be placed in the **[main window]**.
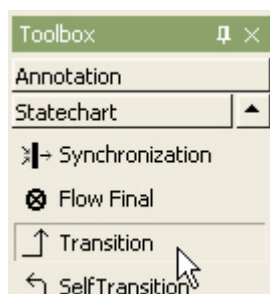

Transition

Semantics

A transition is a directed relationship between a source state vertex and a target state vertex. It may be part of a compound transition, which takes the state machine from one state configuration to another, representing the complete response of the state machine to a particular event instance.
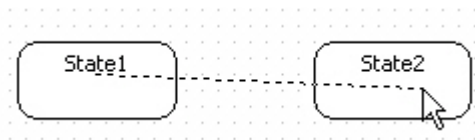
Procedure for creating transition
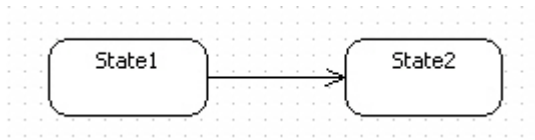
In order to create Transition,

1. Click **[Toolbox] -> [Statechart] -> [Transition]** button.

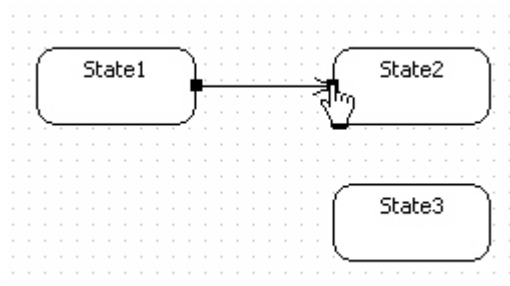2. Drag and drop between states in transition direction in the **[main window]**.

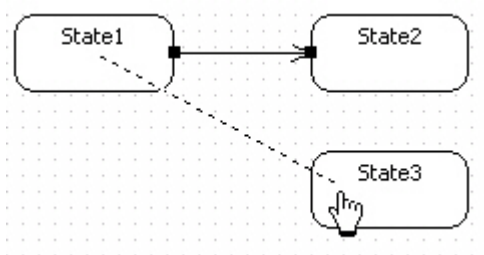3. Between two states, a transition is created.

Procedure for reconnecting to another element
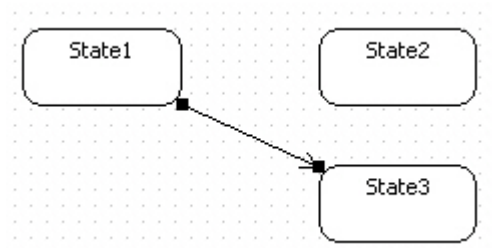
In order to reconnect to another state,

1. Click the end of transition.

2. Drag and drop it into another state.
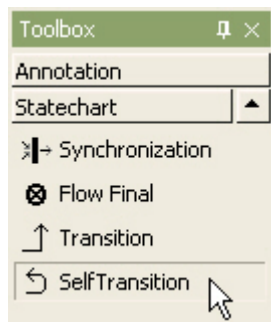
3. Then transition's end will be changed.

Self Transition

Procedure for creating self-transition

In order to create self-transition,

1. Click **[Toolbox] -> [Statechart] -> [SelfTransition]** button.

2. Click state to have self-transition in the **[main window]**.