Toolkit for Conceptual Modeling (TCM)
Specification for TATD
(Activity Diagram editor)

version 1.2

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Chapter 1

Activity Diagram Editor (TATD)

1.1 Specification

1.1.1 Terminology

None.

1.1.2 Restrictions and Extensions

- **Restrictions**
    - **No swim lanes**
    - **No Subactivity States**
    - **No ObjectFlow States**
    - **No Signal Receipt**
    - **No Signal Sending**

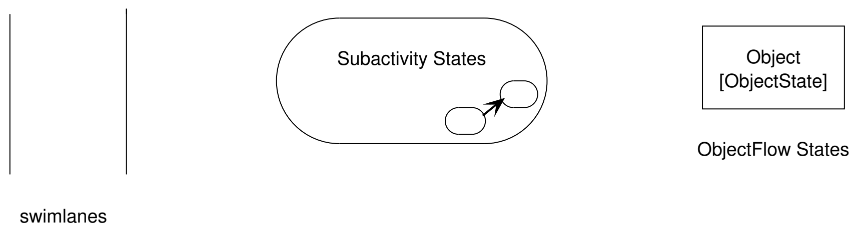

Figure 1.1: Activity Diagram restrictions.

- **Extensions**
  - control flow between start state and action state
  - control flow between two action states
  - control flow between action state and decision
  - control flow between action state and synchronization bar
  - control flow between action state and end state
  - control flow between decision and end state
  - control flow between two synchronization bars
  - control flow between synchronization bar and end state
  - control flow between start state and end state

1.1.3 Abstract Model

- **Nodes**
  - Initial State
  - Action State
  - Decision
  - Inactive State
  - Synchronization Bar (Horizontal)
  - Synchronization Bar (Vertical)
  - Final State

  See figure 1.3.

- **Edges**
  - Control Flow (Transition)

  See figure 1.4.

- **Consistency rules**
  See figure 1.5.

1.1.4 Representation

- **Nodeshapes**
  See figure 1.6.

- **Lines**
  See figure 1.7.

1.1.5 Additional functions

- **Change Bar type** between Horizontal and Vertical representation of synchronization bar.

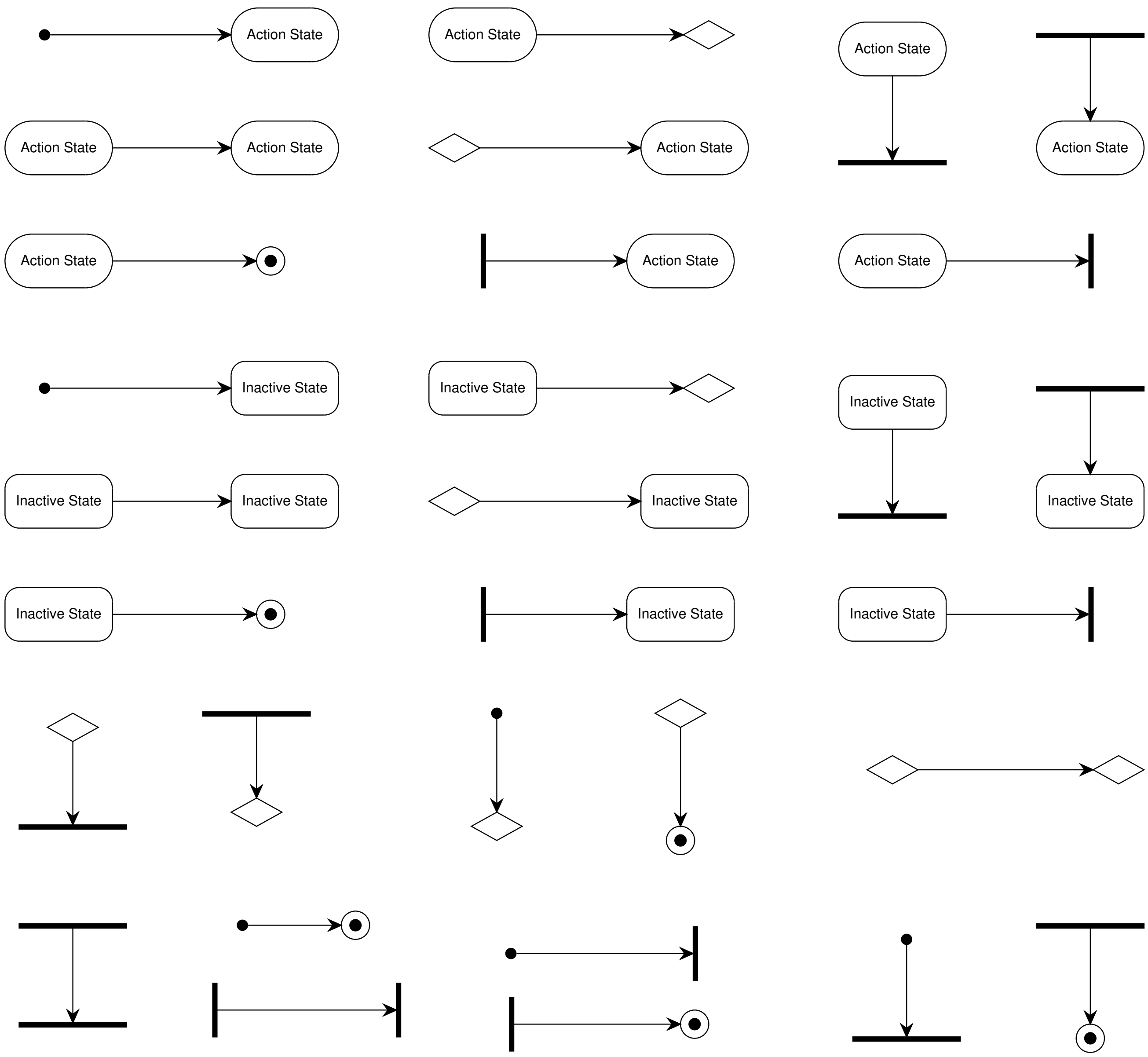

Figure 1.2: Activity Diagram extensions.

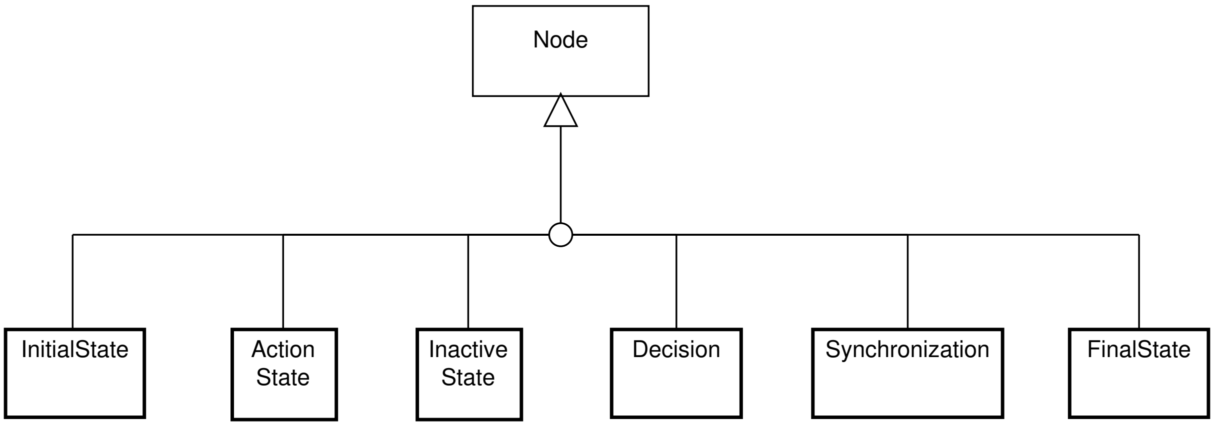

Figure 1.3: Activity Diagram nodes.

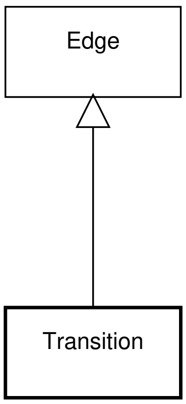

Figure 1.4: Activity Diagram edges.

Constraint	Description
AT1	Each ATD contains exactly one initial state.
AT2	Each ATD contains at least one action state.
AT3	Each ATD contains at least one final state.
AT4	You cannot have a transition from and to the initial state.
AT5	You cannot have a transition from and to a final state.
AT6	You cannot connect different final states.
AT7	Each node is reachable from the initial state by a finite sequence of transitions.
AT8	Each node can reach a final state by a finite sequence of transitions.
AT9	A transition should not lead from and to the same decision or merge point.
AT10	A transition should not lead from and to the same synchronization bar.
AT11	Synchronization bars should have one incoming and two or more outgoing control flows or two or more incoming flows and one outgoing flow.
AT12	Transitions from an action state should not contain event triggers.
AT13	Transitions from an inactive state should contain event triggers.
AT14	Transitions from and to the same state should have an action.
AT15	Transitions from a decision point should have no event.
AT16	Transitions from a decision point should have a guard.
AT17	Transitions from a merge point should have a no event.
AT18	Transitions from a merge point should have a no guard.
AT19	All names of action states and inactive states contain at least one letter.
AT20	Transitions from and to the same node have mutually unique labels.

Figure 1.5: Activity Diagram constraints.

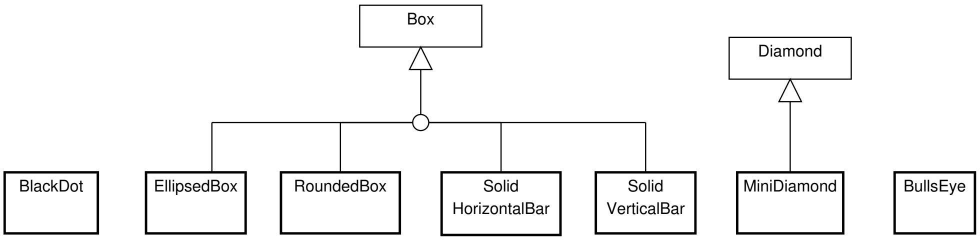

Figure 1.6: Activity Diagram nodeshapes.

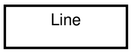

Figure 1.7: Activity Diagram lines.

1.1.6 File format

No changes.

1.1.7 User Interface

- **Node buttons**
  - Start State
  - Action State
  - Decision
  - Inactive State
  - Horizontal Synchronization Bar
  - Vertical Synchronization Bar
  - End State
- **Edge buttons**
  - Control Flow (Transition)

1.2 Design

1.2.1 C++ class structure changes

None.

1.2.2 C++ class diagram

See figure 1.8.

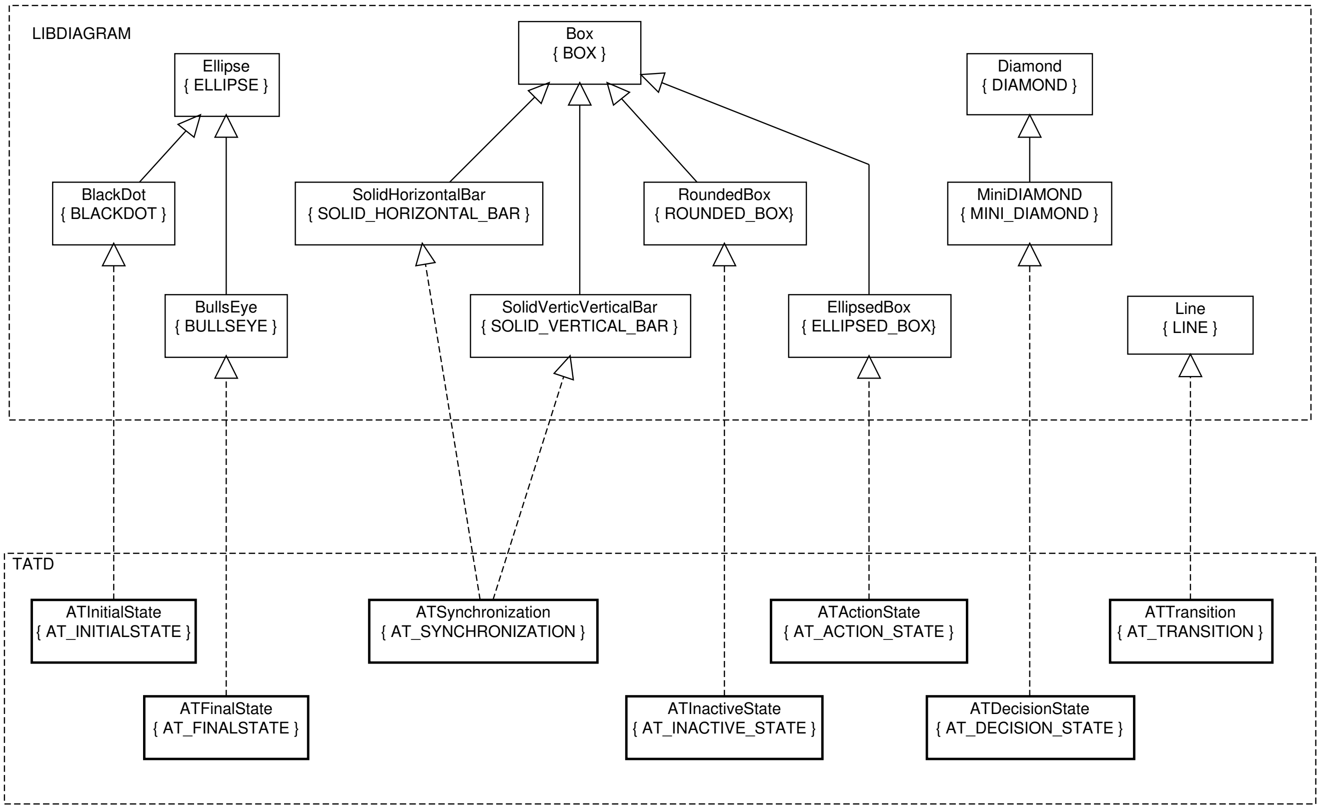

Figure 1.8: Activity Diagram Classes

1.2.3 Consistency Checks

See figure 1.9.

1.2.4 User Interface

None.

1.2.5 Files

- .../bin/tatd

Constraint	Mode
AT1	Soft
AT2	Soft
AT3	Soft
AT4	Immediately
AT5	Immediately
AT6	Immediately
AT7	Immediately/Soft
AT8	Immediately/Soft
AT9	Immediately
AT10	Immediately
AT11	Soft
AT12	Soft
AT13	Soft
AT14	Soft
AT15	Soft
AT16	Soft
AT17	Soft
AT18	Soft
AT19	Immediately
AT20	Immediately/Soft

Figure 1.9: Activity Diagram constraints checks.