Requirement Specification for `Module state_machine`

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Contents

1 SEC-0001: Module Initialisation

1.1 REQ-0005: Default State

The state machine shall start in the state, given while module initialisation.

Reason	Creation of a defined state after initialisation.
Fitcriterion	State machine is in the initial state after initialisation.

1.2 REQ-0006: Default Last Transition Condtion

The state machine shall return the string {/tt /_/_init/_/_} for last transition condition after initalisation.

Reason	Creation of a defined state after initialisation.
Fitcriterion	The last transition condition is {/tt /_/_init/_/_} after initialisation.

1.3 REQ-0007: Default Previous State

The state machine shall return {/tt None} for previous state after initalisation.

Reason	Creation of a defined state after initialisation.
Fitcriterion	The previous state is {/tt None} after initialisation.

1.4 REQ-0008: Additional Keyword Arguments

The state machine shall store all given keyword arguments as variables of the classes instance.

Reason	Store further information (e.g. for calculation of the transition conditions).
Fitcriterion	At least two given keyword arguments with different types are available after initialisation.

2 SEC-0002: Transition Changes

2.1 REQ-0017: Transitiondefinition and -flow

The user shall be able to define multiple states and transitions for the state machine. A transition shall have a start state, a target state and a transition condition. The transition condition shall be a method, where the user is able to calculate the condition on demand.

Reason	Definition of the transitions for a state machine.
Fitcriterion	The order of at least three state changes is correct.

2.2 REQ-0018: Transitiontiming

The user shall be able to define for each transition a transition time. On change of the transition condition to {/tt True}, the transition timer starts counting the time from 0.0s. After reaching the transition time, the transition gets active.

Reason	Robustness of the state changes (e.g. Oscillating conditions shall be ignored).
Fitcriterion	The transition time and the restart of the transion timer by setting the transition condition to {/tt False} and to {/tt True} again results in the expected transition timing ($/pm$0.05s).

2.3 REQ-0019: Transitionpriorisation

The state machine shall use the first active transition. If multiple transition are active, the transition with the highest overlap time will be used.

Reason	Compensate the weakness of the execution quantisation.
Fitcriterion	At least one transition with at least two active conditions results in the expected state change.

3 SEC-0003: Module Interface

3.1 REQ-0009: This State

The Module shall have a method for getting the current state.

Reason	Comfortable user interface.
Fitcriterion	At least one returend state fits to the expecation.

3.2 REQ-0010: This State is

The Module shall have a method for checking if the given state is currently active.

Reason	Comfortable user interface.
Fitcriterion	At least two calls with different return values fit to the expectation.

3.3 REQ-0011: This State Duration

The Module shall have a method for getting the time since the last state change appears.

Reason	Comfortable user interface.
Fitcriterion	At least one returned duration fits to the current state duration ($/pm$ 0.05s).

3.4 REQ-0012: Last Transition Condition

The Module shall have a method for getting the last transition condition.

Reason	Comfortable user interface.
Fitcriterion	At least one returned transition condition fits to the expectation.

3.5 REQ-0013: Last Transition Condition was

The Module shall have a method for checking if the given condition was the last transition condition.

Reason	Comfortable user interface.
Fitcriterion	At least two calls with different return values fit to the expectation.

3.6 REQ-0014: Previous State

The Module shall have a method for getting the previous state.

Reason	Comfortable user interface.
Fitcriterion	At least one returend state fits to the expecation.

3.7 REQ-0015: Previous State was

The Module shall have a method for checking if the given state was the previous state.

Reason	Comfortable user interface.
Fitcriterion	At least two calls with different return values fit to the expectation.

3.8 REQ-0016: Previous State Duration

The Module shall have a method for getting active time for the previous state.

Reason	Comfortable user interface.
Fitcriterion	At least one returned duration fits to the previous state duration ($/pm$ 0.05s).

4 SEC-0004: Transition Callbacks

4.1 REQ-0001: State change callback for a defined transition and targetstate

The state machine shall call all registered methods in the same order like the registration with all user given arguments for a defined set of /emph{transition/_condition} and /emph{target/_state}.

Reason	Triggering state change actions for a specific transition condition and targetstate.
Fitcriterion	Methods are called in the registration order after state change with all user given arguments for the defined transition condition and targetstate and at least for one other condition not.

4.2 REQ-0002: State change callback for a defined transition

The state machine shall call all registered methods in the same order like the registration with all user given arguments for a defined /emph{transition/_condition} and all /emph{target/_states}.

Reason	Triggering state change actions for a specific transition condition.
Fitcriterion	Methods are called in the registration order after state change with all user given arguments for the defined transition condition and at least for one other transition condition not.

4.3 REQ-0003: State change callback for a defined targetstate

The state machine shall call all registered methods in the same order like the registration with all user given arguments for all /emph{transition/_conditions} and a defined /emph{target/_state}.

Reason	Triggering state change actions for a specific targetstate.
Fitcriterion	Methods are called in the registration order after state change with the defined targetstate and at least for one other targetstate not.

4.4 REQ-0004: State change callback for all kind of state changes

The state machine shall call all registered methods in the same order like the registration with all user given arguments for all transitions.

Reason	Triggering state change actions for all transition conditions and targetstates.
Fitcriterion	Methods are called in the registration order after state change.

4.5 REQ-0020: Execution order of Callbacks

The callbacks shall be executed in the same order as they had been registered.

Reason	User shall have the control about the execution order.
Fitcriterion	A callback with specific targetstate and condition will be executed before a non specific callback if the specific one had been regestered first.