

# Glossary

## action (also called **action formula**)

A *formula* containing no temporal operators. It may (and usually does) contain primed variables. Its meaning is an assignment of Boolean values to *steps*.

## behavior

A sequence of states.

## behavior specification

A temporal formula that describes the possible behaviors of a system.

An initial predicate *Init* and next-state action *Next* are taken to be the behavior specification that is the temporal formula  $Init \wedge [Next]_{vars}$ , where *vars* is a tuple containing all the system's variables.

## expression

A syntactic element of a  $TLA^+$  specification or PlusCal algorithm that can be the right-hand side of a definition.

## formula

A Boolean-valued *expression*.

## inductive invariant

An inductive invariant of an *action* is a *state predicate* that cannot be true in the first state and false in the second state of any *step* that satisfies the action.

An inductive invariant of a specification is an inductive invariant of the next-state action that is true of every initial state (and hence is an *invariant* of the specification).

## invariant

An invariant of a specification is a *state predicate* that is true in every *reachable state* of the specification.

## reachable state

A reachable state of a specification is a *state* that occurs in some possible *behavior* of the specification.

## specification

Can mean either a *behavior specification* or the collection of modules that define a behavior specification.

## state

An assignment of values to variables.

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**state function** (also called **state expression**)

An *expression* containing no action operators or temporal operators. Thus, it contains no primes but may (and usually does) contain unprimed variables. Its meaning is an assignment of values to *states*.

**state predicate**

A Boolean-valued *state function*. Its meaning is an assignment of Boolean values to *states*. Viewed as a temporal formula, it is true of a behavior iff it is true of the behavior's first state.

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**step**

A pair of states.

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**subaction**

An *action* that is a disjunct of the next-state action of a specification.

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**temporal formula**

A formula that is either a state predicate or contains one or more temporal operators. Its meaning is an assignment of Boolean values to *behaviors*. A