What is Strong Fairness?

Naming a property *weak fairness* suggests that there is also a property named *strong fairness*. Strong fairness of an action A is the property that asserts that a behavior is *strongly fair* for A. The definition of a behavior σ being strongly fair for A differs from the definition of weakly fair in that its second condition is strengthened to:

- σ does not contain an infinite suffix τ such that A is enabled in infinitely many states of τ and τ contains no A steps.

This is a stronger condition than for weakly fair because, if A is enabled in every state of the infinite suffix τ, then it is enabled in infinitely many states of τ.

Weak fairness is a more common requirement than strong fairness—though for many specifications, the two conditions are equivalent. For example, weak and strong fairness are equivalent for the *Rcv* process of the bounded channel because once the system reaches a state in which *Rcv* is enabled, if no further *Rcv* steps occur then *Rcv* remains enabled from then on (because the channel stays nonempty).

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