

Safety and Liveness

Informally, a safety property asserts that something bad does not happen. More precisely, a safety property is one that can be violated by a single step of a behavior, or by its first state. For example, the property

whenever x equals y , they both equal the gcd of M and N .

is a safety property because it can be violated by a step that makes x and y equal without making them equal to the gcd of M and N .

Informally, a liveness property asserts that something good eventually happens. More precisely, a liveness property is one that you cannot tell is violated without seeing the entire behavior. For example, the property that eventually x equals y is a liveness property because you need to see the entire behavior to know that x is never equal to y .

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