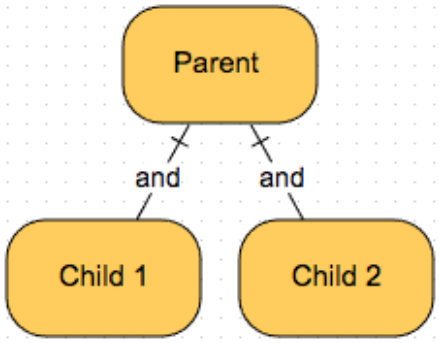
Forward Analysis Propagation Rules

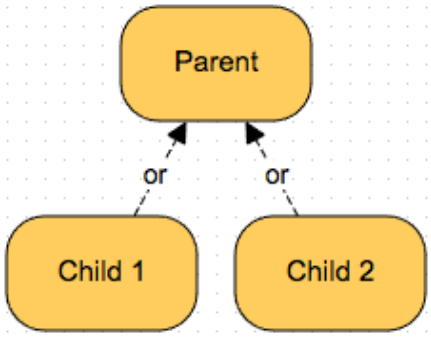
And Decomposition: to achieve the parent, all the children must be achieved



For AND-Decomposition we take the minimum value of all the child nodes.

✓ < ✓. < ✗. < ✗

Or Decomposition (**Means-Ends**): to achieve the parent, one or more alternatives must be achieved



For OR-Decomposition we take the maximum value of all the child nodes.

✓ < ✓. < ✗. < ✗

AND-Decomposition

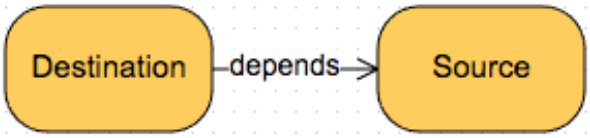
Inputs		Result
Child 1	Child 2	Parent
✓	✓	✓
✓	✓.	✓.
✓	✗.	✗.
✓	✗	✗
✓.	✓	✓.
✓.	✓.	✓.
✓.	✗.	✗.
✓.	✗	✗
✗.	✓	✗.
✗.	✓.	✗.
✗.	✗.	✗.
✗.	✗	✗
✗	✓	✗
✗	✓.	✗
✗	✗.	✗
✗	✗	✗

OR-Decomposition

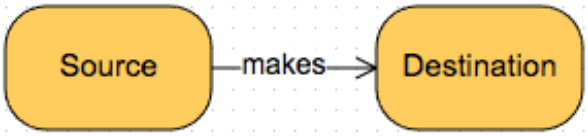
Inputs		Result
Child 1	Child 2	Parent
✓	✓	✓
✓	✓.	✓
✓	✗.	✓
✓	✗	✓
✓.	✓	✓
✓.	✓.	✓.
✓.	✗.	✓.
✓.	✗	✓.
✗.	✓	✓
✗.	✓.	✓.
✗.	✗.	✗.
✗.	✗	✗.
✗	✓	✓
✗	✓.	✓.
✗	✗.	✗.
✗	✗	✗

Forward Analysis Propagation Rules Continued

Dependency: **Dependency links propagate the value in the opposite direction of the depends arrow.** For example, the *Destination* depends on the *Source*. The label at *Source* is propagated directly to the *Destination*, see the table below.

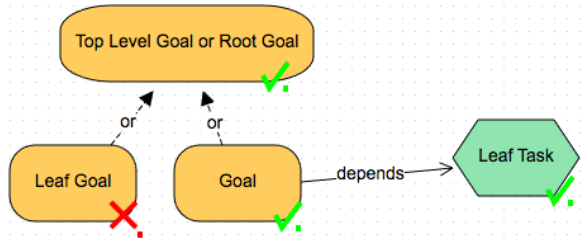


Contribution Links: Contribution links propagate based on the type of link as shown in this table below.



Source	Destination for each Link Type				
	Depends	Makes	Helps	Hurts	Breaks
✓	✓	✓	✓	✗	✗
✓	✓	✓	✓	✗	✗
✗	✗	✗	✗	✓	✓
✗	✗	✗	✗	✓	✓

Example:



For example, *Top Level Goal or Root Goal* gets the value of Partially Satisfied because in an OR-Decomposition we take the maximum of Partially Satisfied and Partially Denied.
Note: The value of *Goal* was first propagated from the value of *Leaf Task*.