Documentation

Friday, May 3, 2024

1:04 PM

## Use on Organizational Patterns

Let’s assume a sequence of organizational patterns from the Piecemeal Growth pattern language. Let’s denote names of the patterns in this sequence with first letters of the words in their names:  
  
SST – denotes Self Selecting Team organizational pattern.  
DG - denotes Diverse Groups organizational pattern.

UP - denotes Unity of Purpose organizational pattern.

PR - denotes Patron Role organizational pattern.

FW - denotes Fire Walls organizational pattern.

GK - denotes Gate Keeper organizational pattern.

CS - denotes Compensate Success organizational pattern.

STO - denotes Size the Organization organizational pattern.

PII – denotes Phasing It In organizational pattern.

APP - denotes Apprenticeship organizational pattern.

SV - denotes Solo Virtuoso organizational pattern.

DIP - denotes Developing in Pairs organizational pattern.

HD - denotes Holistic Diversity organizational pattern.

DER - denotes Domain Expertise in Roles organizational pattern.

SBS - denotes Subsystem by Skill organizational pattern.

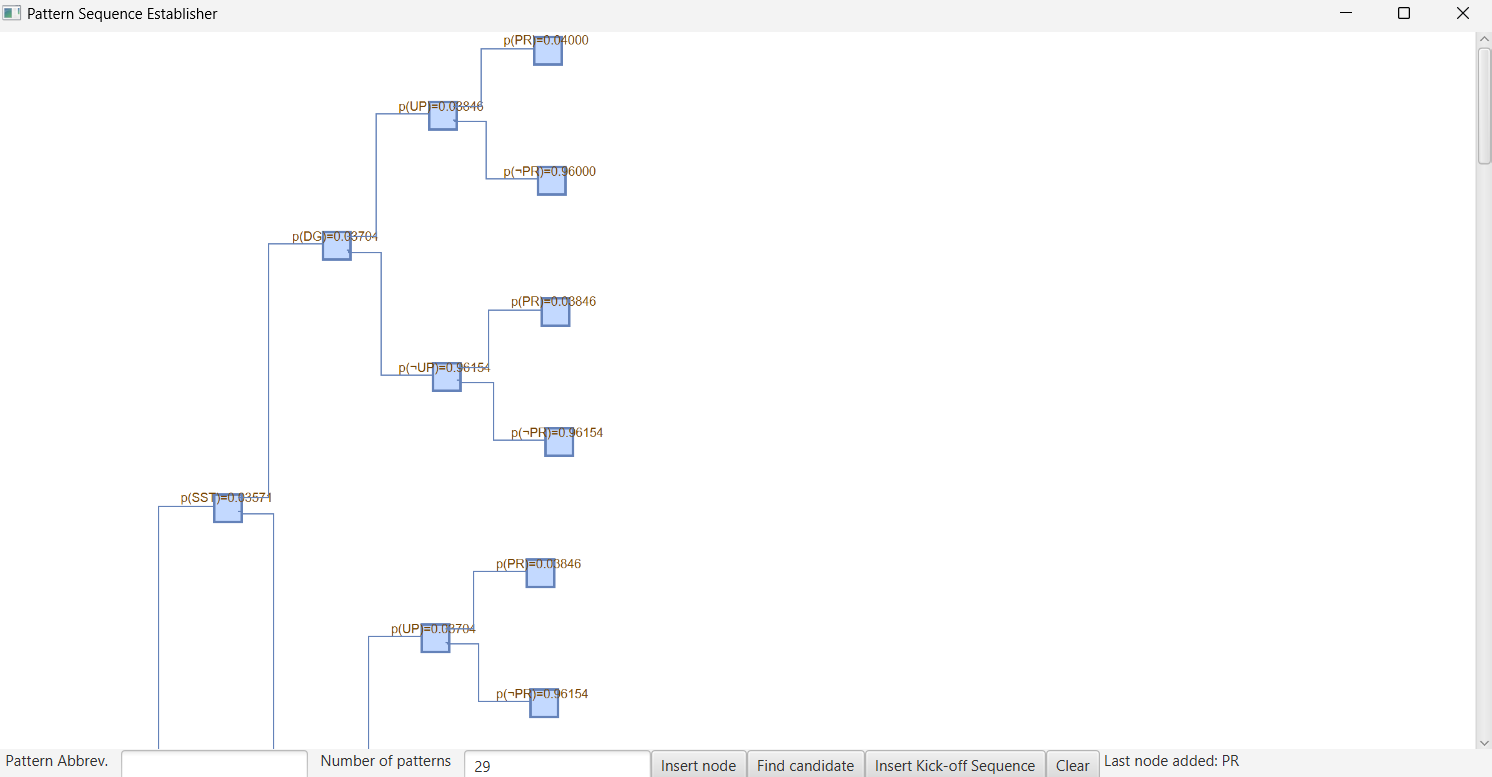
MTN - denotes Moderate Truck Number organizational pattern.

**Kick-off sequence 1:** SW -> SST -> DG -> UP -> PR -> FW -> GK -> CS -> STO -> PII -> APP -> SV -> DIP -> HD -> DER -> SBS -> MTN

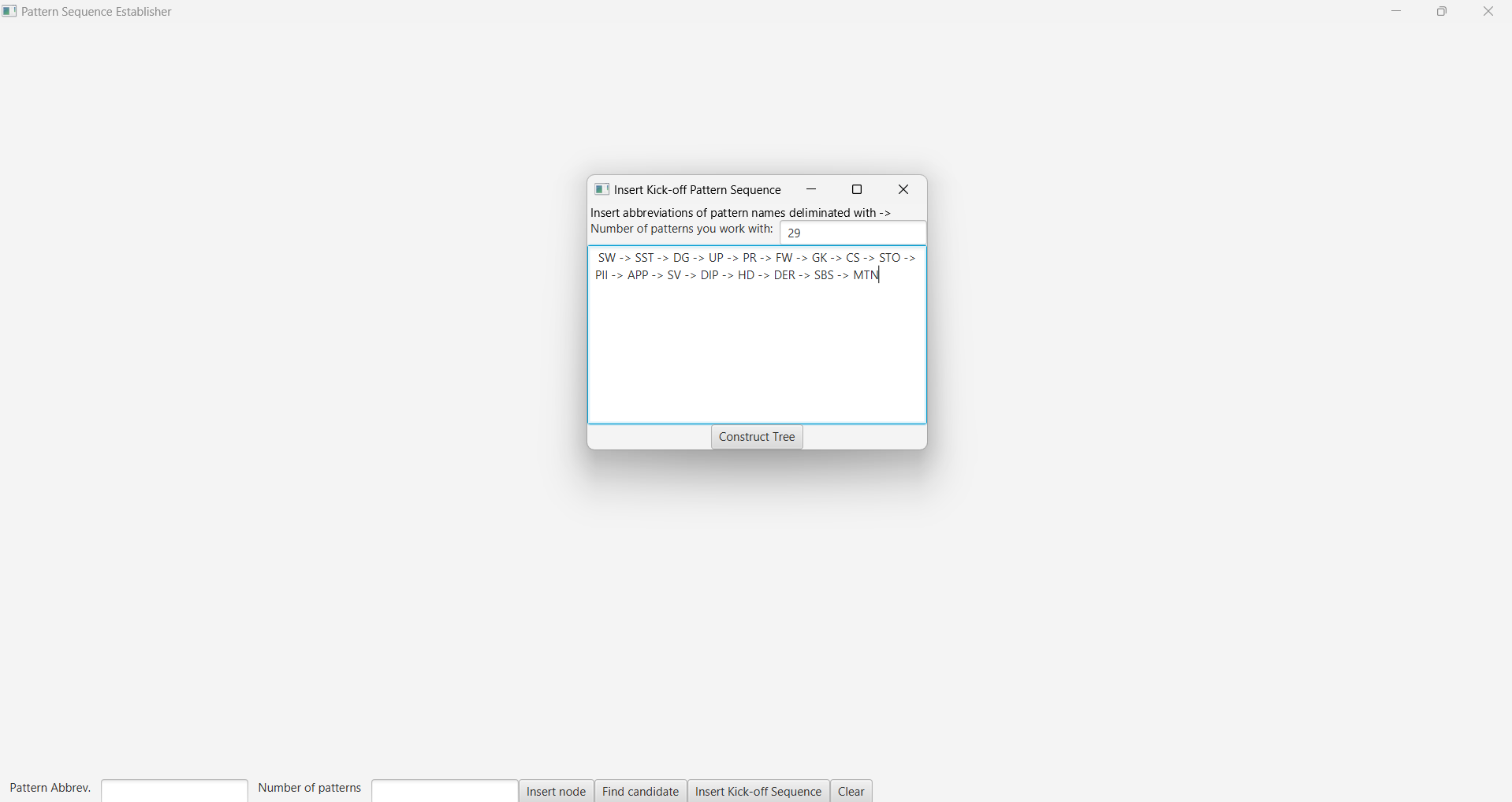
This sequence is meaningful, its use can be explained in pattern story and describes transformation of the small team experimenting with new technology into the wider organizational structure after initial success of the software prototype they were responsible for.

262 141 nodes are required to implement stochastic tree for this sequence, if each node must hold information about all its parents, along with probability of the use of each of these nodes representing pattern sequence.

Users of the application have the option to insert new nodes into the stochastic tree one by one by inserting pattern name abbreviation into the relevant text field labeled “Pattern Abbrev.”. Value into the text field labeled “Number of patterns” must be inserted as well and it’s the number of patterns user works with. Each node is added into the stochastic tree after clicking on submit button “Insert node”. After that, the user does not have to specify the number of patterns anymore, but the text field for this number becomes non-editable.

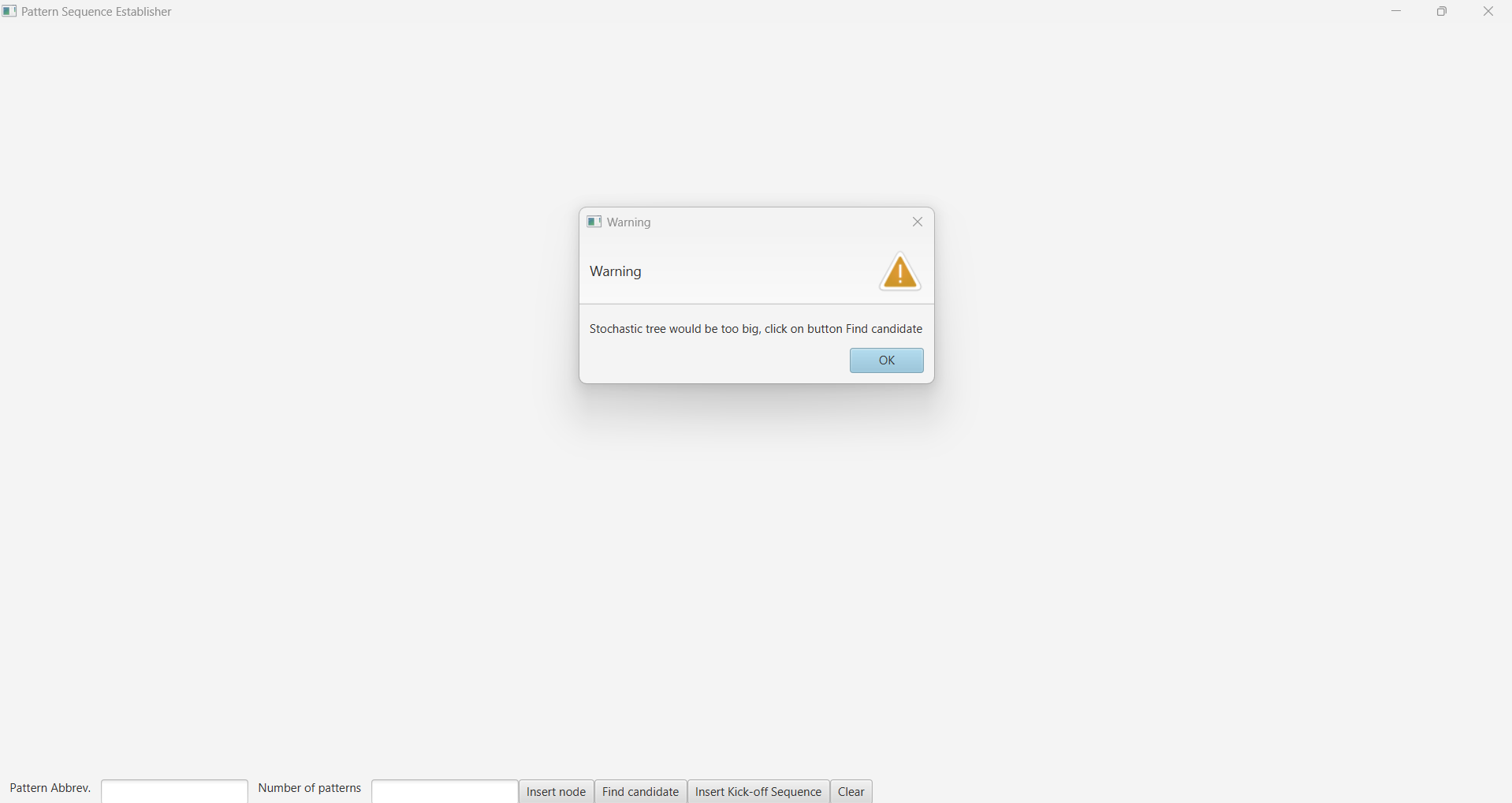


To speed up inserting kick-off sequences and constructing stochastic trees on top of them, application provides option to upload them through the text area displayed after the click on “Insert Kick-off Sequence” button.

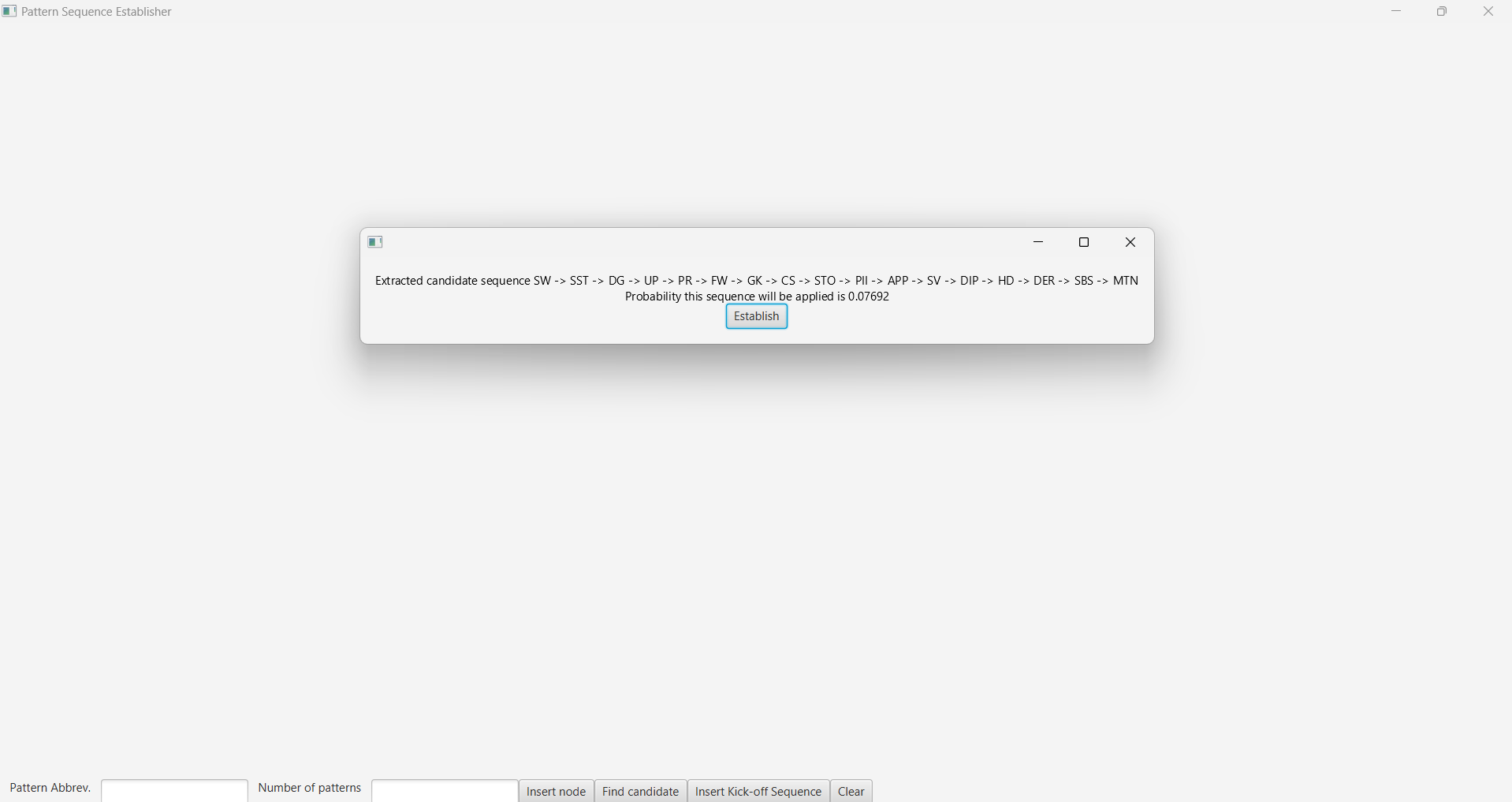


Because our kick-off sequence has 17 patterns, a stochastic tree for this sequence would be too big to be displayed with JGraphT graphic library. This library only allows me to draw a binary tree and functionality behind the stochastic tree must be implemented by my own. This graphic library is also very slow when it comes to loading a big graph, therefore, other graphic libraries should be explored as well.

Stochastic trees are used only to find an expected pattern sequence candidate. If the visualization of the stochastic tree would be too big to be visualized, the application stops visualizing it, provides warning about what happened and lets user be shown with the expected pattern sequence candidate, in a matter of seconds. The structure of the stochastic tree is constructed but visualization is stopped.

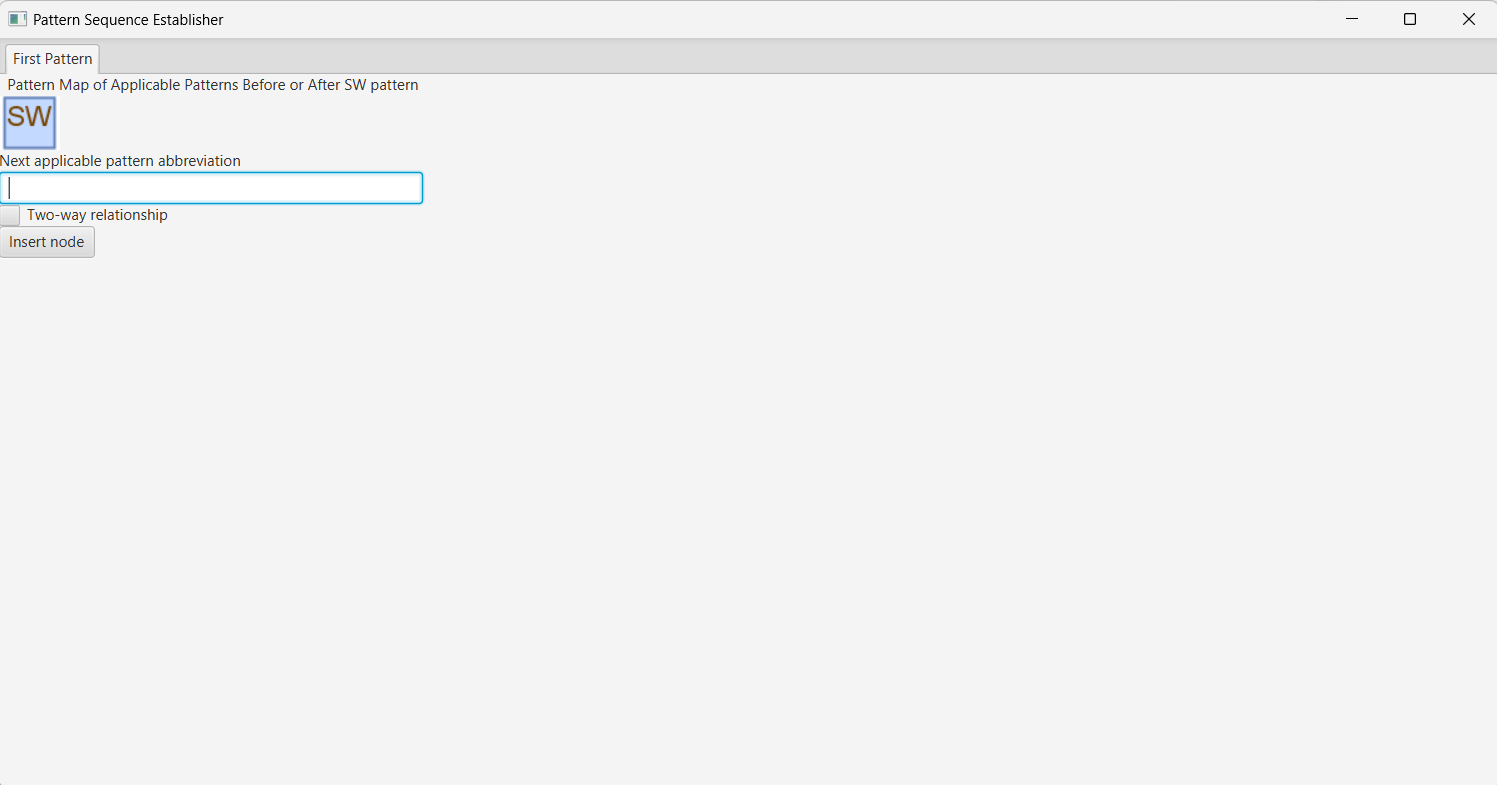


As can be seen on the bottom picture, application displays expected pattern sequence candidate along with the probability of applying it by the assumed domain expert.



After clicking on button “Establish”, user is redirected to new tab where she can add additional applicable patterns after the first pattern in the candidate sequence into the pattern map of applicable patterns. Abbreviations for these patterns must be inserted into the text field labeled “Next applicable pattern abbreviation”. If this second pattern links to the first pattern in candidate sequence in its text description, checkbox “Two-way relationship” must be checked.

Each relationship between the first pattern in expected pattern sequence candidate and additional applicable pattern is added into the pattern map after clicking on button ‘Insert node’.



After each addition of relationship to pattern map, a new row is added to the table with the conditional probabilities and symmetry of relationships. This table is shown on the right side of the tab. Table consists of four columns:

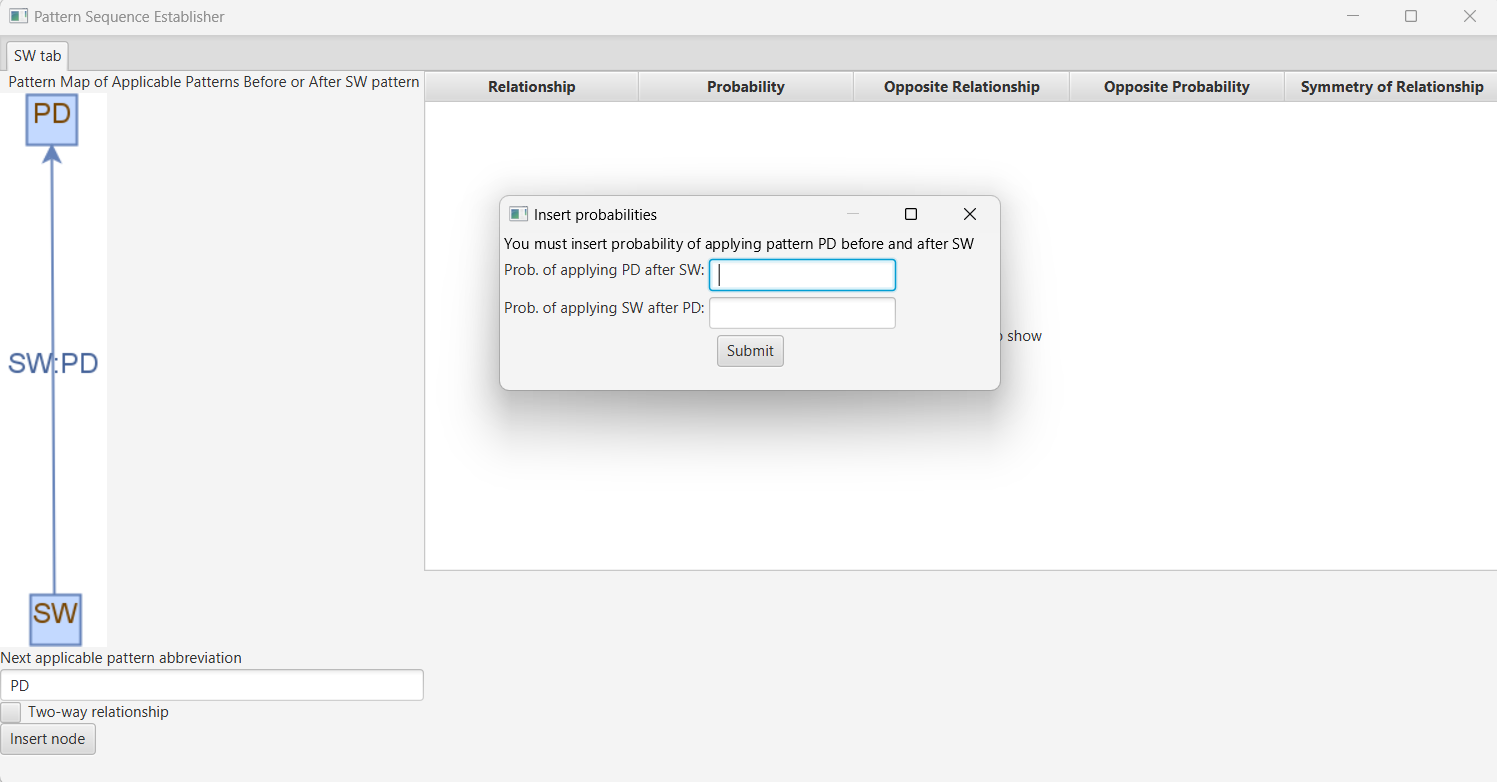
* A column named “Relationship” indicates the first pattern in the expected pattern sequence candidate links to additional pattern provided by user of this application.
* A column named “Probability” provides conditional probability of applying this additional applicable pattern after the first pattern in expected pattern sequence candidate. This probability is extracted from the stochastic tree.
* A column named “Opposite Relationship” provides inverse probability to the conditional probability and this opposite probability is calculated with Bayes rule. It is a conditional probability of applying an additional applicable pattern before application of the first pattern in expected pattern sequence candidate.
* A column named “Symmetry of Relationship” provides symmetry of relationship between the first pattern in the expected pattern sequence candidate and each additional applicable pattern. This value is calculated as the absolute value of difference between values in columns “Probability” and “Opposite probability”.

Pattern expected to be applied after the first pattern in the expected pattern sequence candidate is the one having the strongest symmetry (lowest number in the column “Symmetry of Relationship”) of relationship with the first pattern in candidate sequence. Name of this next expected pattern is provided to the user after clicking on button “Find next applicable pattern”.

A screenshot of a computer

Description automatically generated

If the next applicable pattern is not present in the kick-off pattern sequence, conditional probability for column “Probability” cannot be extracted from the stochastic tree and different stochastic tree for different kick-off pattern sequence had to be constructed. Because of that, application prompts user to provide value for column “Probability” and “Opposite Probability” directly, such that symmetry of the relationship can be computed.



After clicking on button “Continue”, user is redirected to another tab where he continues doing the same. She is asked to provide other applicable patterns after the pattern that was previously identified as pattern expected to be applied next in the first tab (Self Selecting Team). Symmetries of relationships are calculated again and provided on the table on the right-hand side. This time, the next applicable pattern was DG = Diverse Groups. This makes an expected pattern sequence SW -> SST -> DG standing for Skunk Works -> Self-Selecting Team -> Diverse Groups.

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Users can also get back to previous tabs anytime they want to see what led to the decision to recommend the next applicable pattern.

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