

Anwendung zur Katalogisierung der Eigenschaften von Petrinetzen und Transitionssystemen und ihren Beziehungen

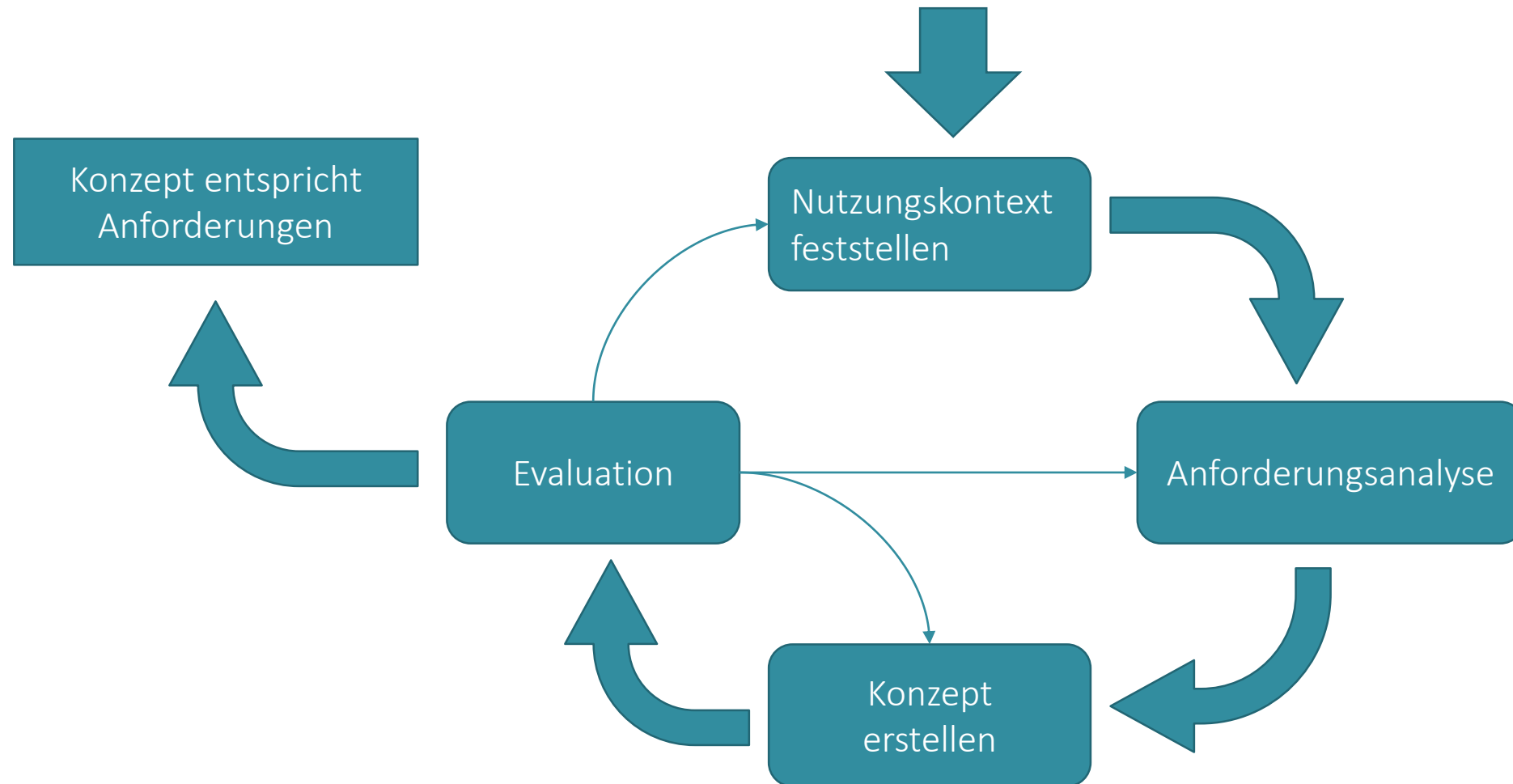
Alexandra Reger

18.11.2016

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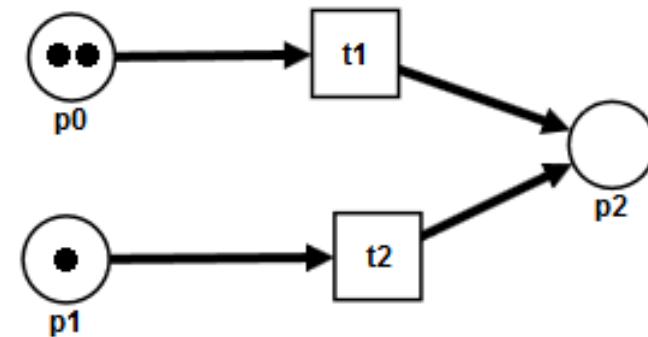
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 - *Anforderungen*
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Vorgehen - Human Centered Design Process



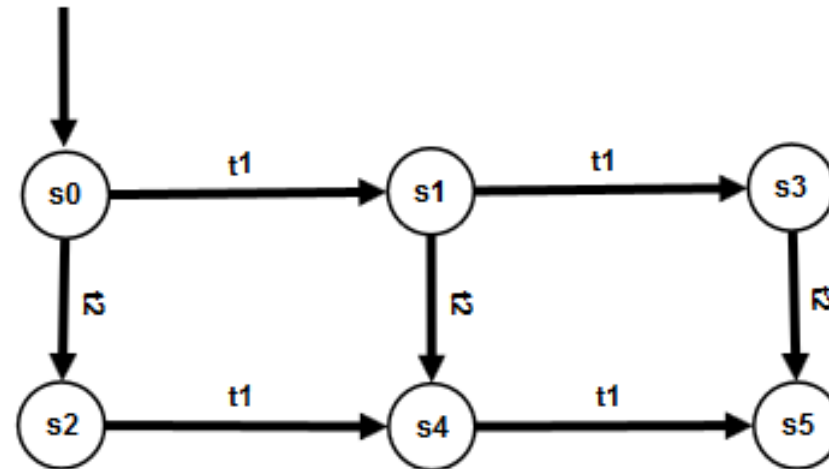
Theorie

- Petrinetz (PN) – Tupel (P, T, F, B)
- P – Places/Stellen
- T – Transitionen
- F – forward-Matrix
- B – backward-Matrix



Theorie

- Transitionssystem (TS) – Tupel (S, A, T, S_0)
- S – States/Zustände
- A – Labels/Markierungen
- T – Transitionsrelation
- S_0 – Startzustände



Theorie

- Eigenschaften
 - *folgern*
 - *ausschließen*
- Beispiel Suche für Vermutungen, Sätze

- weak forward determinism
- persistent

- \Rightarrow strong forward determinism

Problemstellung

○ Beispiel:

○ For labelled transition systems which are

- *finite*
- *totally reachable*
- *weakly forward deterministic*
- *persistent*

- *weak periodicity \Rightarrow disjoint small cycles*
- *mild cycle-consistency \Rightarrow disjoint small cycles*
- *prime cycles \Rightarrow disjoint small cycles*
- *prime cycles + full backward determinism \Rightarrow strong cycle consistency*
- *mild cycle-consistency \Rightarrow full backward determinism*
- *prime cycles + weak cycle-consistency \Rightarrow path-nondisjointness*
- *prime cycles + simple cycle-consistency \Rightarrow full backward determinism*



Vorausgesetzte
Eigenschaften



Gefolgerte
Eigenschaften

Problemstellung

- Keine Übersicht der Eigenschaften
- Suche ineffizient

- finite
- totally reachable
- weakly forward deterministic
- persistent
- weak periodicity
- disjoint small cycles
- weak cycle-consistency
- simple cycle-consistency
- mild cycle-consistency
- strong cycle consistency
- prime cycles
- full backward determinism
- path-nondisjointness



Problemstellung

- Keine Übersicht der Eigenschaften
- Suche ineffizient
- Zusammenhänge nicht sichtbar
 - weak periodicity \Rightarrow disjoint small cycles
 - mild cycle-consistency \Rightarrow disjoint small cycles
 - prime cycles \Rightarrow disjoint small cycles
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Problemstellung

- Keine Übersicht der Eigenschaften
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prime cycles + full backward determinism \Rightarrow strong cycle consistency
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prime cycles + simple cycle consistency \Rightarrow strong cycle consistency

Konzept

- Anforderungen an die Software
 - *Benutzerfreundlich*
 - *Fokus auf*
 - Darstellung der Ergebnisse
 - Darstellung der Beziehungen
- Entwurfsentscheidungen
 - *Webanwendung*

Konzept

- 2 Hauptfunktionen
- *Suche von Aussagen*
- *Datenbank Pflege*

The screenshot shows a web application interface with a dark green header and a light green main content area. The header contains a 'Logo' placeholder and a navigation menu with the following items: 'Search Statement', 'Property', 'Definition', 'Reference', and 'Statement'. Below the navigation menu, there is a table with four columns corresponding to the menu items. Each column contains three buttons: 'New', 'Edit', and 'Delete'. The main content area contains the text: 'Anwendung zur Katalogisierung von Eigenschaften von Petrinetzen und Transitionssystemen, sowie den Beziehungen zwischen den Eigenschaften.' At the bottom of the page, there is a footer with the text: '2016 Forschungsseminar Alexandra Reger'.

Property	Definition	Reference	Statement
New	New	New	New
Edit	Edit	Edit	Edit
Delete	Delete	Delete	Delete

Anwendung zur Katalogisierung von Eigenschaften von Petrinetzen und Transitionssystemen, sowie den Beziehungen zwischen den Eigenschaften.

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Konzept

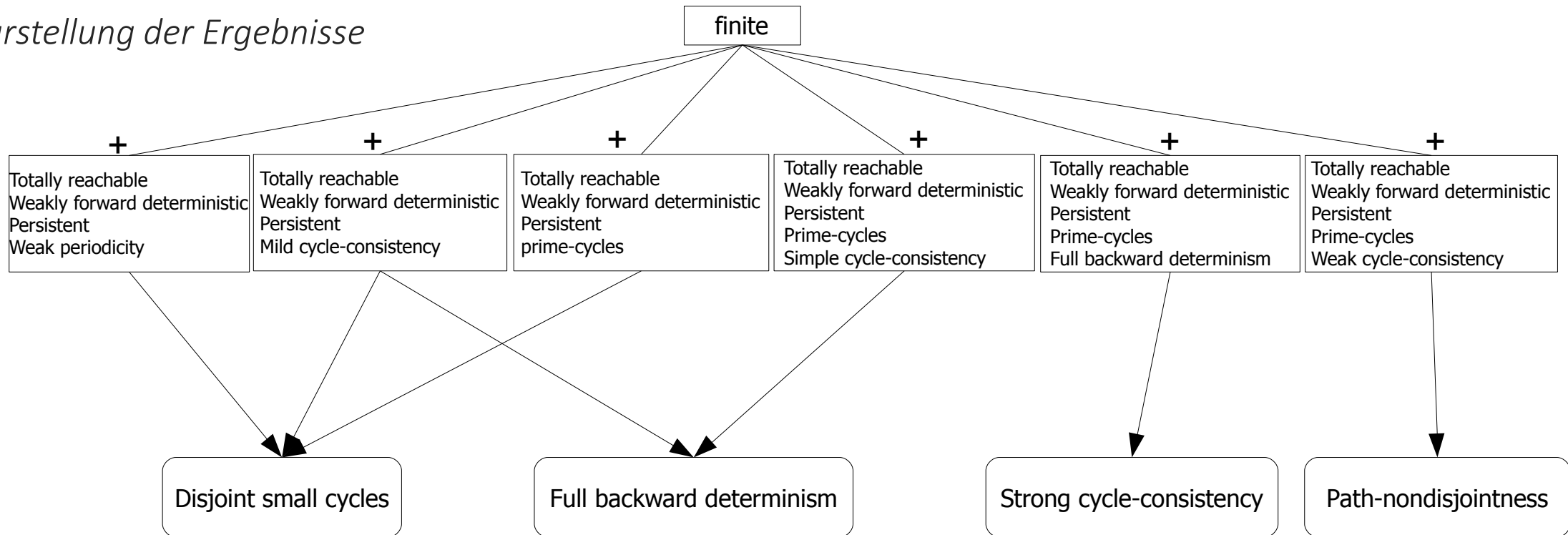
- Suche
- *Darstellung der Ergebnisse*

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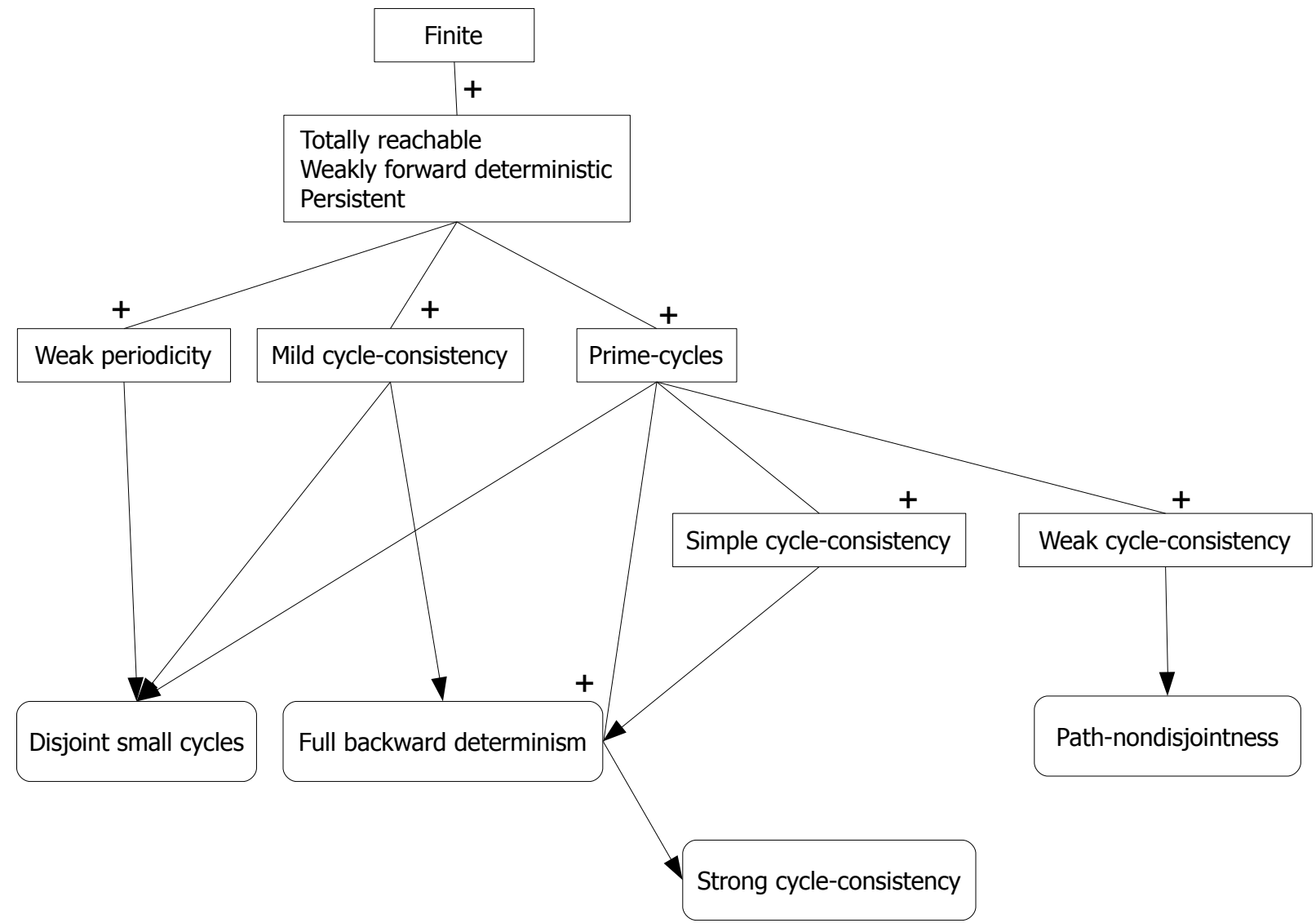
Konzept

- Suche
- *Darstellung der Ergebnisse*



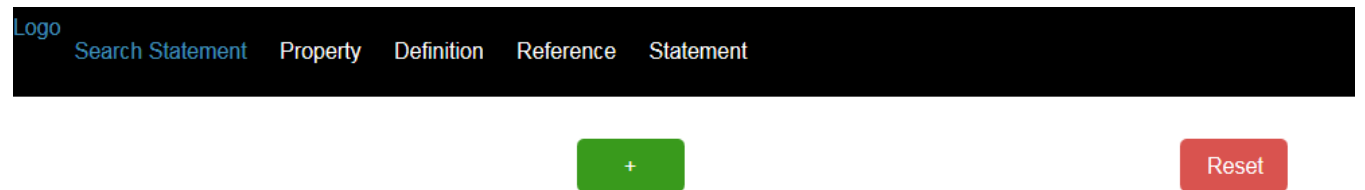
Konzept

- Suche
- *Darstellung der Ergebnisse*



Konzept

- Suche
- *Vorgehensweise*



Konzept

- Suche
- *Vorgehensweise*

The screenshot shows a web application interface. At the top, there is a black navigation bar with the text "Logo" in blue, followed by "Search Statement" in light blue, and "Property", "Definition", "Reference", and "Statement" in white. Below the navigation bar, there is a central grey dialog box titled "Choose Properties" with a horizontal line underneath. Inside the dialog box, there are six property labels arranged in two columns: "Property 1" and "Property 4" in the first row, "Property 2" and "Property 5" in the second row, and "Property 3" and "Property 6" in the third row. A green "Next" button is located at the bottom right of the dialog box. To the right of the dialog box, there is a red "Reset" button. At the bottom of the page, there is a black footer bar with the text "2016 Forschungsseminar Alexandra Reger" in white.

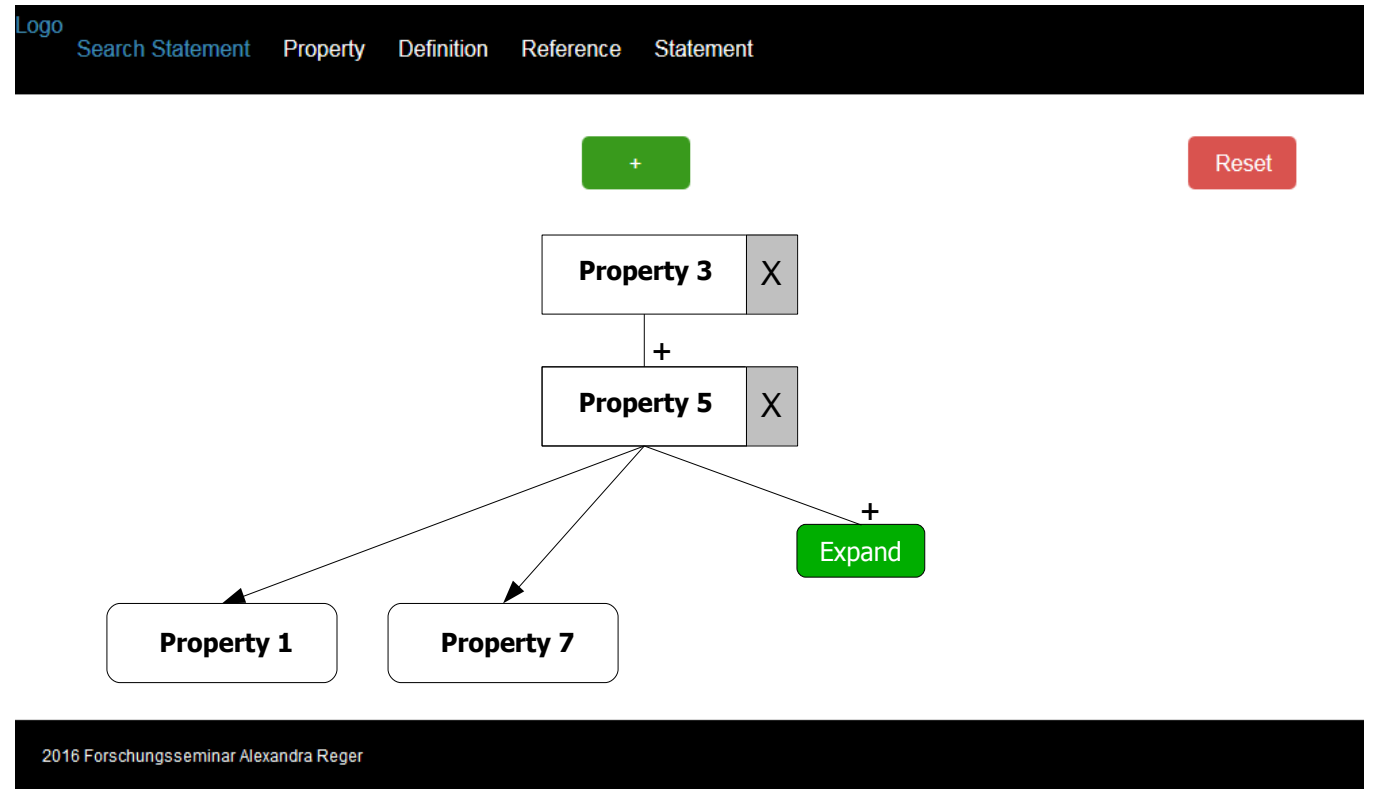
Konzept

- Suche
- *Vorgehensweise*

The screenshot shows a web application interface. At the top, there is a black navigation bar with a 'Logo' on the left and a menu of links: 'Search Statement', 'Property', 'Definition', 'Reference', and 'Statement'. Below the navigation bar, there is a central grey dialog box titled 'Choose Properties'. Inside this dialog, there are six property labels: 'Property 1', 'Property 2', 'Property 3', 'Property 4', 'Property 5', and 'Property 6'. The labels 'Property 3', 'Property 5', and 'Property 6' are each enclosed in a white rectangular box with a thin black border. A green 'Next' button is located at the bottom right of the dialog box. To the right of the dialog box, there is a red 'Reset' button. At the bottom of the page, there is a black footer bar containing the text '2016 Forschungsseminar Alexandra Reger'.

Konzept

- Suche
- *Vorgehensweise*



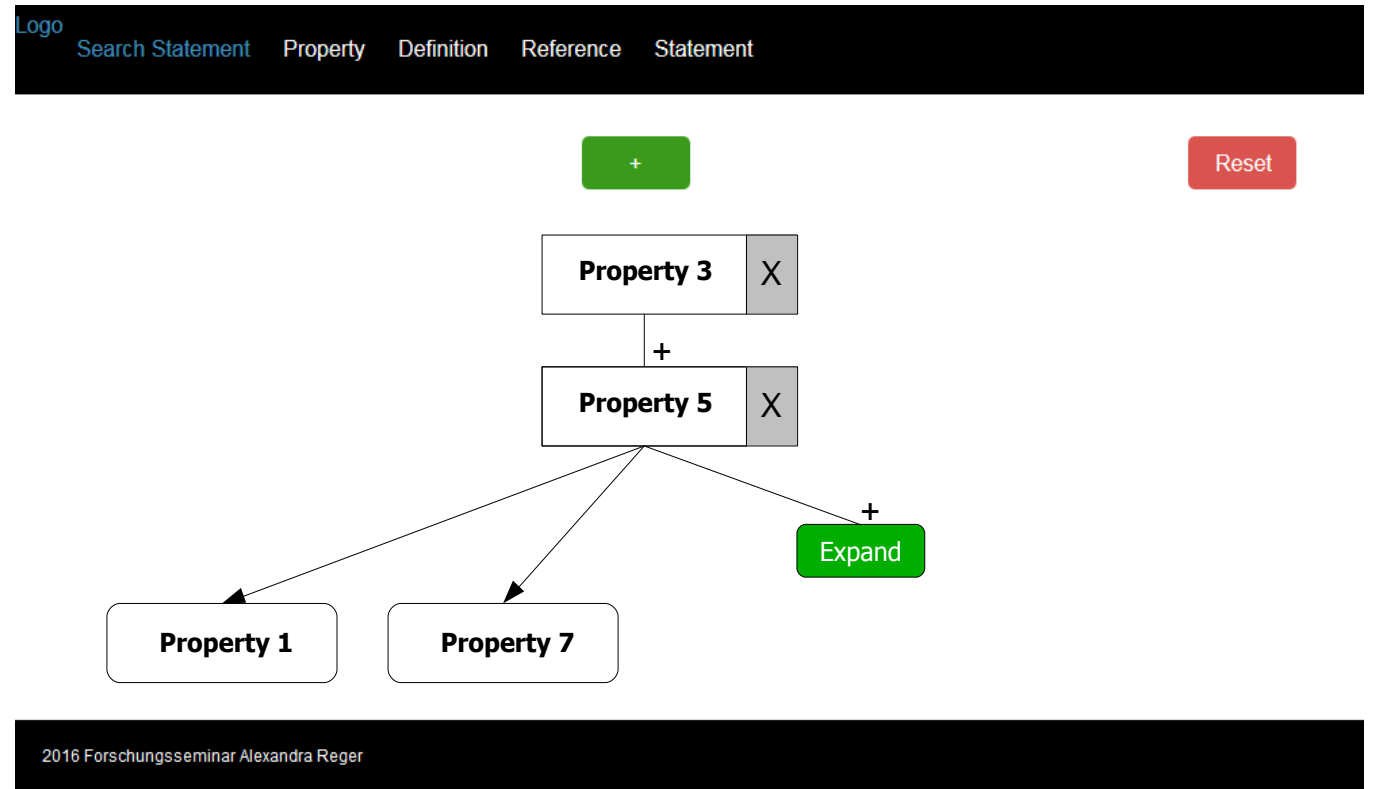
Konzept

- Suche
- *Vorgehensweise*

The screenshot displays a web application interface with a dark header bar. On the left, there is a 'Logo' and a navigation menu with items: 'Search Statement', 'Property', 'Definition', 'Reference', and 'Statement'. A modal window titled 'Show Definition' is open, containing a 'Property 1' label, a 'Definition description' text area, and a 'Reference' text area. A 'Close' button is located at the bottom right of the modal. To the right of the modal, there is a red 'Reset' button. A small white box with the text 'Property' and an arrow points to the 'Property 1' label in the modal. At the bottom of the page, a dark footer bar contains the text '2016 Forschungsseminar Alexandra Reger'.

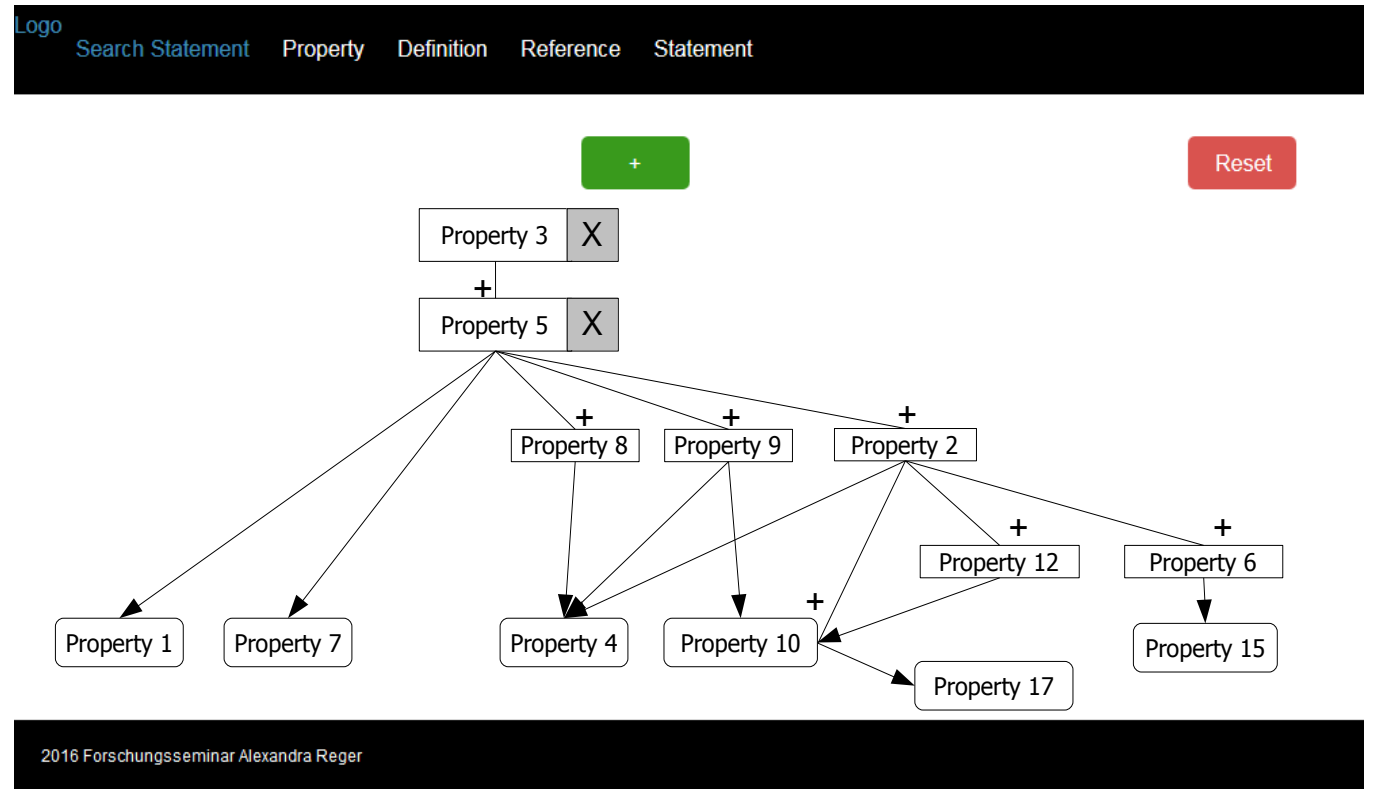
Konzept

- Suche
- *Vorgehensweise*



Konzept

- Suche
- *Vorgehensweise*



Konzept

- Datenbank Pflege
 - Eigenschaften
 - Definitionen
 - Quellen
 - Aussagen

persistent

If for all states $s, s', s'' \in S$, and labels $t \neq u$, if $s[t]s'$ and $s[u]s''$, then there is some state $r \in S$ such that both $s'[u]r$ and $s''[t]r$

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finite + totally reachable + weakly forward deterministic + persistent + weak periodicity \Rightarrow disjoint small cycles

Konzept

- Datenbank Pflege
- *Eigenschaften*

The screenshot shows a web application interface with a black header bar. On the left of the header is a 'Logo' placeholder. To its right are navigation links: 'Search Statement', 'Property' (highlighted in blue), 'Definition', 'Reference', and 'Statement'. Below the header, the main content area is titled 'Properties' in a large, bold font. In the top right corner of this area is a green button labeled 'Add Property'. Below the title, there are two property entries, each separated by a horizontal line. The first entry is 'Property 1', which has sub-links for 'Definitions' and 'References'. To the right of 'Property 1' are two buttons: a green 'Edit' button and a red 'Delete' button. The second entry is 'Property 2', which also has sub-links for 'Definitions' and 'References'. At the bottom of the page is a black footer bar containing the text '2016 Forschungsseminar Alexandra Reger'.

Konzept

- Datenbank Pflege
- *Eigenschaften hinzufügen*

Logo Search Statement **Property** Definition Reference Statement

Add new Property

Name

Definition ▼

Definition preview

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Konzept

- Datenbank Pflege
- *Eigenschaften bearbeiten*

Logo Search Statement **Property** Definition Reference Statement

Edit Property

Name

Definition

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Zeitplan

Dauer	Aufgabe
1 Woche	Umfrage durchführen
1 Woche	Anforderungsanalyse
1 Woche	Konzept anpassen
6 Wochen	Implementierung <ul style="list-style-type: none">• GUI• Datenbank• Funktionalität
1 Woche	Einführung schreiben
1 Woche	Dokumentation schreiben
2 Wochen	Evaluation durch Benutzer und Anpassung
1 Woche	Fazit schreiben
2 Wochen	Fehlersuche, Korrektur, Puffer
16 Wochen	

Fazit

- Webanwendung
- Funktionen:
 - *Datenbank Pflege*
 - *Aussagen Suche*
- Ziele
 - *Eigenschaften*
 - Definitionen
 - Darstellung Zusammenhänge, Beziehungen
 - *effiziente Suche*
 - *benutzerfreundlich*

Quellen

- Best, Eike und Devillers, Raymond: The Power of Prime Cycles, F. Kordon and D. Moldt: PETRI NETS 2016, LNCS 9698, S. 74, Springer International Publishing Switzerland, 2016
- Priese, Lutz und Wimmel, Harro: Theoretische Informatik : Petri-Netze, Springer-Verlag Berlin Heidelberg, 2003

Grafiken

- Kurosu, Masaaki: Human Centered Design: Second International Conference, HCD 2011, Springer Science & Business Media, 2011

Vielen Dank für die
Aufmerksamkeit.