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Computer Science
and Engineering
Department

Using context graphs to help users in their daily activities

Bachelor Project - September 2014

Author

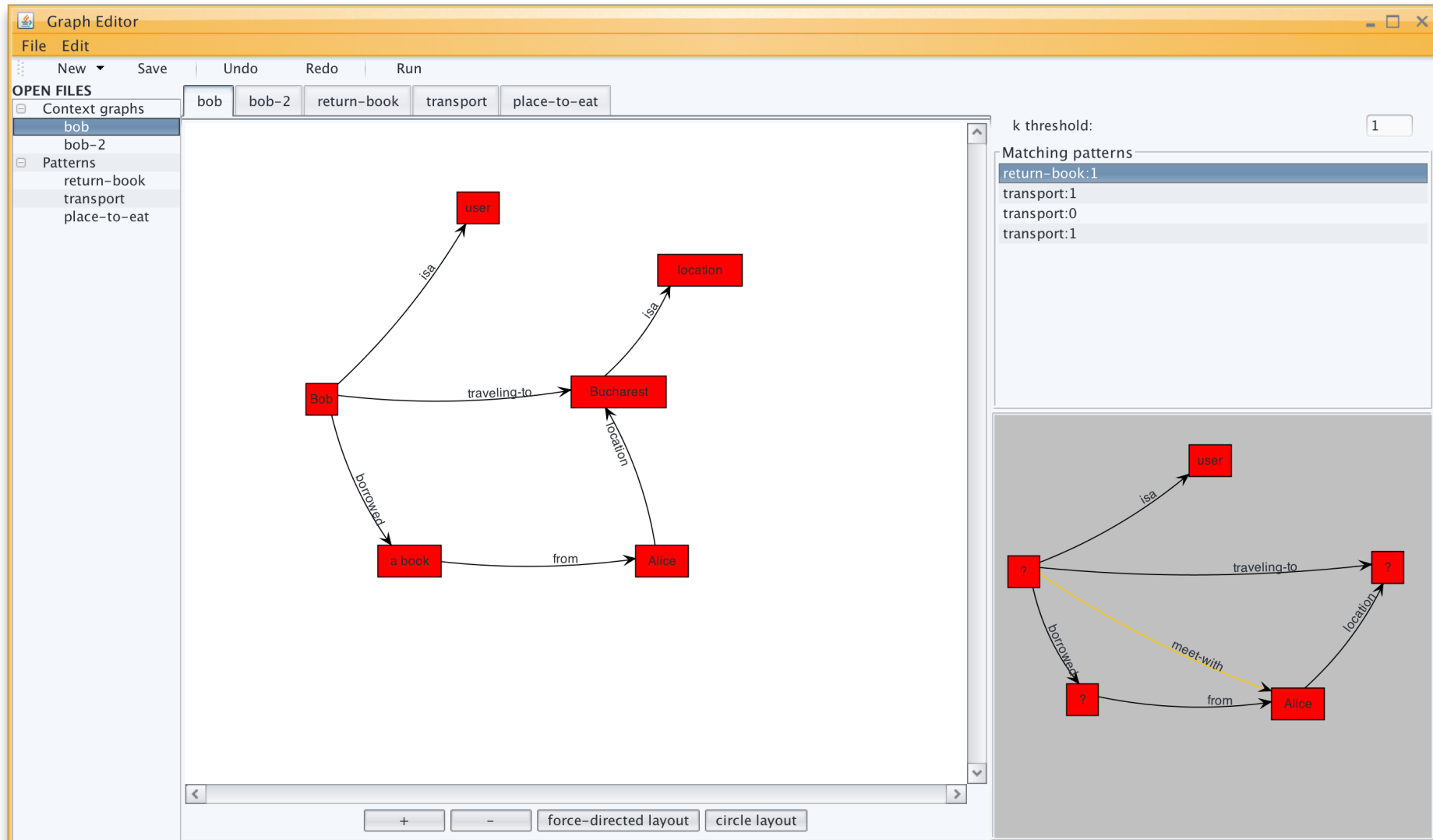
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Context graph editor

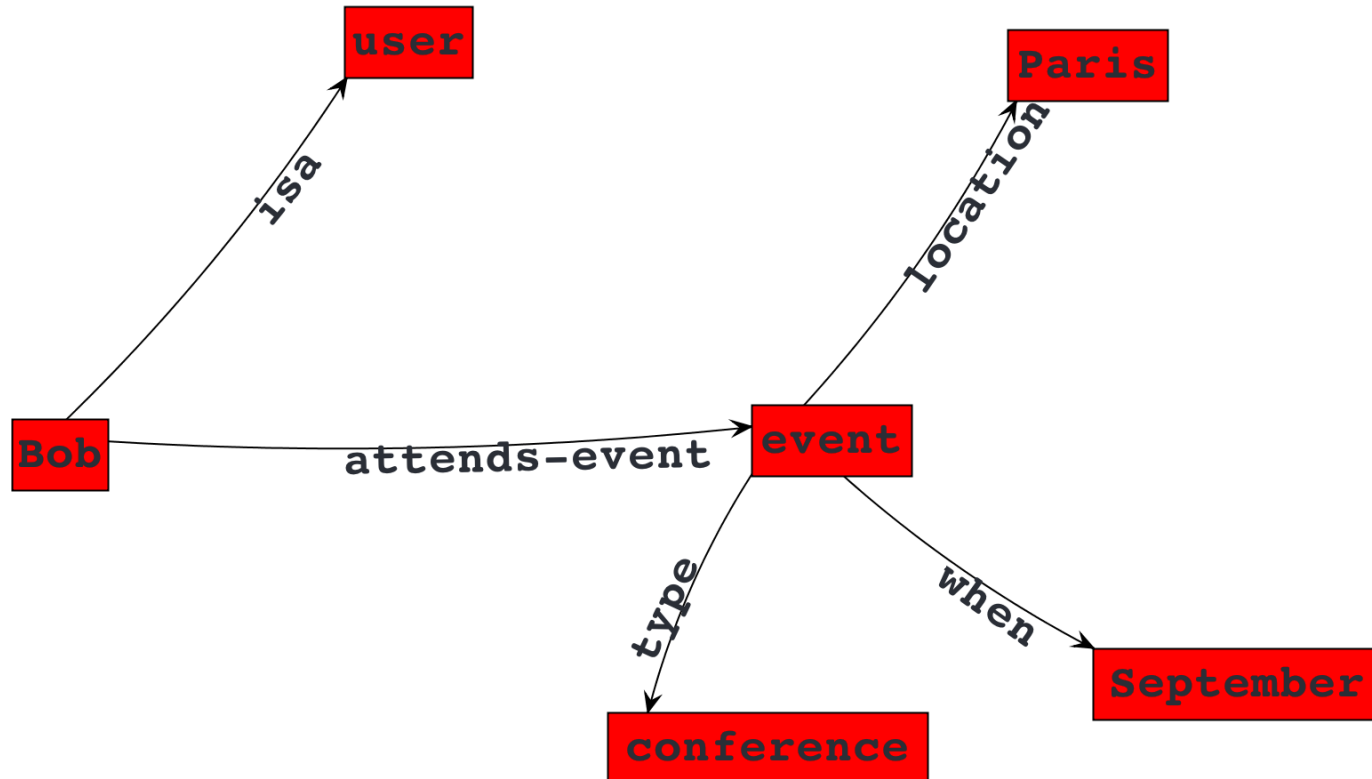




- model for context representation as a graph
 - nodes are concepts relevant to the user
 - edges are associations between concepts
- context graphs can be used by context-aware systems



Context graphs



Context graph representing a user who attends a conference held in Paris in September.

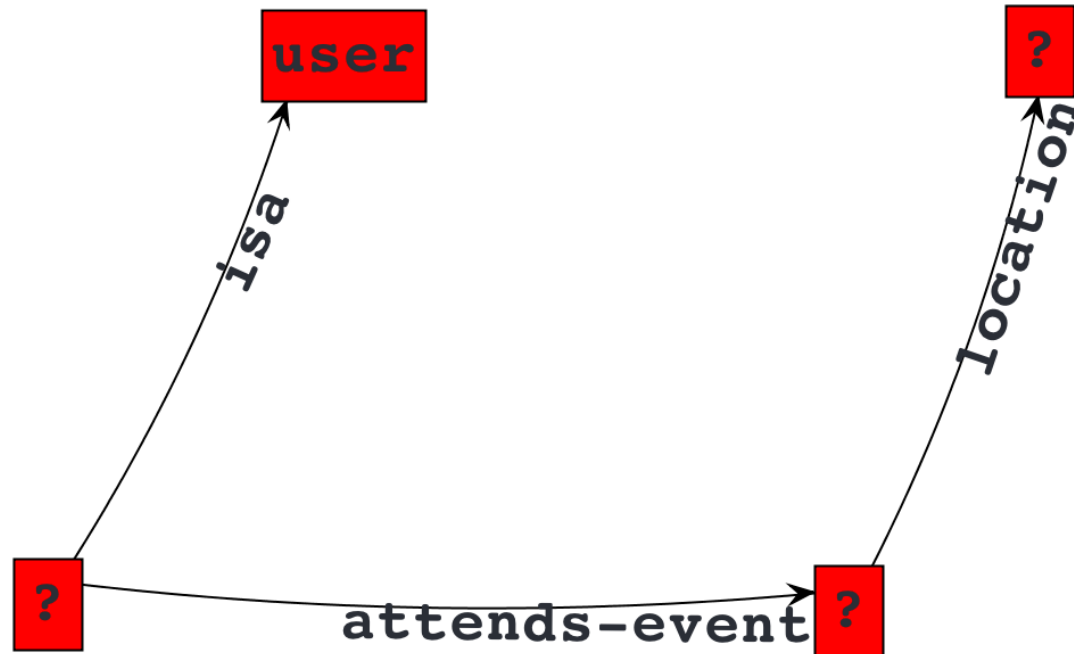


Context graph patterns

- identifying the user's situation is done using context graph patterns
- patterns are context graphs describing more general situations
- patterns use the “?” as a wildcard symbol



Context graph pattern



Pattern: User attends an event with location.

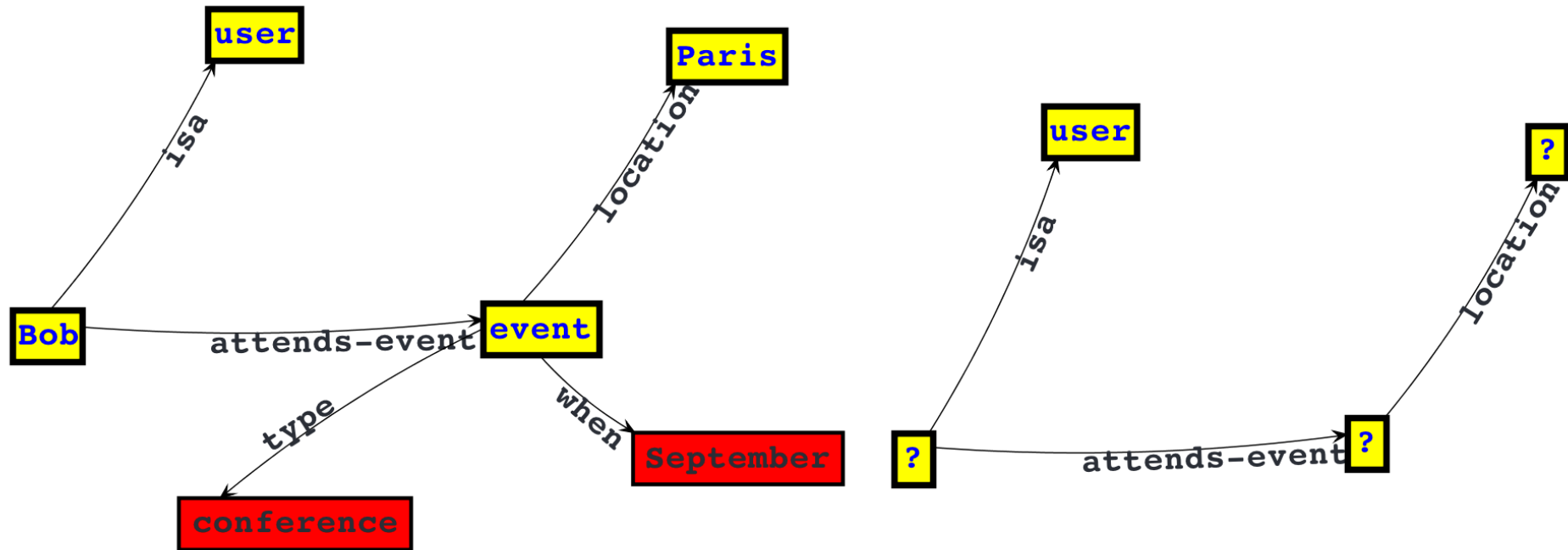


Context matching

- the user's context graph is matched against a list of patterns
- matching is done by graph comparison



Matching



Match: Bob is attending an event in Paris.



Related projects

- `net.xqhs.Graphs`
 - java library
 - context graph representation
 - context graph matching
- JUNG
 - java library
 - graph visualization
 - graph editing



Basic workflow

- the user edits context graphs and patterns
- the application matches existing patterns against the current context graph



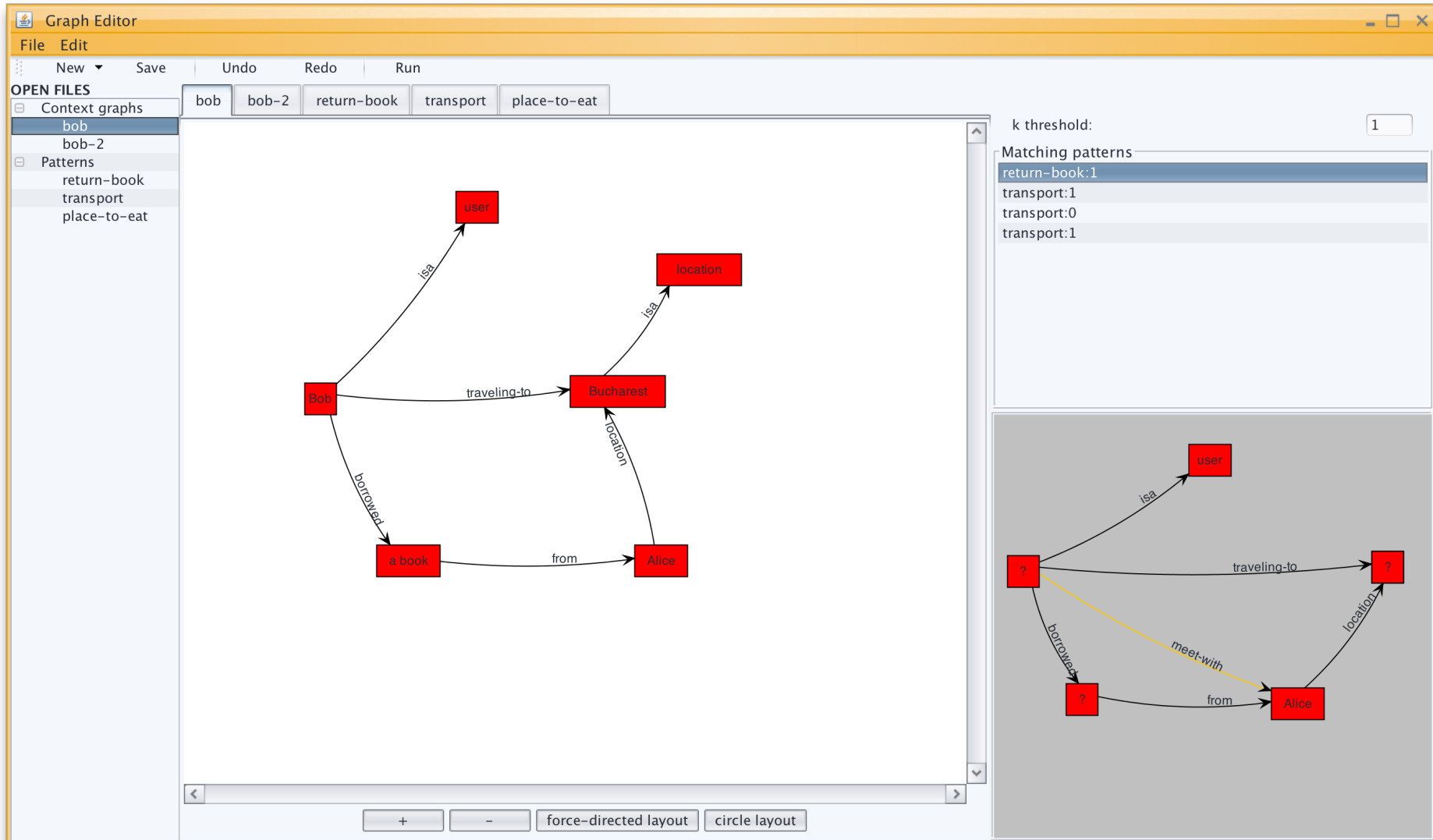
- basic editor features:
 - add/remove nodes
 - label editing
 - drag gestures
- layout:
 - force-directed layout
 - circle-layout
- save/load from files: text or binary format



Context matching

- context matching
 - automatic detection of matching patterns
- configurable threshold
 - complete matches
 - partial matches
- a list of matching patterns is displayed

User interface



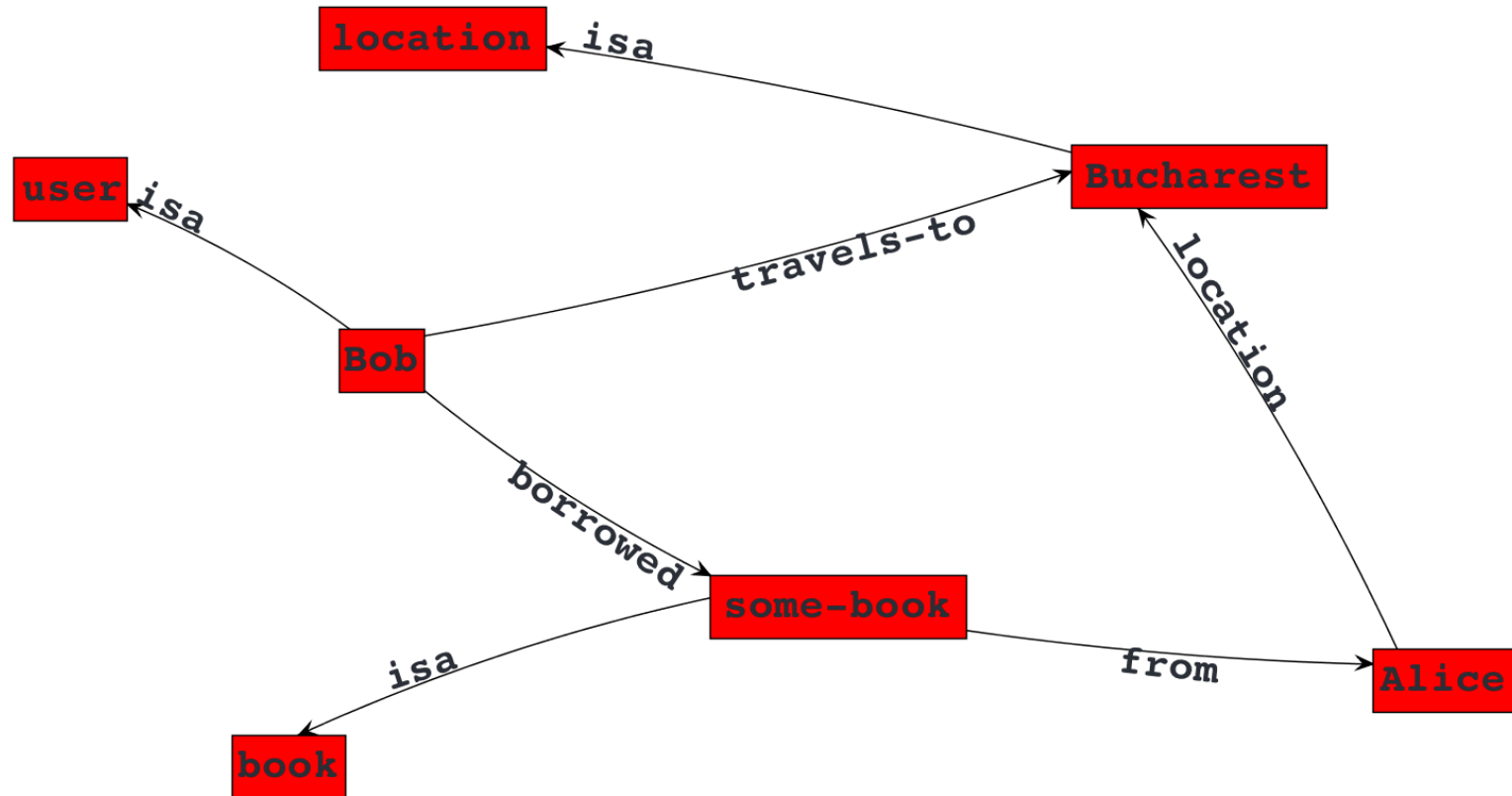


Possible scenario

- create notifications conditioned by contextual information (patterns)
- simulate context change by editing the graph
- observe matching patterns
 - matching patterns can be considered a trigger for notifying the user



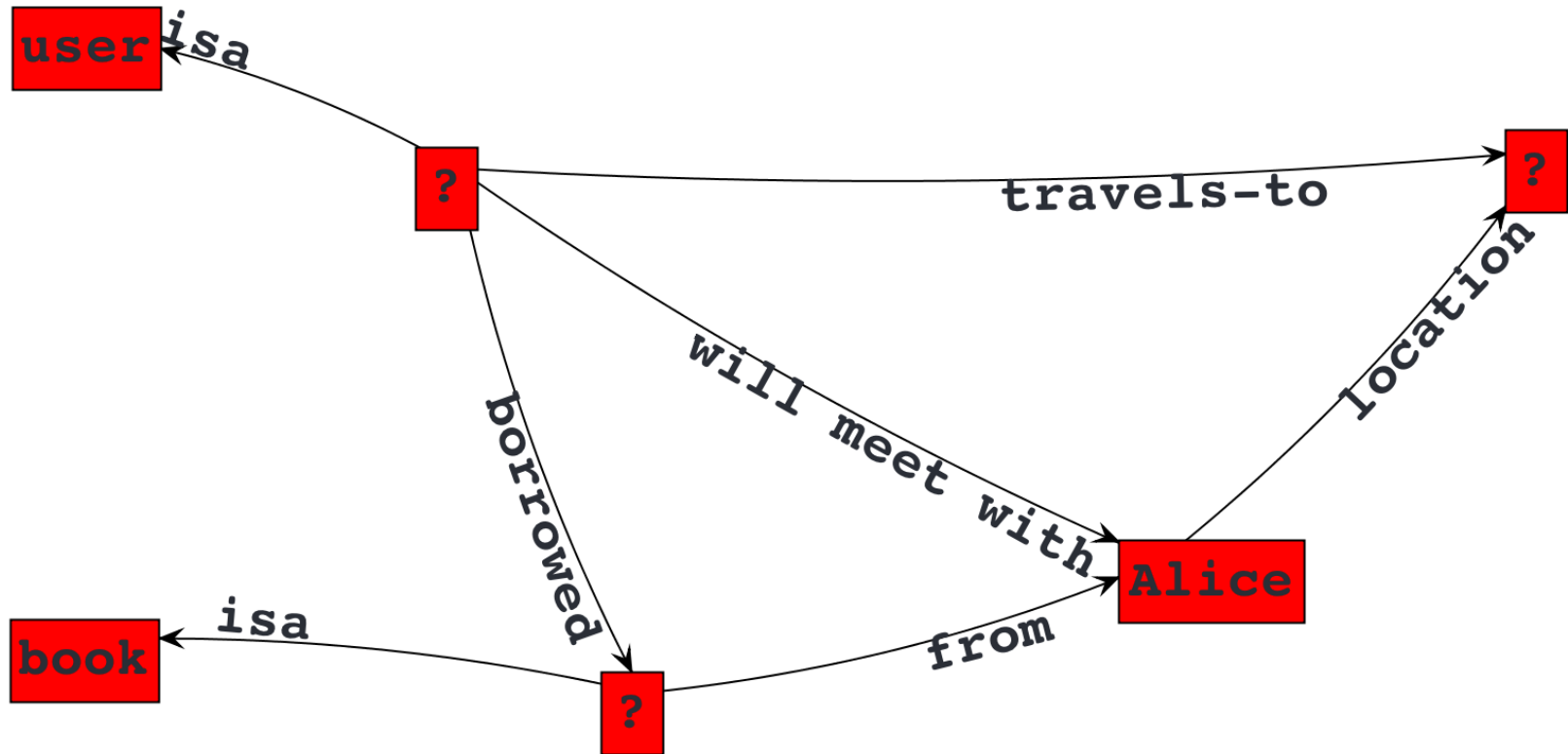
Context graph example



context graph: Bob is traveling to Bucharest. He previously borrowed a book from Alice, which also lives in Bucharest.



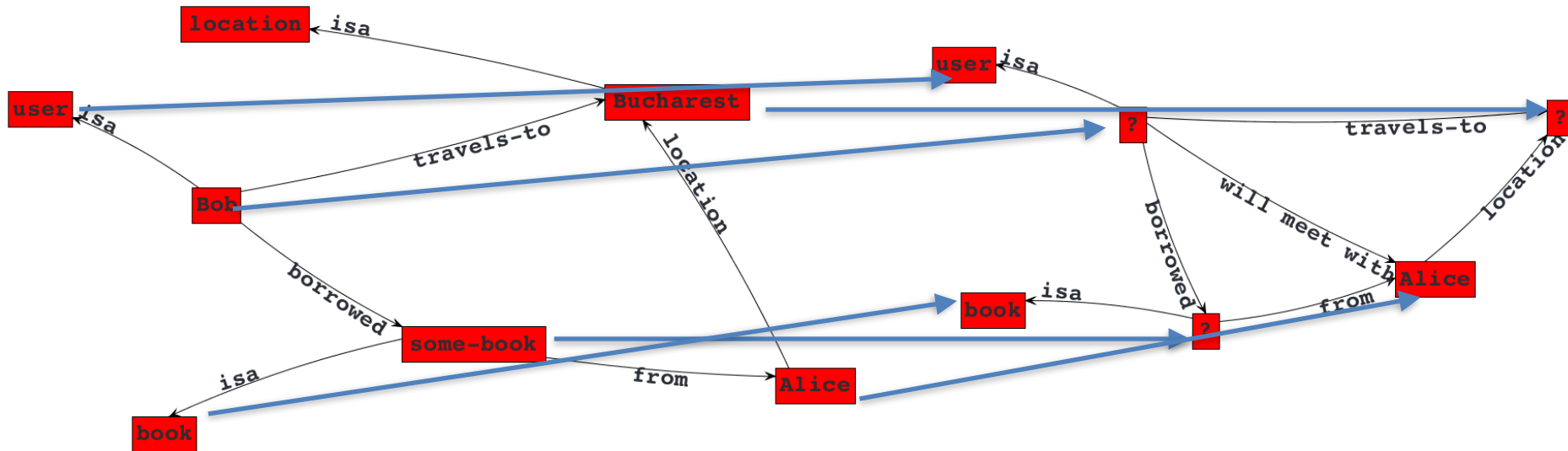
Pattern example



graph pattern: reminder for returning book when traveling to the same city as Alice.



Matching



Context Graph

Graph Pattern

Partial match detected by the application.
The match should trigger a notification.

Summary

- context graph editor
- automatic matching of patterns to the current context graph
- simulating scenarios in which context graphs are useful

Questions__?

Thank you!