

# Personalized recommendation scheme based on content and knowledge hierarchy



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# Goal

- to navigate students according dependencies between knowledge and their actual user model by presenting most suitable concepts

# Solution and realization

- ontology based recommendation
- pre-run enhancement of concepts and interconnection with ontology
- on the fly evaluation (rating) of suitable concepts

# Ontology-based recommendation

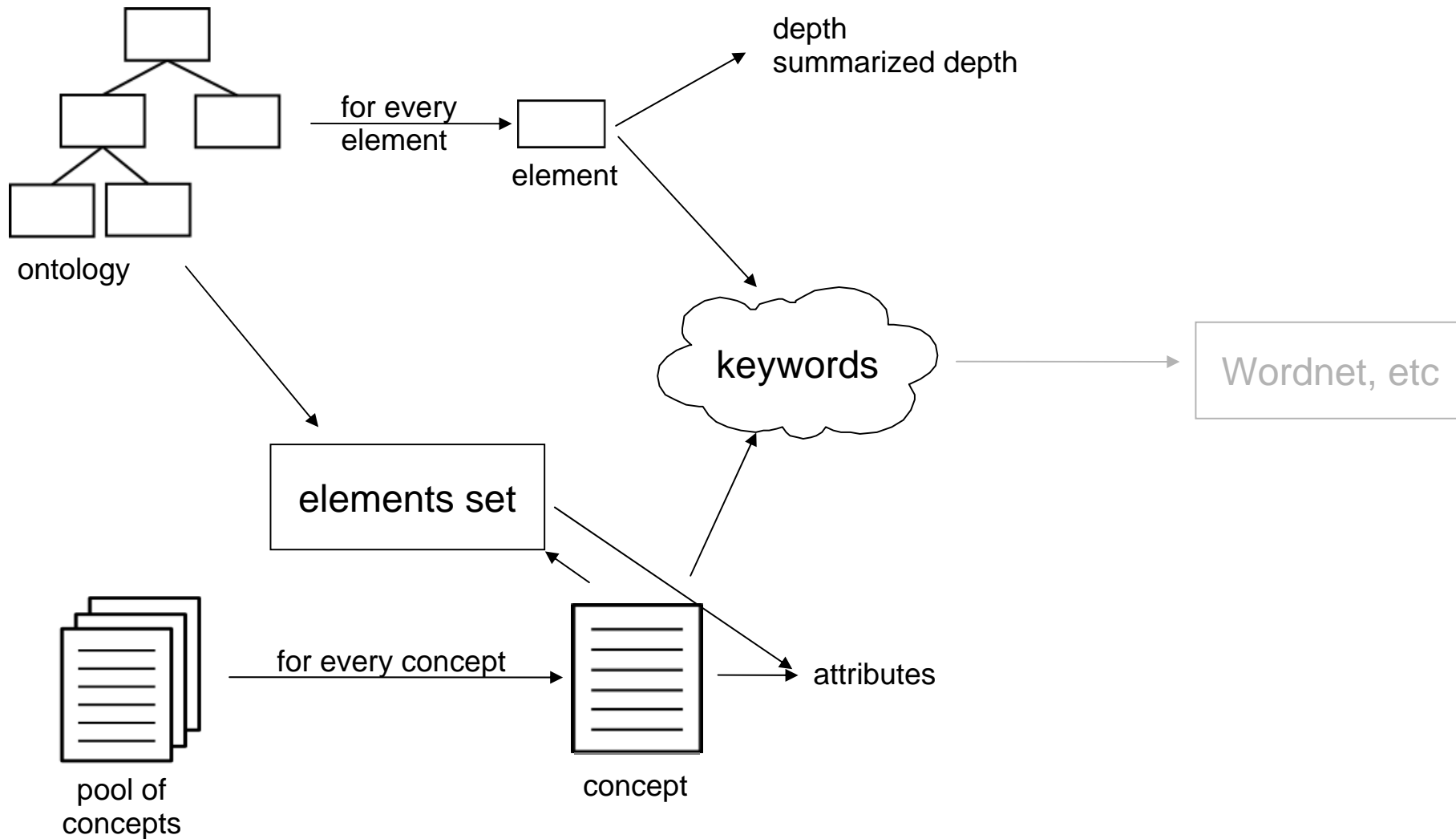
- concepts which evaluated as *simple* for student are recommended
- concepts are evaluated and ordered according their *added attributes* and *actual students model*
- every concept of the domain is represented by *learning material* of the domain
- structure of the domain is captured in *domain ontology*, where relationships and dependencies between elements are stored

# Ontology-based recommendation

## two steps algorithm

- *concept enhancement* – interconnection with ontology based on keywords, enhancement of every concepts and first computation of attributes
- *recommendation* – navigation of students through the pool of concepts

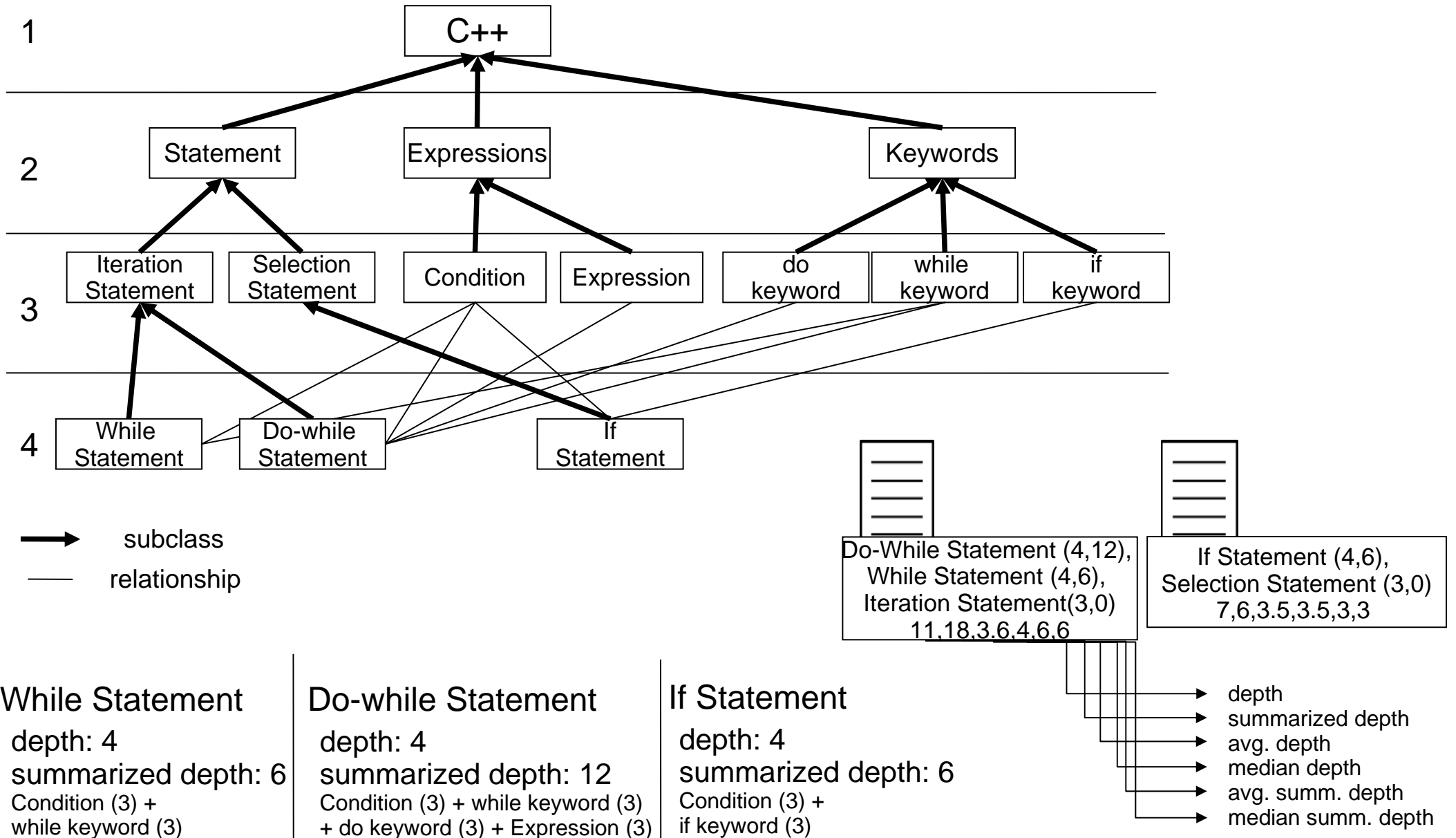
# Concepts Enhancement



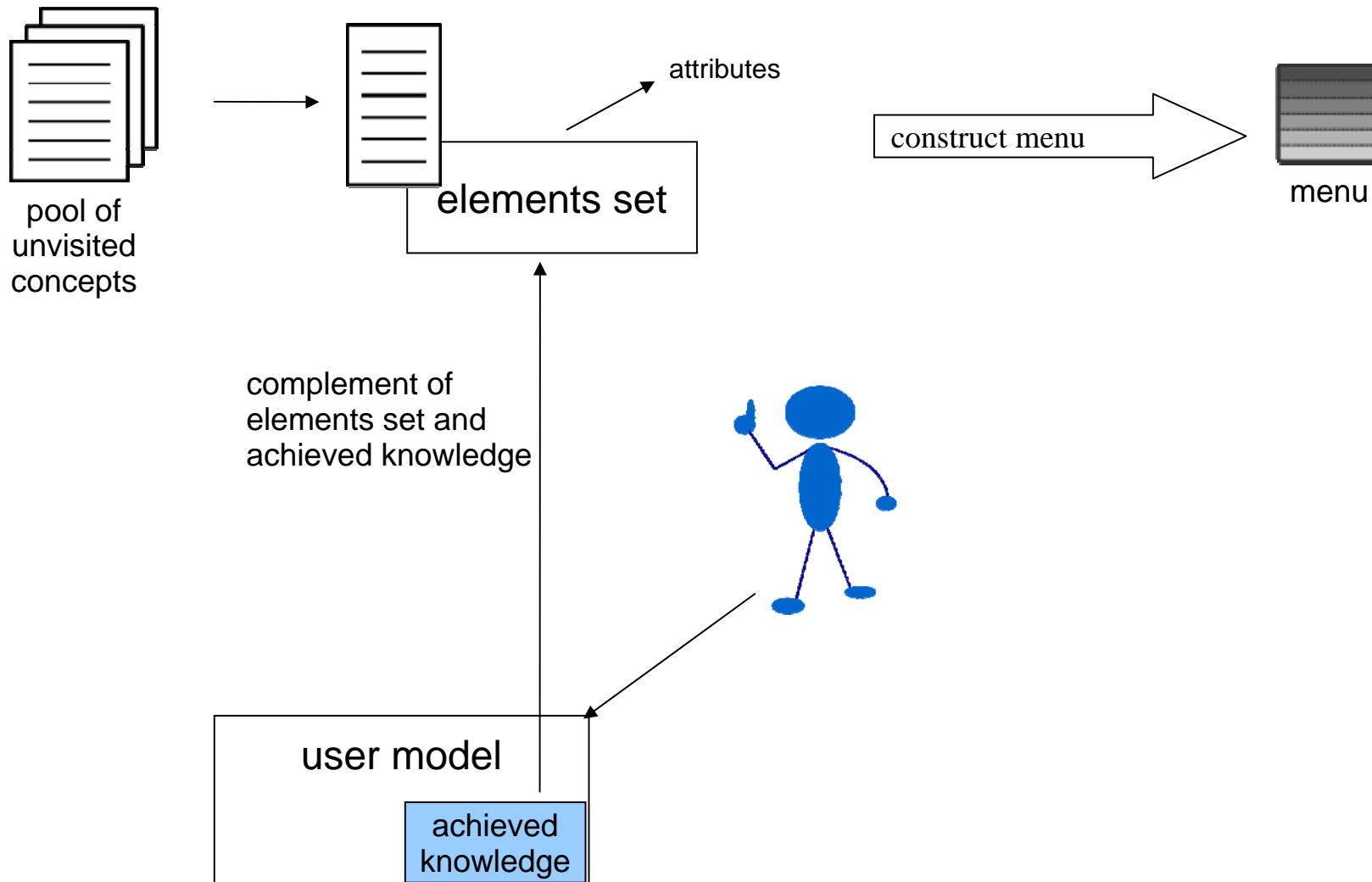
# Attributes of concepts (metrics)

- **depth** – sum of depths of elements in elements set
- **summarized depth** – sum of summarized depths of elements in elements set
- **average depth** – average of depths of elements in elements set
- **median depth** – median of depths of elements in elements set
- **average summarized depth**
- **median summarized depth**

# Example – element attributes



# Recommendation

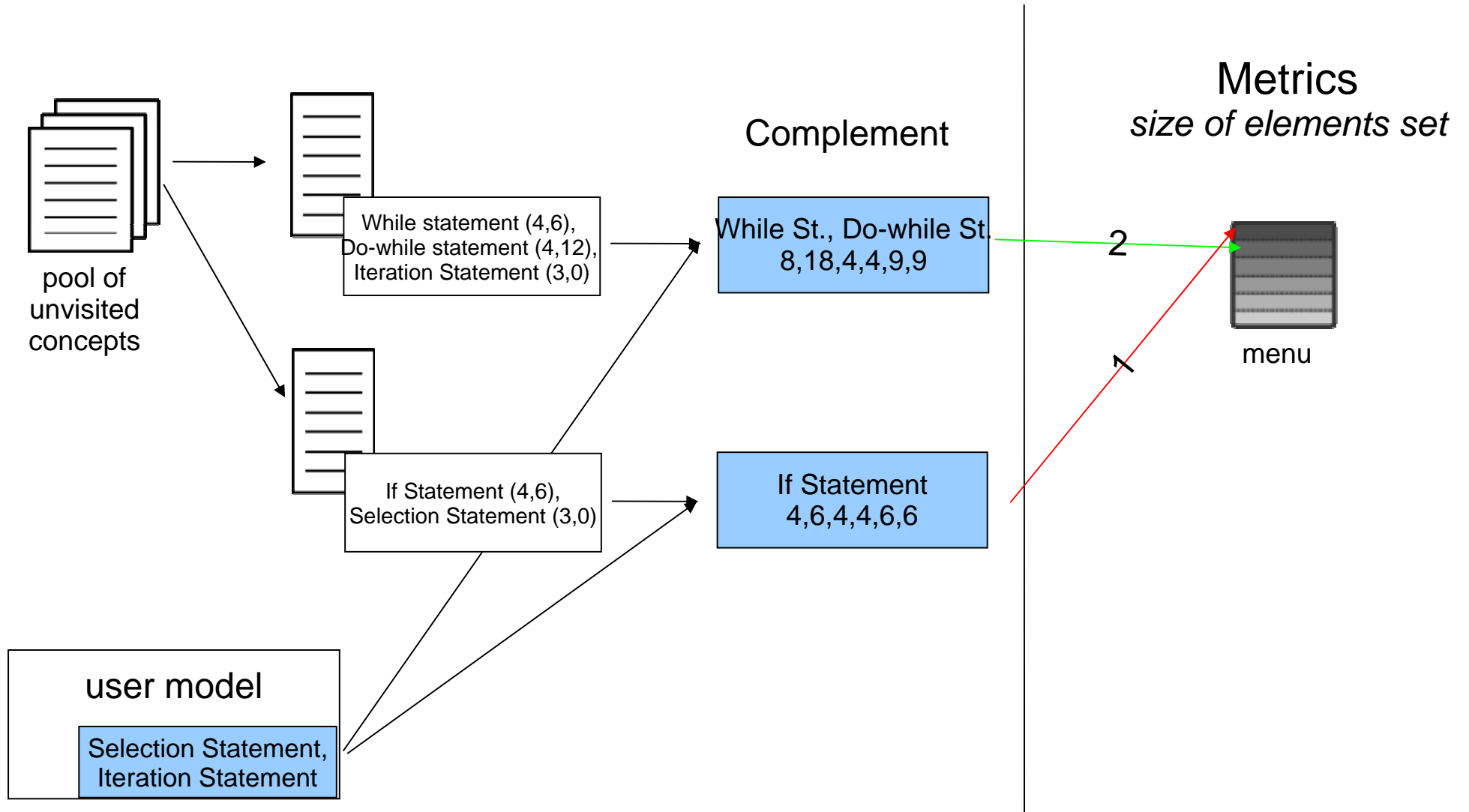




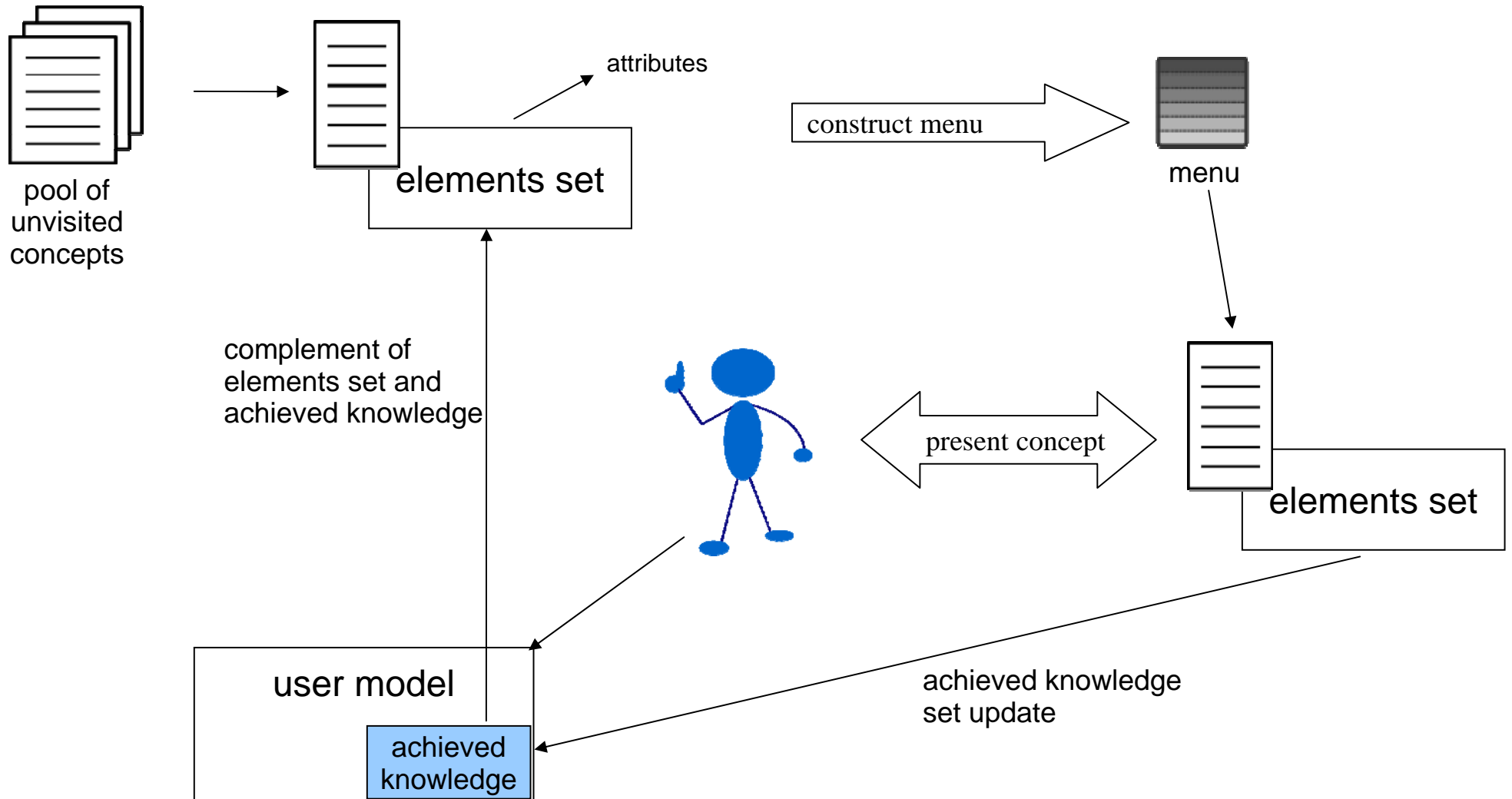
# Menu construction

- use of different **metrics** together with on the fly evaluated attributes
  - *size of elements set*
  - *depth and summarized depth of concepts*
  - *size of elements set together with median depth*
  - ...
- *count of menu entries* is restricted by defined threshold value (system defined, course setting, student setting)

# Example



# Recommendation



# Conclusions and future work

- extension of the algorithm
  - insertion/removal of concepts into/from the pool
  - changes of concepts
- web-based delivery system
  - testing, release
  - test run in summer term 2008/09 (C++ course)
  - comparison new approach with the old one (sequential vs. recommendation with threshold)

# Contacts

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