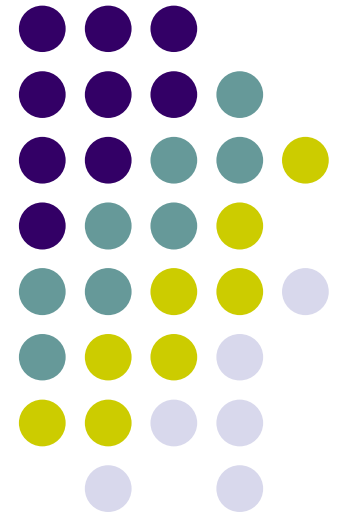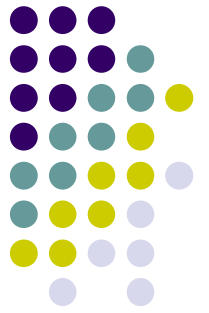# Theory and Practice of Case-Based Learning Aids

Janet L. Kolodner

Mark Guzdial
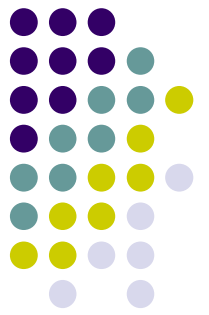
Presented by Zhan Gao

# CBR Features

- Was developed as a model for create intelligent systems

- As a cognitive model, values the concrete over the abstract

- Use experiences to reason and learn, helpful for building expertise
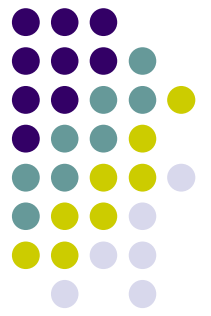
# Case-Based Learning Aids

- Two parts of this paper
  - Case-Based Reasoning as a model of cognition
  - CBR's implications for supporting learning
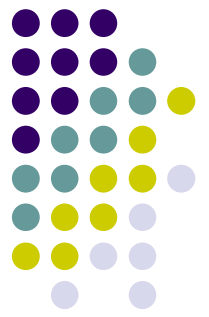
# I. CBR as a Model of Cognition
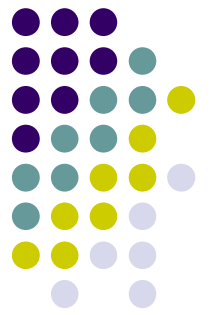
- Case Based Reasoning suggests three components of cognition:

  - Cases
  - Case Indexes
  - Case Processor

# I. CBR as a Model of Cognition Cases

- Cases are interpretation of experiences
  - Several sub components
  - The better interpretation of these components the easier to remember

- Lessons-learned
  - Derive lessons that can be learned from the case

- Case library (library of case)
  - The set of cases in one's memory is referred to as one's case library
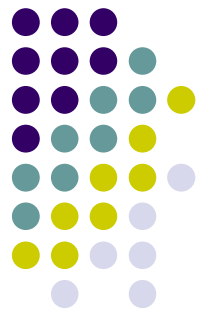
# I. CBR as a Model of Cognition Case Indexes

- Good indexing schema allows reasoner to see a past situation as being relevant to the one now facing it

- Lacking knowledge/experience may cause incomplete indexing

- Situation assessment allows a reasoner to remember a case that was not well indexed

# I. CBR as a Model of Cognition Case Processor

- Case processor has a variety of responsibilities
  - Interpreting a new situation that relevant cases can be located in the case library
  - Decide the most applicable cases
  - Applying lessons learned from old case to the new situation
  - Noticing results and explaining exceptions
  - Structuring an experience as a case and index it
  - Re-interpreting and re-indexing old case with new findings
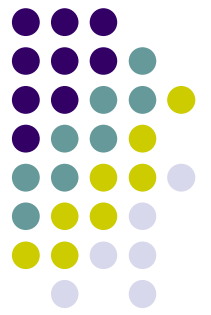
# II. CBR for Supporting Learning

- CBR suggests a form for what we store in memory about our experiences and the kinds of reflection that are effective for being able to reuse those experiences.

- CBR suggests five facilitators for learning effectively from hand-on activities
  1. Having experiences of what needs to be learned.
  2. Interpreting the experiences to recognize what can be learned from.
  3. Anticipating usefulness to develop indexes.
  4. Experiencing failure, explaining failures.
  5. Learning to use cases effectively to reason.

- CBR suggests the types of appropriate experiences
  - Concrete experience
  - Experiences that can help learner to improve their learning

# II. CBR for Supporting Learning Support for Reflection
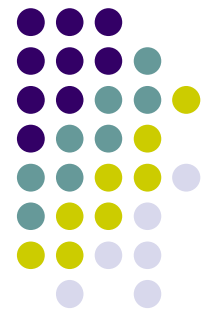
- Alan Collins and John Seely Brown first suggested that the computer could be used to support reflection

- Reflection of CBR is critical for:
  1. Interpreting an experience and extract what might be learned from it
  2. Creating indexes
  3. Creating evaluation solutions

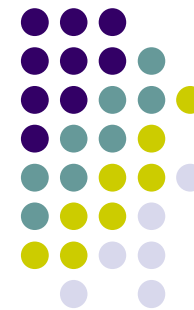# II. CBR for Supporting Learning Support for Reflection

- Challenges to create good CBR-informed supports for reflection
  - Motivating reflection
  - Generating feedback
  - Encouraging quality reflection
  - Not overdoing it

# II. CBR for Supporting Learning Support with Case Library
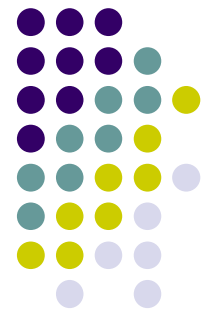
- Case library offers the opportunity for students to learn from others' experiences
- Case library offers information to learners
  - Advice in the form of stories
  - Vicarious experience using a concept or skill
  - The lay of the domain and guidance on what to focus on
  - Strategies and procedures
  - How to use cases

# END