CSE 591: Knowledge Representation and Reasoning (Fall 2009)

Time and Place MW 3:30–4:45 a.m., BYAC 240

Instructor Joohyung Lee (joolee@asu.edu)

Instructor's Office Hours MW 5–6 p.m. and by appointment, BY 574

Description Knowledge representation and reasoning (KRR) is one of the fundamental areas in Artificial Intelligence. Any intelligent agent needs to know in order to behave intelligently, and draw conclusions effectively from the knowledge. Thus the KRR research is concerned with how to encode knowledge in an adequately expressive formalism and how to draw relevant conclusions efficiently from the knowledge base. Various methods have been developed in the past 50 years, and it's often discovered that they are in fact closely related to each other. This is a Ph.D. level course which will introduce basic and recent developments in the research in knowledge representation and reasoning.

References We will read several research papers and some chapters from the followings:

- Knowledge representation and reasoning. Ronald Brachman and Hector Levesque. Morgan Kaufmann Publishers.
- Handbook of knowledge representation. Edited by Frank van Harmelen, Vladimir Lifschitz, and Bruce Porter. Elsevier Science.

The books are recommended but not required.

Topics

1. classical logic: propositional logic, first-order and second-order logic
2. nonmonotonic logics: circumscription, stable model semantics
3. logic programming: answer set programming
4. reasoning about actions : situation calculus, event calculus, action languages
5. description logics and the Semantic Web

Grading The grade will be determined by class participation, two midterms, homework and a project.

Class participation	20%
Two midterms	30%
Homework	25%
Project	25%

Class Participation For problems announced for class discussion, you are expected to volunteer to present solutions to at least two problems at some times during the semester; in this way you get credit for class participation. This should be a solution that you found by yourself, without help from others.

Homework Several times during the semester you will receive e-mail messages with homework problems. When you work on these additional problems, you may consult the materials handed out in class and your notes, but not any books, and you should not accept any help.

Project The project is individual. You may choose your own topic, or the instructor will assist you in selecting one.

Initial proposal	10%
Survey, progress report	30%
Final report	60%

The syllabus is subject to change if necessary.