

Name	
email	

6.034 Final Examination December 15, 2010

Circle your TA and principle recitation instructor so that we can more easily identify with whom you have studied:

Martin Couturier	Kenny Donahue	Gleb Kuznetsov
Kendra Pugh	Mark Seifter	Yuan Shen

Robert Berwick	Randall Davis	Lisa Fisher
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Indicate the approximate percent of the lectures, mega recitations, recitations, and tutorials you have attended so that we can better gauge their correlation with quiz and final performance and with attendance after OCW video goes on line. Your answers have no effect on your grade.

	Lectures	Recitations	Megas	Tutorials
Percent attended				

Quiz	Score	Grader
Q1		
Q2		
Q3		
Q4		
Q5		

There are 48 pages in this final examination, including this one. In addition, tear-off sheets are provided at the end with duplicate drawings and data. As always, open book, open notes, open just about everything.

Quiz 1, Problem 1, Rule Systems (50 points)

Kenny has designed two suits for the Soldier Design Competition, and he and Martin like to grapple in the prototypes on Kresge Oval.

- Kendra insists the suits qualify as “**deadly weapons**” and Kenny should give them to her for safekeeping.
- Kenny and Martin insist that they are examples of an “**enhanced prosthesis**” and that they should be able to keep them

The TAs decide to use Rule-Based Systems to resolve their dispute.

Rules:

P0	IF (AND ('(?x) is a Crazy Physicist', '(?x) is an Engineer') THEN ('(?x) builds a Weaponized Suit')
P1	IF ('(?y)'s (?x) is Cardinal Red' THEN ('(?y)'s (?x) is not US Govt. Property')
P2	IF (OR (AND ('(?y) is an Engineer', '(?y)'s (?x) is Really Heavy'), '(?y)'s (?x) is stolen by the Air Force') THEN ('(?y)'s (?x) is a Deadly Weapon')
P3	IF (OR ('(?y) is not evil', '(?y) is a Robotacist') THEN ('(?y)'s suit research is not Evil')
P4	IF (AND ('(?y)'s (?x) research is not Evil', '(?y)'s (?x) is not US Govt. Property') THEN ('(?y)'s (?x) is an Enhanced Prosthesis')

Assertions:

A0: (Kenny is a Robotacist)

A1: (Martin is an Engineer)

A2: (Kenny's suit is Cardinal Red)

A3: (Martin's suit is Really Heavy)

Part A: Backward Chaining (30 points)

Make the following assumptions about backward chaining:

- The backward chainer tries to find a matching assertion in the list of assertions. If no matching assertion is found, the backward chainer tries to find a rule with a matching consequent. In case none are found, then the backward chainer assumes the hypothesis is false.
- The backward chainer never alters the list of assertions; it never derives the same result twice.
- Rules are tried in the order they appear.
- Antecedents are tried in the order they appear.

Simulate backward chaining with the hypothesis

Kenny's suit is an enhanced prosthesis

Write all the hypotheses the backward chainer looks for in the database in the order that the hypotheses are looked for. The table has more lines than you need. We recommend that you use the space provided on the next page to draw the goal tree that would be created by backward chaining from this hypothesis. **The goal tree will help us to assign partial credit in the event you have mistakes on the list.**

1	Kenny's suit is an enhanced prosthesis
2	
3	
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10	