

# On the Structure and Usability of a Course Planning and Audit System

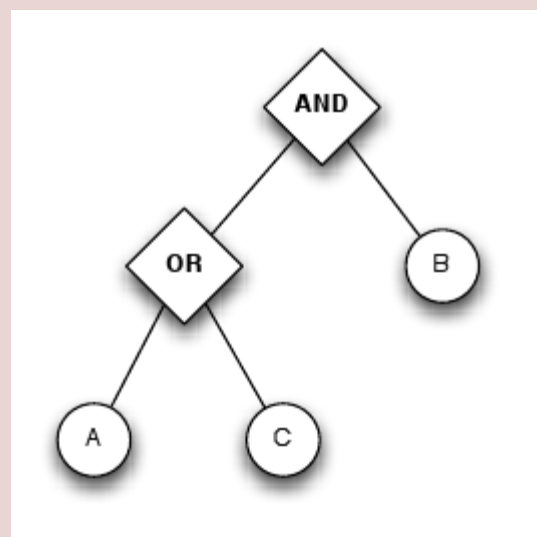
Tal Rusak, Vincent Kam, G. Scott Russ, Christopher Barnes  
Advisor: David Gries

## Coursework and Requirements

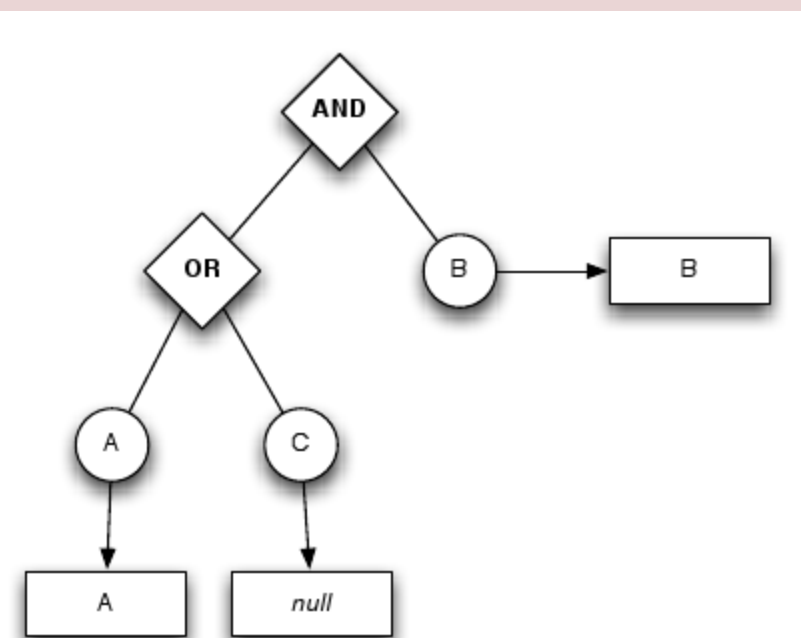
Academic requirements can be:

- Individual Courses (CS 2110, CS 3110, ECON 2040)
- Option Groups  
Include several possible rules, such as:  
 $x$  Courses in total  
 $x$  Courses [must be/must not] be in  $y$  of the following groups  
 $x$  Courses must be at a level  $y$
- Free-Text requirements  
Requirements that must be manually approved by an advisor.

Academic programs (majors) can then be represented as a tree using the above components:

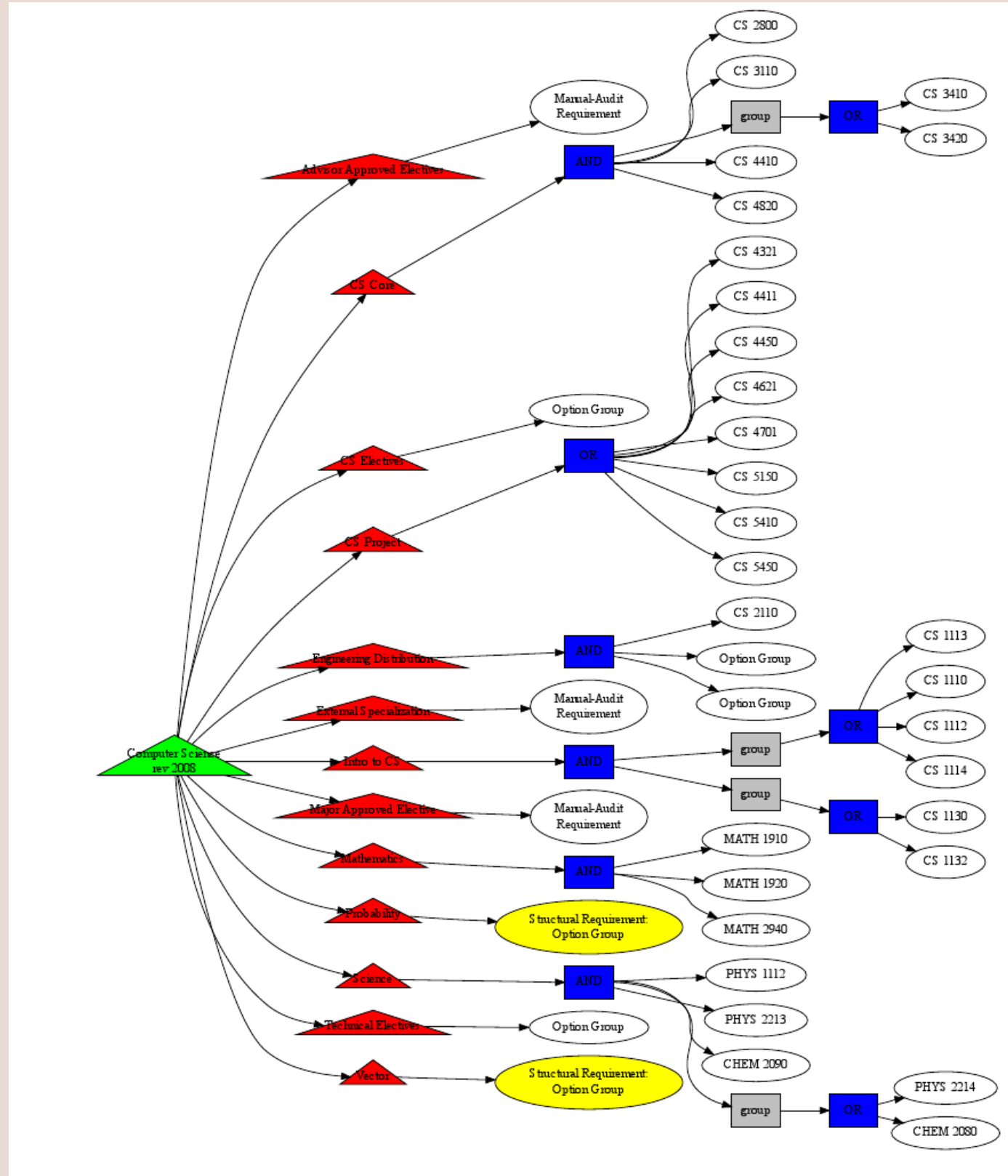


Tree can be easily audited by walking down its components:

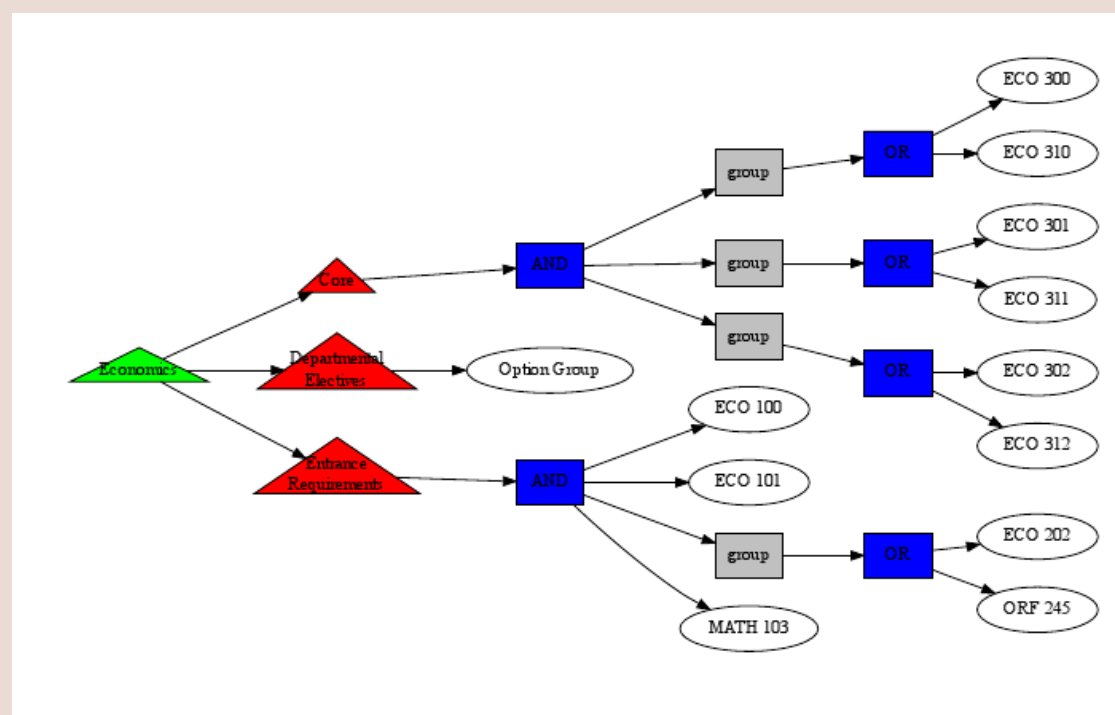


## Example Major Expression Trees

Cornell's New Computer Science Major:



The Economics Major at Princeton:



## Where is the BOOM?

We present a novel paradigm for expressing and auditing major requirements using tree-based logical expressions. We also show the human-computer interface that demonstrates the ease-of-use of our system.

## System User Interface

Entering Requirements:

(a) This screen demonstrates the entry of a single course and optional elements (grade and credit hours)

(b) This screen shows the use of Boolean expressions

(c) This screen shows the application of course groups to achieve parenthetical elements in the requirements expressions.

(d) This screen shows an option group used to input complex requirements

(e) This screen shows the entry of a manual requirement.

Major Progress:

Computer Science Major (ENGR)

Calculus Sequence

- MATH 191 : Calculus I for Engineers
- AND
- MATH 192 : Multivariable Calculus for Engineers
- AND
- MATH 294 : Linear Algebra for Engineers

Introductory Programming

- CS 300 : Introduction to Computing
- AND
- CS 211 : Object-Oriented Programming and Data Structures

1 Credit Project

- CS 212 : Programming Practicum

CS Core

- CS 280 : Discrete Structures
- AND
- CS 312 : Data Structures and Functional Programming
- AND
- CS 314 : Computer Organization
- OR
- CS 316 : Computer System Organization and Programming
- AND
- CS 321 : Numerical Methods in Computational Molecular Biology
- OR
- CS 322 : Introduction to Scientific Computation
- OR
- CS 421 : Numerical Analysis and Differential Equations
- OR
- CS 428 : Introduction to Computational Biophysics
- AND
- CS 381 : Introduction to Theory of Computing
- AND
- CS 414 : Operating Systems
- AND
- CS 482 : Introduction to Analysis of Algorithms

Liberal Distribution Courses

- NBS 275 : Religions of Israel - HA (Historical Analysis)
- EDUC 404 : Learning and Teaching I (Approval Pending)

5 Additional Courses Required: 1 Course must 200 level or higher. At least two additional categories required: CA (Cultural Analysis); LA (Literature and the Arts); KCM (Knowledge, Cognition, Moral Reasoning); SBA (Social and Behavioral Analysis); FL (Foreign Languages).

Overall major interface:

**dustreport** Logged in as John Doe (My Account) | Log Out

menu item 1   menu item 2   menu item 3

Major Name

---

01. CS 2800 or CS 2950 or CS 3111

---

02. CS 3110

---

03. HUMA C1001 and HUMA C1002

OR

COCI C1101 and COCI C1102

OR

2 Courses from List A

OR

1 Course from List A and  
1 Course from List B or List C

Add Specific Course    Add Rule Set    Add Group