MPhil in Advanced Computer Science
Basic Rewriting Theory

Leader: Marcelo Fiore (course lecturer)
Timing: Michaelmas
Prerequisites: Basic computer science and mathematical background
Structure: 8 Lectures

AIMS

This module aims to provide an elementary introduction to the basic concepts and techniques of the theory of rewriting, and to its applications in computer science.

SYLLABUS

1. Abstract reduction systems: equivalence and reduction; well-founded induction; termination; confluence.

2. Equational problems: word problem; term rewriting systems; unification.

3. Termination: reduction, polynomial, and simplification orders.

4. Confluence: critical pairs; orthogonality.

5. Completion: Knuth-Bendix; Huet.

6. Symbolic computation: Gröbner bases; Buchberger's algorithm.

OBJECTIVES

On completion of this module students should:

- be able to apply the basic language and proof methods of rewriting theory, and thereby

- be able to read research papers that use and/or are based on rewriting theory.

COURSEWORK

Exercise sheets will be provided.

PRACTICAL WORK

N/A

ASSESSMENT

The course will be assessed by means of a written test to be set and marked by the course lecturer.

RECOMMENDED READING

[1] F. Baader and T. Nipkow. *Term Rewriting and All That.* Cambridge University Press, 1998.

[2] Terese. *Term Rewriting Systems.* Cambridge Tracts in Theoretical Computer Science 55, Cambridge University Press, 2003.

Last updated: January 2009