CS521: PRINCIPLES OF PROGRAM ANALYSIS (3-0-0: 3)

Introduction

Program analysis, data flow analysis, constraint based analysis, abstract interpretation, type and effect systems, algorithms.

Preliminaries

Partially ordered sets, complete lattices, construction of complete lattices, chains, fixed points.

Data flow analysis

Intraprocedural Analysis, monotone frameworks, equation solving – the MFP and MOP solution, interprocedural analysis, intraprocedural versus interprocedural analysis.

Abstract Interpretation

Correctness relations, approximation of fixed points, widening operators, narrowing operators, Galois connections.

Text Books and References

1. F. Nielson, H. R. Nielson, C. Hankin, "Principles of Program Analysis", Springer.
2. M. Sharir and A. Pnueli, "Two Approaches to Inter-Procedural Data-Flow Analysis", New York: Courant Institute of Mathematical Sciences, New York University.
3. N. Jones and S. Muchnik, "Program Flow Analysis: Theory and Applications", Prentice-Hall.