

Introduction

- Syllabus
 - MCS-236 is a **WRITD** course that teaches you
 - * how to write proofs
 - * basic graph theory
 - The course consists of four components:
 - * homework—30%
 - * exams (2 intra-term, 1 final)—40%
 - * proof portfolio (mastery type)—30%
 - * participation extra credits—10%
 - Participation can raise your grade!
- Applications of graph theory to CS
 - Theoretical Computer Science
 - * automata theory
 - Compiler Construction
 - * syntax tree & parsing
 - * graph coloring & register allocation
 - * immediate dominators in a flowgraph & global flow analysis and program optimization
 - Programming & Software Engineering
 - * the dependency graph & make
 - * flowchart
 - * UML diagram

- Operating Systems
 - * resource allocation graph & the deadlock problems
 - * digraph & directory structure
 - * wait-for graph & deadlock detection in distributed computing
 - * process tree
- VLSI design: planarity, thickness of graphs, MST
- Graph Coloring: resource allocation, scheduling, time tabling, garbage collection, etc.
- The web graph, friendship graph, cooperation graph, etc.
- etc.
- Some reminders
 - Definitions of floor $\lfloor \cdot \rfloor$ and ceiling $\lceil \cdot \rceil$.
 - The expression $A \leq B \leq C$ says that $A \leq B$ and $B \leq C$.
 - Manipulation of inequality:
 - If $a \leq b$ and $a' \leq b'$ then $a + a' \leq b + b'$.
 - If $a \leq b$ and $c > 0$ then $ac \leq bc$.
 - If $a \leq b$ and $c < 0$ then $ac \geq bc$.