

254276 Discrete Mathematics

Instructor: Antony Harfield

Website: <http://harfield.org.uk/discrete>

Course Description

This course introduces the concepts and techniques of discrete mathematics which are fundamental to the design and analysis of computer systems and software. The course cover logic, sets, relations, functions, counting, inductive proofs, and graphs, with an emphasis on applications in computer science.

Objectives

- To develop mathematical reasoning, to be able to follow logical arguments and to apply logic to computing problems.
- To become familiar with discrete structures such as sets, relations, functions and graphs and understand their applications in computing.

Schedule

Week	Topic	Description
1	Orientation	Introduction to discrete maths
2 - 3	Logic	Propositional logic, truth tables, laws of logic, predicate logic
4 - 5	Sets	Sets and set operations
6	Functions	Mathematics of functions, inverse functions and function composition
7 - 8	Relations	Equivalence relations, partial/full orders
10 - 11	Induction	Mathematical induction, recursive definitions
12	Counting	Pigeon-hole principle, permutations
13 - 14	Graphs	Introduction to graph theory
15	Conclusion	Review of all topics

Timetable

- One 2-hour lecture per week
- One 2-hour workshop per week

Recommended reading

- Discrete Mathematics and its applications, by Kenneth H. Rosen.
- Discrete Mathematics for computer scientists by John Truss.

Assessment

- Workshops (once per week) - 20%
- Mid-term exam (on logic, sets, relations and functions) - 40%
- Final exam (all topics) - 40%

Grading

$\geq 80\%$	A	$\geq 60\%$	C
$\geq 75\%$	B+	$\geq 55\%$	D+
$\geq 70\%$	B	$\geq 50\%$	D
$\geq 65\%$	C+	$< 50\%$	F

A total overall grade of at least 50% is required to complete this course.

Fill in the blank squares so that each row, each column and each 3-by-3 block contain all of the digits 1 thru 9.

The dotted lines indicate areas which contain a non-repeating set of digits adding up to the sum shown.

11	25			14	9		12	
		15			4		14	6
40			3	15	9			
	8				12		38	
				11				
	15		13	6	4			
	17	7			13		10	6
			26	4	15			
					11		12	