

Discrete Mathematics

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Hanoi 2011

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1 Introduction

This file will contain the table of contents of the class web site.

The web site is divided into weekly folders. Each folder will include lecture notes, weekly assignments, some additional information and a folder called supplements.

In it you can find examples, some additional explanations, or proofs.

A more detailed description of each file and folder follows below.

2 Content

1. Syllabus-2011.pdf
2. Journal.pdf General information.
3. General Information.pdf: includes table of contents.
4. **Week-1**
 1. prep-2.pdf: preparation problem for lecture-2.
 2. Lecture-1: Introduction to logic.
 3. Lecture-2: Logic, truth tables, equivalences, disjunctions, conjunctions.
 4. Lecture-3: Satisfiability.
 5. Drill-1.pdf: logic drill.
 - f. assign1.pdf
5. **Week-2**
 1. logic.htm: Logic functions in SAGE.
 2. LectureNo-4.pdf: satisfiability.

3. assign2.folder
4. logisim folder: has the program to visually generates gates and circuits, plus three examples.

6. **Week-3**

1. LectureNo-6.pdf: Relations.
2. LectureNo-5.pdf: Sets, introduction.
3. Lecture-7.pdf: Cardinality.
4. drill-2.pdf: Logic drill.
5. assign3.pdf

7. **Week-4**

- a. Lecture-9:Problems on finite sets.
- b. Lecture-8 Linear algebra.pdf: Linear algebra and finite sets.

8. **Week-5**

1. Lecture-8 Sequences.pdf: sequences.
2. Lecture-7.pdf: Cardinality of sets, countable and uncountable sets.
3. assignment-4.pdf
4. Supplements:
 1. Sequences-drill.pdf
 2. drill-3.pdf
 3. Card Tricks.pdf: three card tricks based on sequencing.

9. **Week-6**

1. LinearAlgebra.pdf: Applications of Linear Algebra for solving problems on finite sets.
2. finiteSets.pdf
3. Supplements:
4. fano.pdf: a graphic view of the Fano plane.

10. **Week-7**

1. Permutations.pdf: Some useful facts about permutations.
2. LineraAlgebra.pdf: Applications of Linear Algebra for solving problems on finite sets.
3. finietSets.pdf:
4. assignment-6.pdf
5. Supplements

1. permutations-lexicographic-ordering.pdf
2. drill-6.pdf

11. **Week-8**

1. counting.pdf: counting techniques.
2. basic-counting.pdf:
3. assignment-7.pdf:
4. Supplements:
 - LetsCount.pdf: a list of counting problems.
 - ExtraExamples_5_n.pdf: A sample of solved counting problems.
 - Drill-7.pdf: Finite fields, finite projective geometries, counting drills.

12. **Week-9**

1. recurrence.pdf: recurrence relations, classification, examples, solving linear recurrence relation with constant coefficients.
2. DM-journal-8.pdf: The week's plan.
3. combinations.pdf
4. assignment-8.pdf

13. **Week-10** Mid Term.

14. **Week-11**

1. journal-11.pdf: plan for the week.
2. discreteOptimization.pdf: A sample of discrete optimization problems, mainly scheduling problems.
3. Assignment-9.pdf
4. Supplements:
 - a. Drill-11.pdf: Permutations, combinations, binomial coefficients problems.
 - b. Stirling.pdf: A proof of Stirling's formula for the approximation of $n!$

15. **Week-12**

1. recurrence.pdf: recurrence relations, generating functions.
2. Assignment-10.pdf
3. RR-practice.pdf: recurrence relations practice problem.
4. ExtraExamples_7_n: four files with sample problems and answers.
5. Drill-12.pdf: Drill questions for the class tutorial.

16. **Week-13**

1. Named Numbers.pdf: Stirling Numbers of the first and second kinds.
2. Supplements: Drill-13: named numbers problems.

17. **Week-14**

1. Lecture-15.pdf: A brief review of modular arithmetic in SAGE and some useful theorems (no proofs)
2. Lecture-16.pdf: Prime numbers and the RSA cryptosystem.
3. Supplements folder:
 - a. Challenge.pdf: An invitation to factor a large integer by finding matching square roots.
 - b. NumberTheory.htm: A SAGE notebook with Number Theory demonstrations.
 - c. Drill-14.pdf: Basic number theory in-class exercises.

18. **Week-15**

1. Factoring.pdf. Using square roots to factor large integers.
2. Folder Supplements: factoring, primitive roots.