Massachusetts Institute of Technology
6.042J/18.062J: Mathematics for Computer Science
Professors Tom Leighton and Santosh Vempala

Handout 15
October 2, 1997

Revised Course Outline

Sep	1	2 Registration Day	3	4 Lecture 1: Admistrivia. Logical notation and basic proof techniques. PSet 1 out.	5 Tutorial 1
Sep	8	9 Lecture 2: Induction. PSet 1 due. PSet 2 out.	10	11 Lecture 3: Strong induction and well-ordering.	12 Tutorial 2
Sep	15	16 Lecture 4: Proof techniques for networks. PSet 2 due. PSet 3 out.	17	18 Lecture 5: Proof techniques for networks.	19 Tutorial 3
Sep	22 MIT HOLIDAY	23 Lecture 6: Formal Methods: state machines and invariants. PSet 3 due. PSet 4 out.	24	25 Lecture 7: Formal Methods: derived variables.	26 Tutorial 4

Sep-Oct	29	30 Lecture 8: Analysis Tools: evaluating sums. PSet 4 due. PSet 5 out.	1	2 Lecture 9: Analysis Tools: products and asymptotic notation.	3 Tutorial 5
Oct	6	7 Lecture 10: Analysis Tools: Recurrences. PSet 5 due. PSet 6 out.	8	9 Lecture 11: Analysis Tools: Linear Recurrences.	10 Tutorial 6
Oct	13 MIT HOLIDAY	14 Lecture 12: Counting Arguments: Carindality, Bijections, Pigeonhole Principle, Lower Bd Args. PSet 6 due PSet 7 out.	15	16 Lecture 13: Counting Arguments: Countability. Infinities. Diagonalization.	17 Tutorial 7
Oct	20	21 Lecture 14: More Counting: Permutations and Combinations. PSet 7 due.	22	23 Lecture 15: More Counting: Permutations and Combinations.	24 Tutorial 8

Oct	27 **Midterm Ice Cream Get-Together** 7:00–9:00pm Walker Memorial	28 Lecture 16: Permutations and combinations of multisets. PSet 8 out.	29 Quiz: 7:00–9:00pm Walker Memorial	30 Lecture 17: Generating functions.	31 Tutorial 9
Nov	3	4 Lecture 18: Introduction to probability. Sample points and spaces. PSet 8 due. PSet 9 out.	5	6 Lecture 19: Probability laws. Events. Conditional probability.	7 Tutorial 10
Nov	10 MIT HOLIDAY	11 MIT HOLIDAY	12	13 Lecture 20: Independence. Birthday paradox. Failure analysis.	14 Tutorial 11
Nov	17	18 Lecture 21: Random variables. Binomial distributions. Asymptotics. PSet 9 due. PSet 10 out.	19 Drop Date	20 Lecture 22: Functions of random variables. Expectation.	21 Tutorial 12

Nov	24	25 Lecture 23: Expectation PSet 10 due. PSet 11 out.	26	27 MIT HOLIDAY. Thanksgiving.	28 MIT HOLIDAY. Thanksgiving.
Dec	1	2 Lecture 24: Markov's Theorem, Laws for expectation. PSet 11 due. PSet 12 out.	3	4 Lecture 25: Variance, Moments, Chebyshev's Theorem.	5 Tutorial 13
Dec	8	9 Lecture 26: Gambler's ruin. Random walks. PSet 12 due.	10	11	12

(Lecture topics are subject to change.)