

CSI 30 LECTURE NOTES (Ojakian)

Topic 16: Permutations and Combinations

OUTLINE

(References: 6.3, 6.4 (part), 7.1)

1. Permutations
 2. Combinations
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1. Permutation

- (a) Question: Have there every been 2 decks of cards with the cards in the same order?
- (b) DEF: Permutation and r -permutation of set.
- (c) Notation. $P(n, r)$
- (d) Example: Do on [4].
- (e) Theorem: Number of r -permutations is ...

2. Combination

- (a) Example. Consider 4 students in this class. How many committees of 3 students?
Of 2 students?
- (b) DEF: r -combination or size r subset ...
- (c) Notation. Examples. Do many!
- (d) Theorem 2 (Section 6.3, p. 431)
- (e) Example 14. Bit strings.
- (f) Example 15. Choosing committee.
- (g) Theorem: Corollary 2 (p. 433). $C(n, r) = C(n, n - r)$

3. Application: Expanding Binomials (Section 6.4)

- (a) Recall “FOIL”
- (b) Example 1 (p. 437). $(x + y)^3 = \dots$
- (c) Theorem 1 (p. 437). Also state as: The coefficient of $x^{n-j}y^j$ is $C(n, j) = C(n, n-j)$
- (d) Examples 2, 3, 4.
Write out examples.
- (e) Exercises. Section 6.4: 1 - 9

4. Exercises

- (a) Section 6.3: 1 - 41
- (b) Probability. Section 7.1: 8 - 20 (Poker)
- (c) Section 7.1: 24 - 27, 38 (Lottery)
- (d) Section 7.1: 31 - 34