Math/CSE 1028:
Discrete Mathematics for Engineers

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6.5 Permutations with Repetition

- Thm 1: The number of r-permutations of a set with n objects with repetitions allowed is n^r

- Thm 2: There are C(n+r-1,n-1) r-combinations from a set with n elements when repetition is allowed.

Permutations with Identical Objects

Thm 3 (page 428)

- Reasoning 1: Assume distinguishable and then divide by number of times the same arrangement is counted

- Reasoning 2: Choose places for the indistinguishable objects and then they can be arranged in only one way.

Distinguishable Objects into Distinguishable Boxes

Thm 4 (page 429)

- Reasoning: Choose elements for the first box, then the second box, and so on and use the product rule.

- Reasoning 2: Map this to permutation with identical objects.

Indistinguishable Objects into Distinguishable Boxes

- r indistinguishable objects can be placed in n distinguishable boxes in C(n+r-1,r-1) ways

- The case of indistinguishable boxes is much harder and is omitted (pp 430-431)