SOA and CAS: Exam P, Probability[1]
Chapter 2: Combinatorics

Yi Li [2]

January 13, 2024

(1) Give: "event happens at random", which is equivalent to "event has equal probability of occuring"

For example: total 20 people arriving at random $\Longleftrightarrow$ P(each person arriving first)=$\frac{1}{20}$

(2) *Definition:* Probability =$\frac{A}{B}$= $\frac{\#\text{ event of interest}}{\#\text{total number of evets}}$

(3) *Properties:*

(3.1) $n! = n*(n-1)*(n-2)*...*1$ (Recall that: $\Gamma(n) = (n-1)*(n-2)*...*1$)

(3.2) $C_n^m = \frac{n!}{(n-m)!\ m!}$; $A_n^m = \frac{n!}{(n-m)!}$

(4) *Duplicate Elements:* number of distinict permutations=$\frac{n!}{k_1!*k_2!*...*k_j!}$

For example: given a set of {1,2,2,3,3,3,4,4}

$\Longleftrightarrow$ A total of 7 elements: one "1"; two "2"; three "3"; two "4"

$\Longleftrightarrow$ Number of distinict permutations = $\frac{8!}{1!*2!*3!*2!}$

[1]The purpose of the use is non-commercial research and/or private study. Please do not copy or distribute without permission of the author.

[2]Email: liyifinhub@outlook.com This note was drafted when I was preparing for the exam. Please email me if you find any errors. My personal website http://www.yilifinhub.com