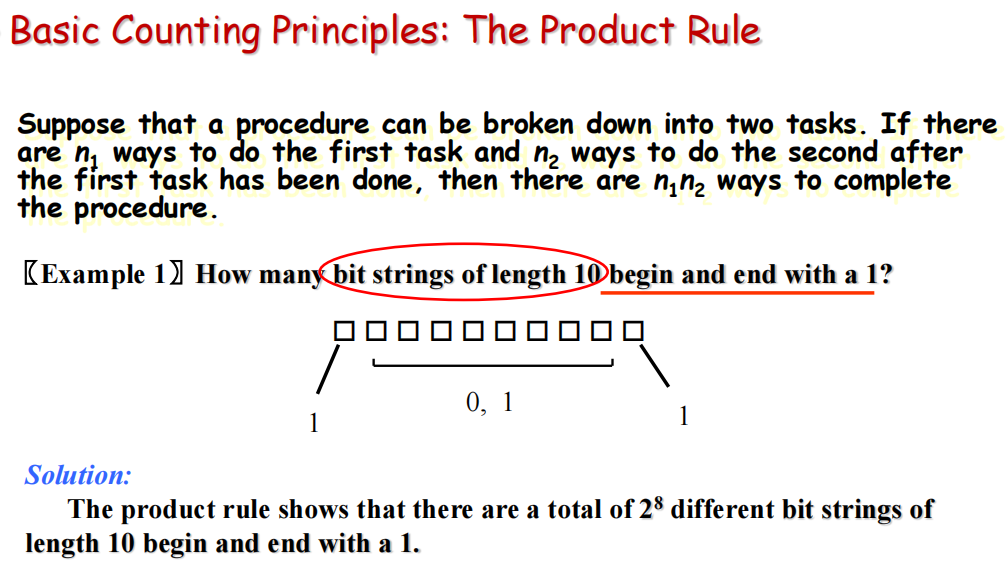
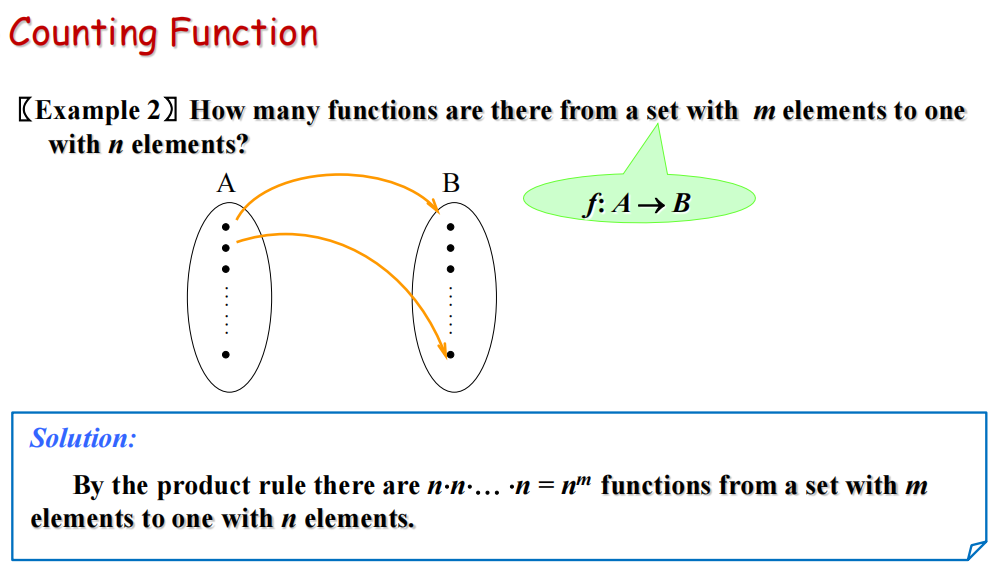
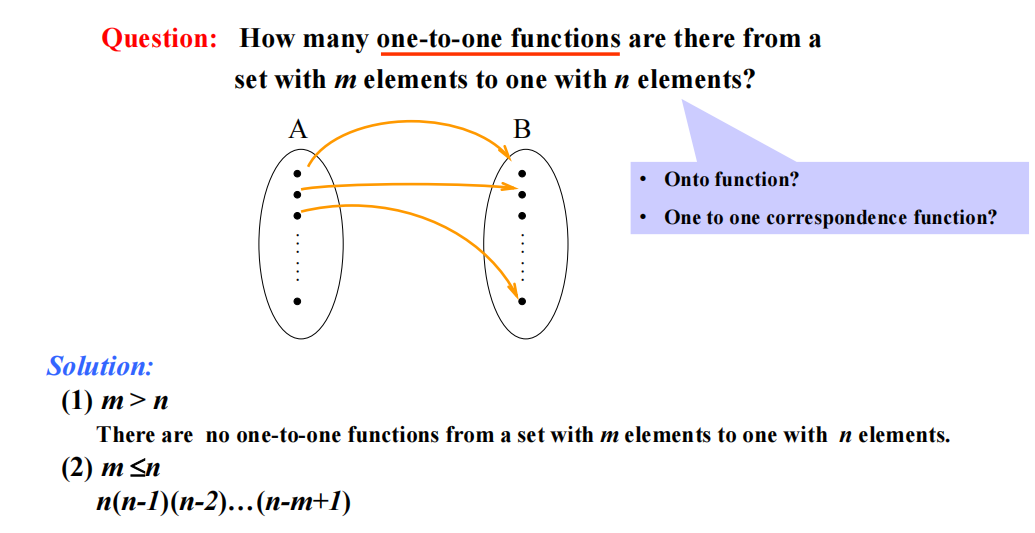
**Chapter 6 Counting**

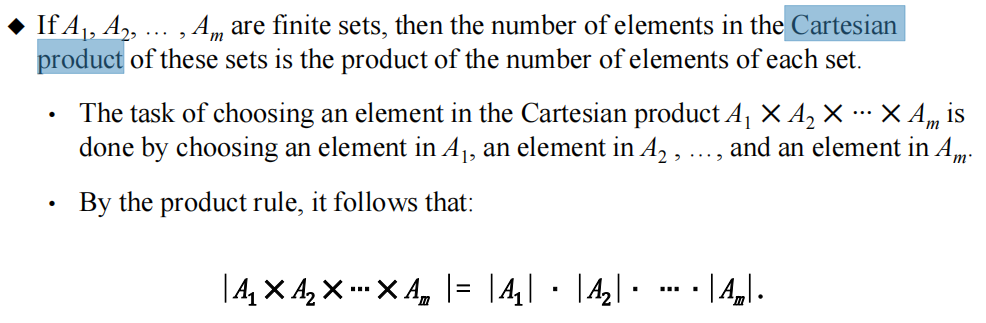
**（6.1）The Basics of Counting**

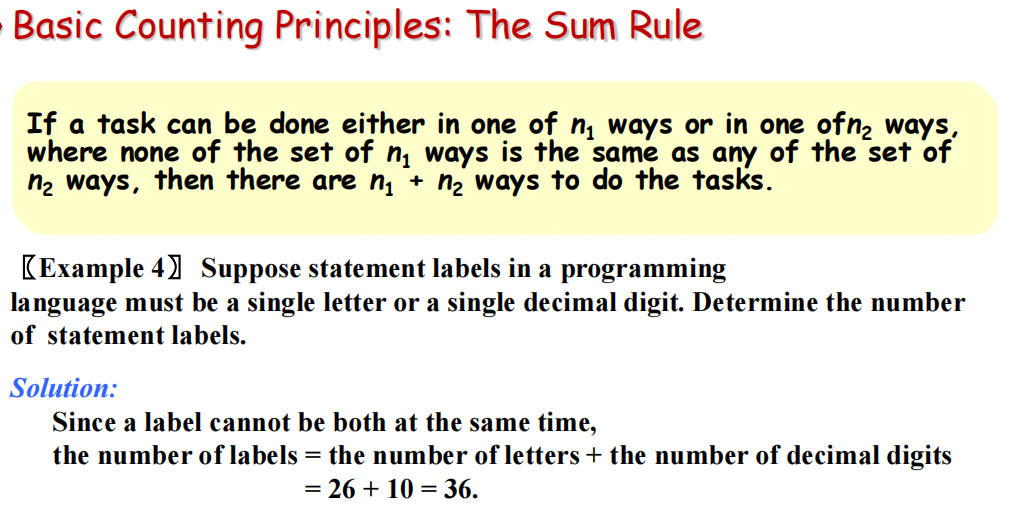


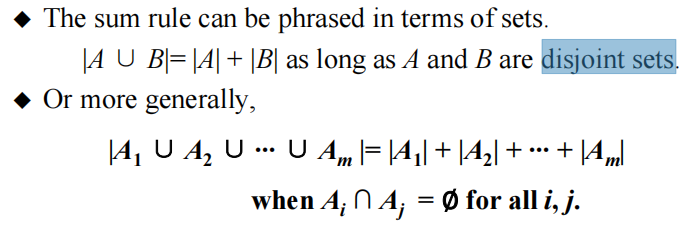




Cartesian product（笛卡尔积）





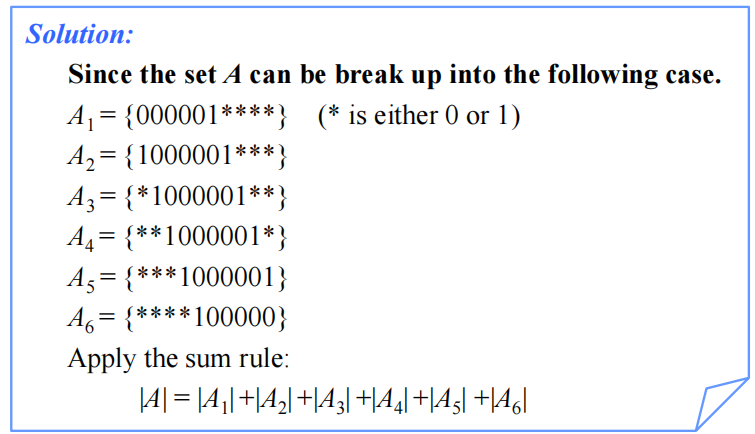


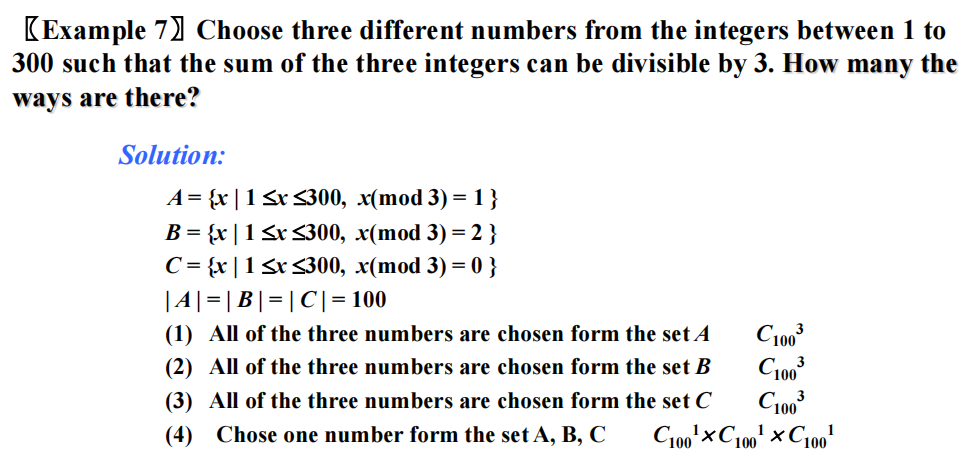


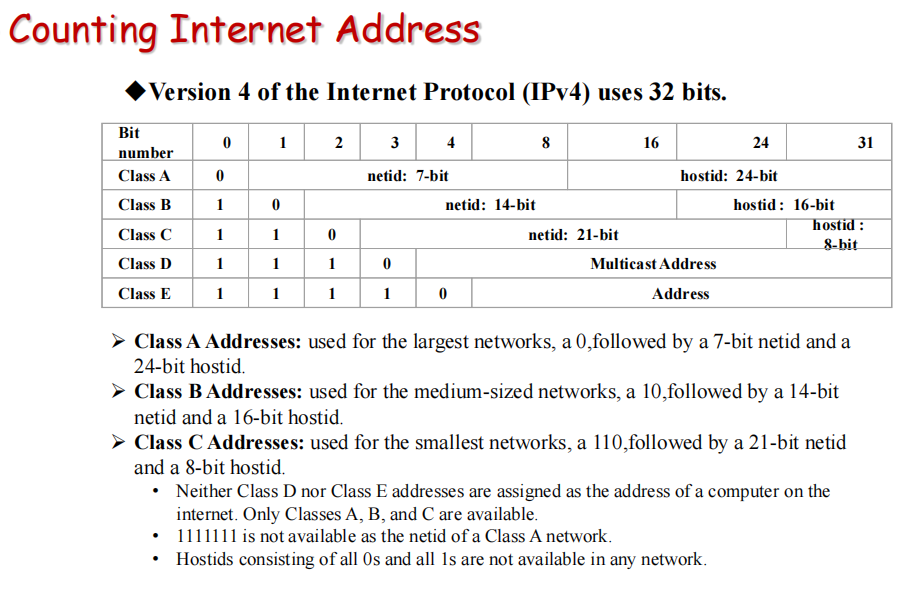
**〖Example 6〗Counting the number of elements in *A*,**

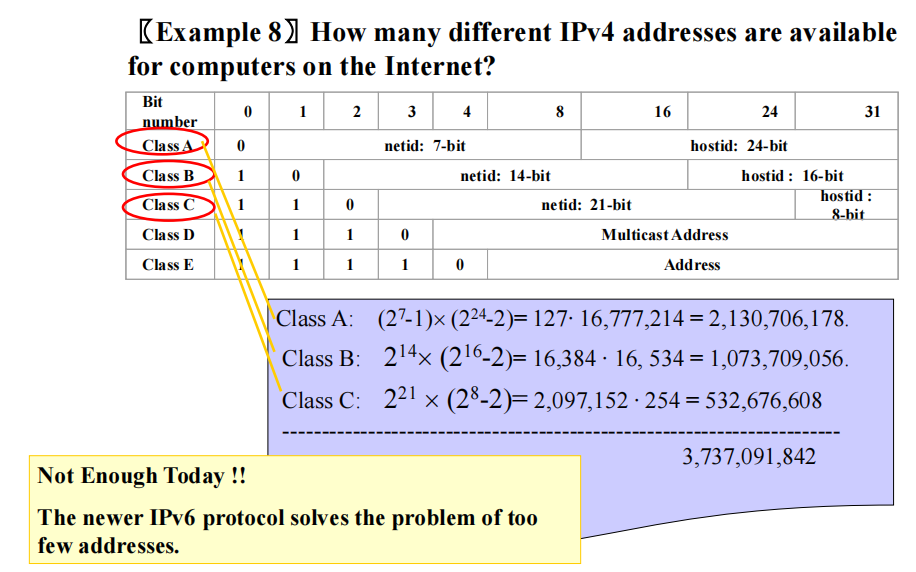
***A* = {length 10 bit strings with 0-streak of length exactly 5}.**

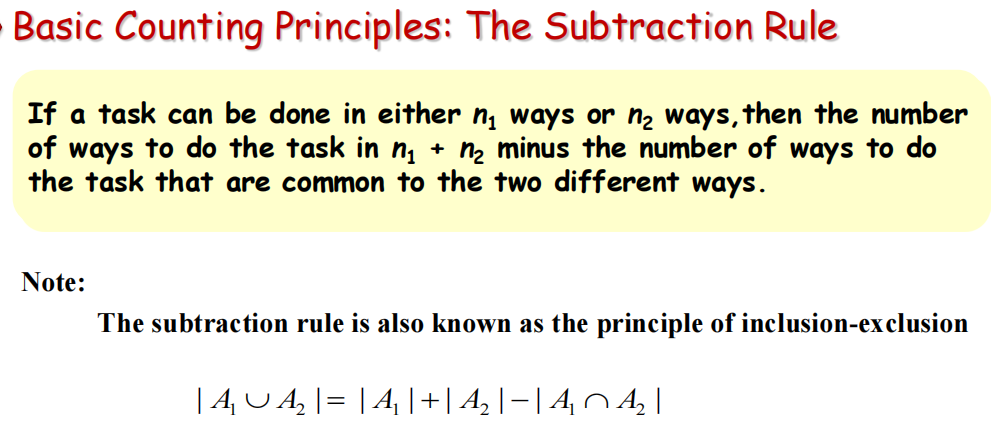
（恰好有5个连续的0）

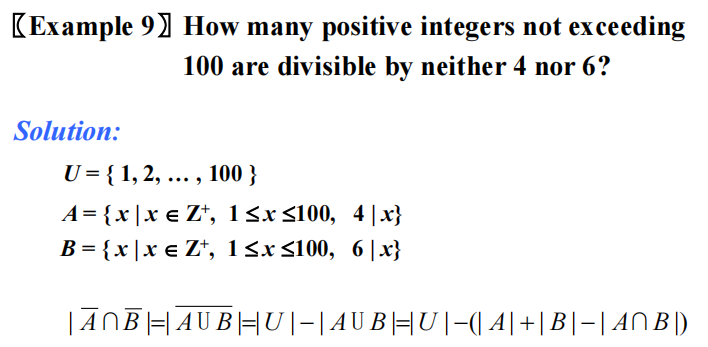


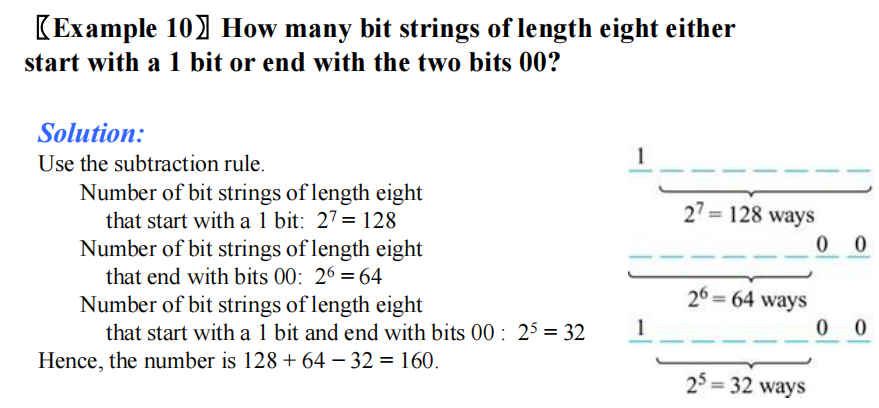




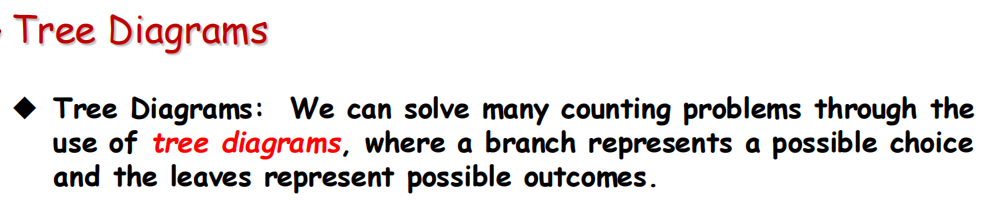


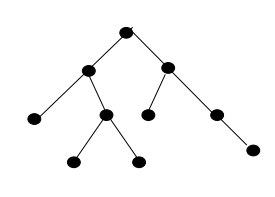




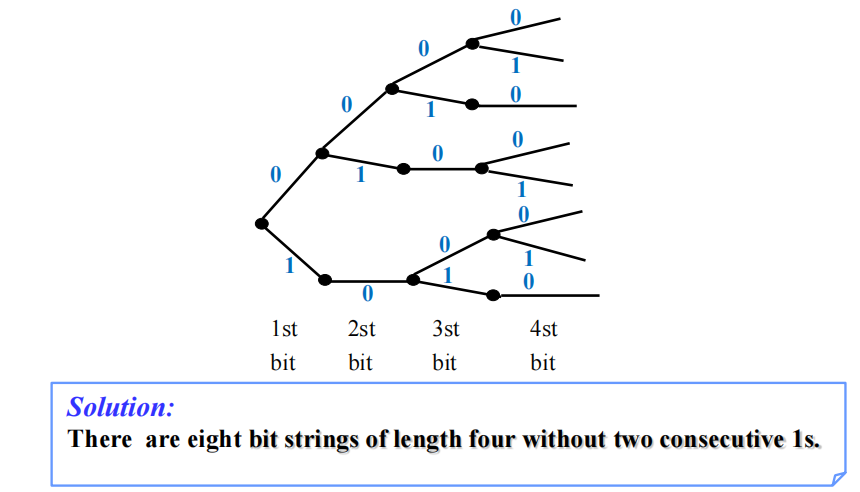


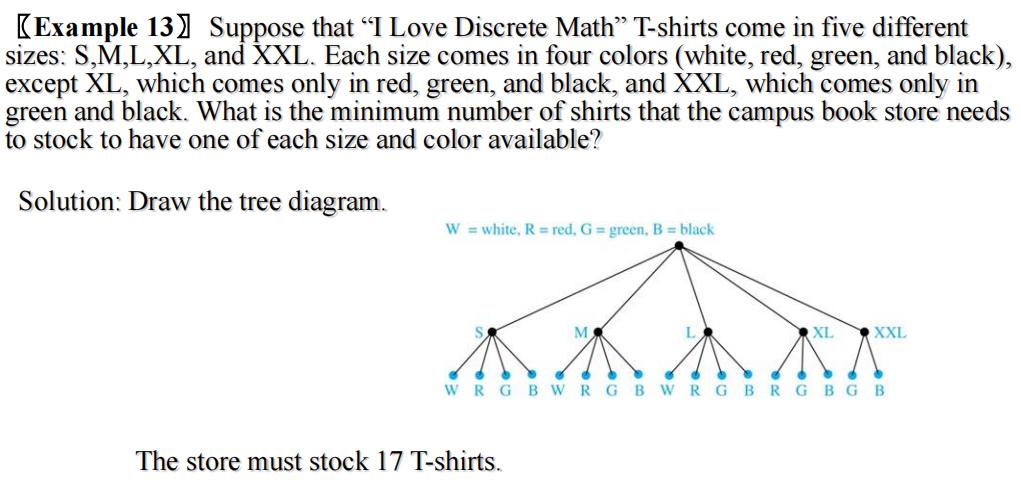






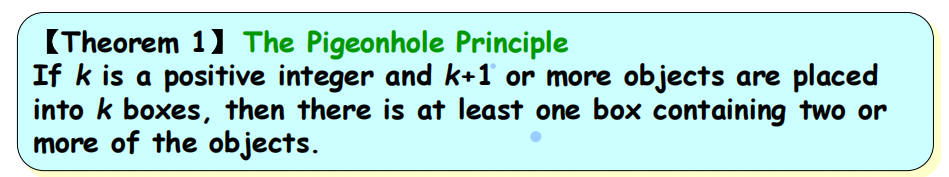
**〖Example 12〗How many bit strings of length four do not have two consecutive 1s（没有两个连续的1）?**

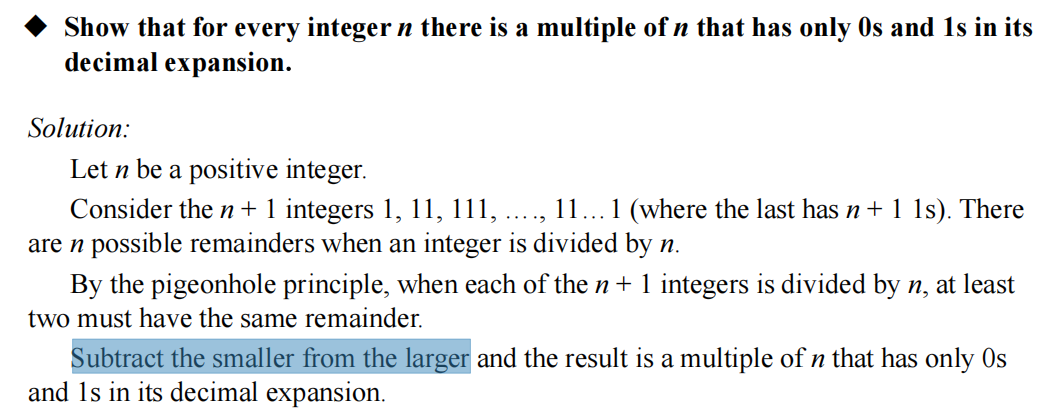




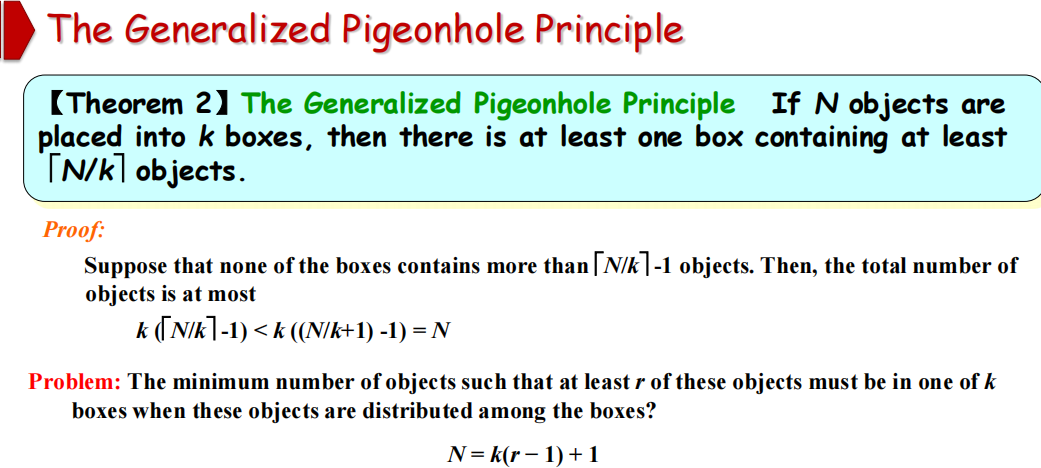
**（6.2）The Pigeonhole Principle**

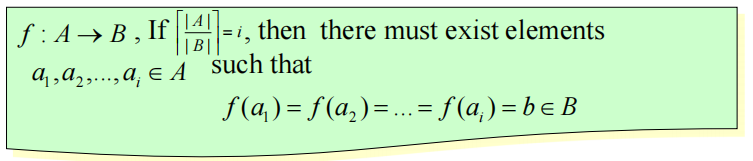
**（鸽洞原理/抽屉原理）**

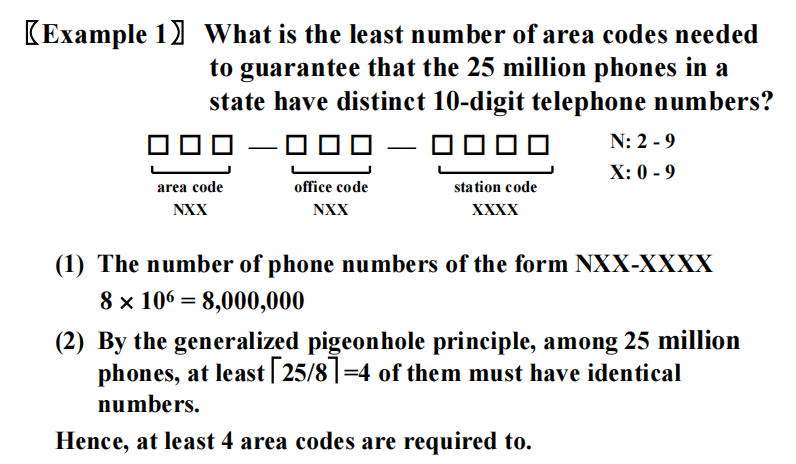


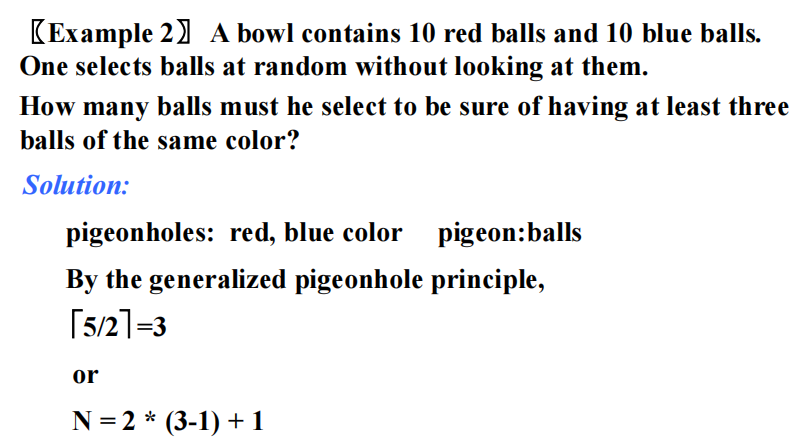


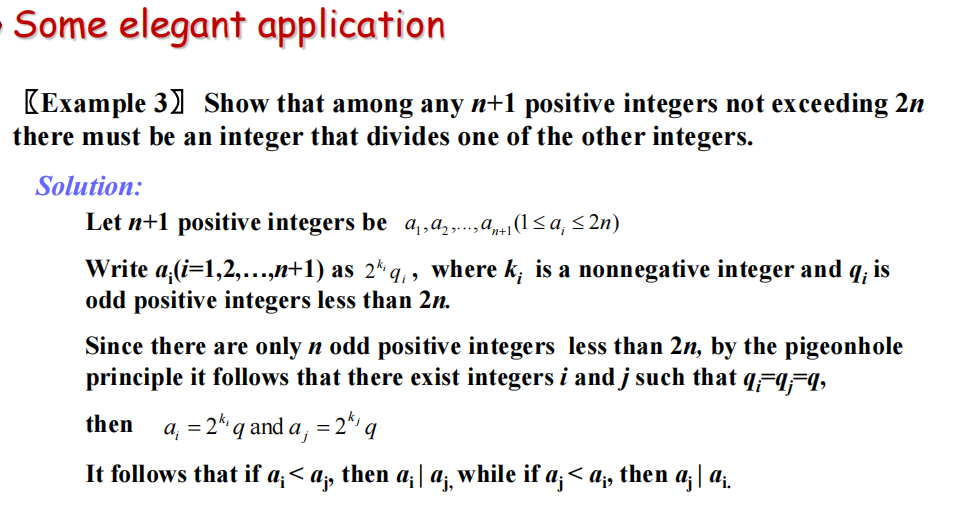
Subtract the smaller from the larger（从大的减去小的）

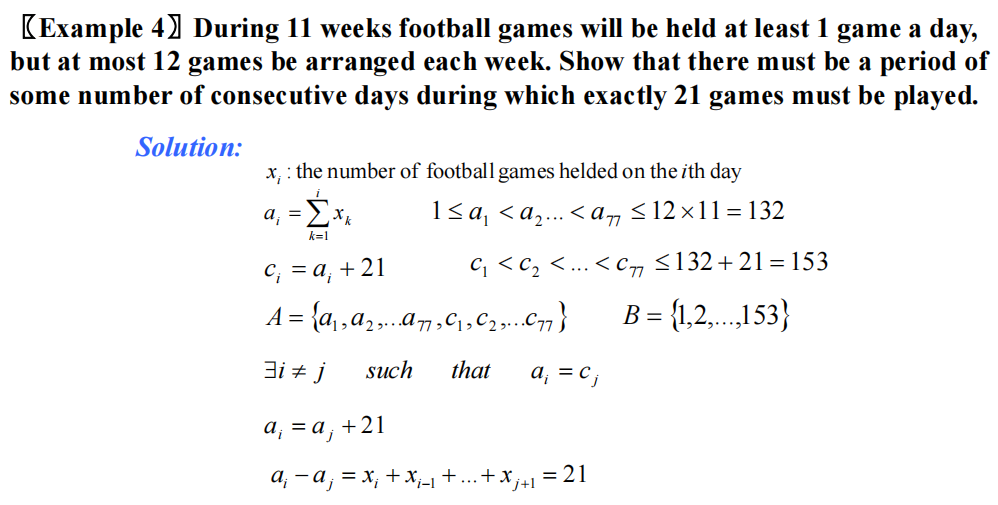


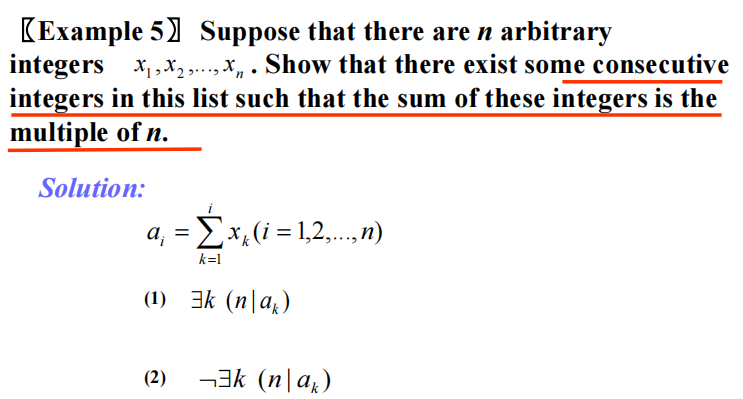




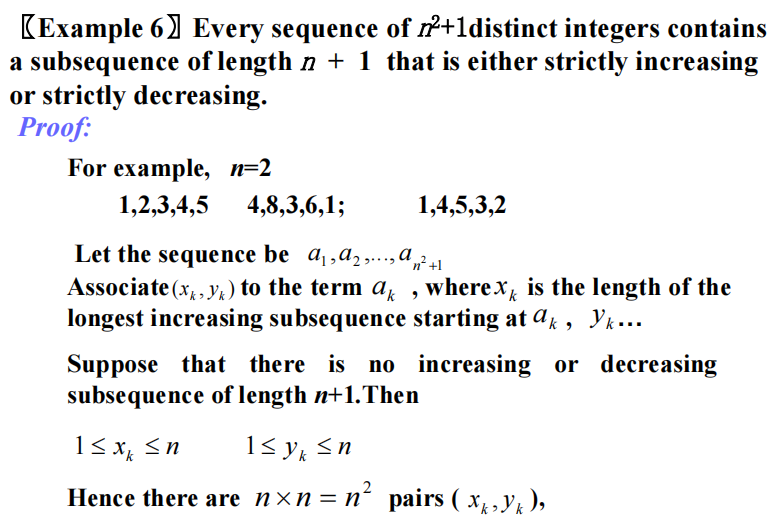


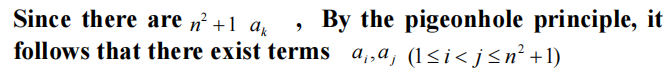






第（2）种情况下，必定有两个数模n的余数相同，他们相减就是n的倍数



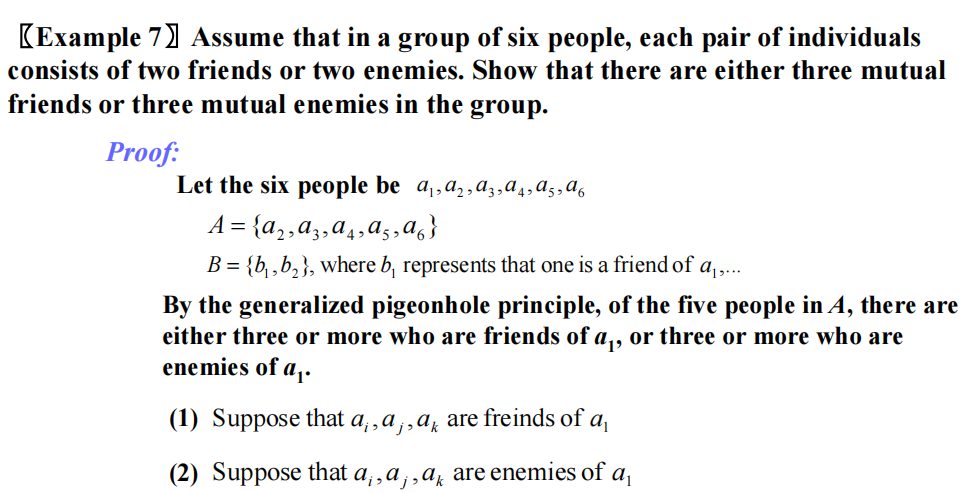


**such that** (*xi* , *yi*) = (*x* *j，y j* )，（yk代表从ak开始的最长递减序列的长度）

**Since** *ai* ≠ *a j*

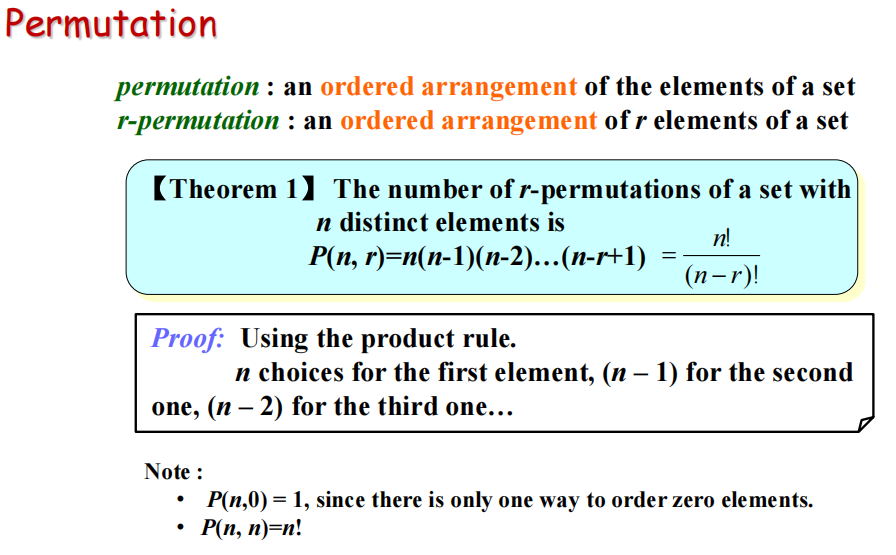
**It follows that**

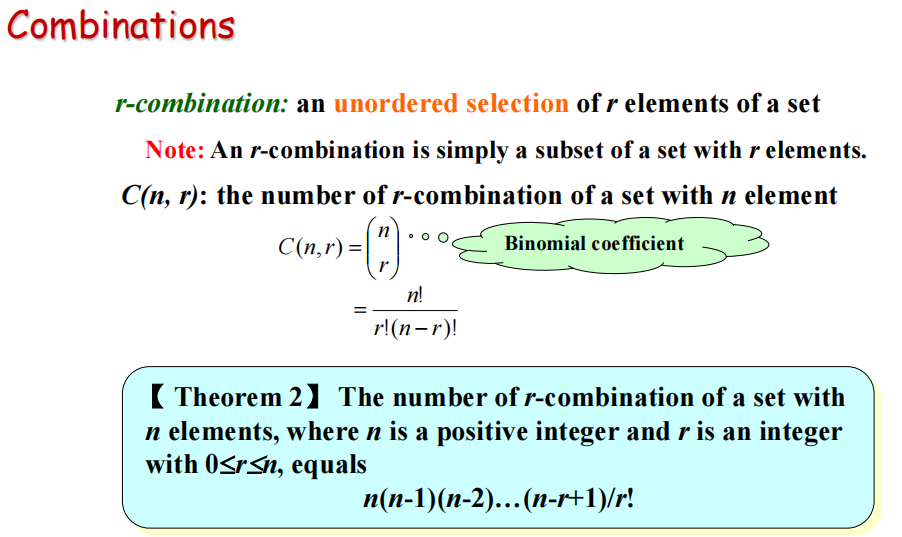
**(1)** *ai* < *a j （则xi>=xj+1,矛盾！）* **(2)** *ai* > *a j（则yi>=yj+1,矛盾！）*

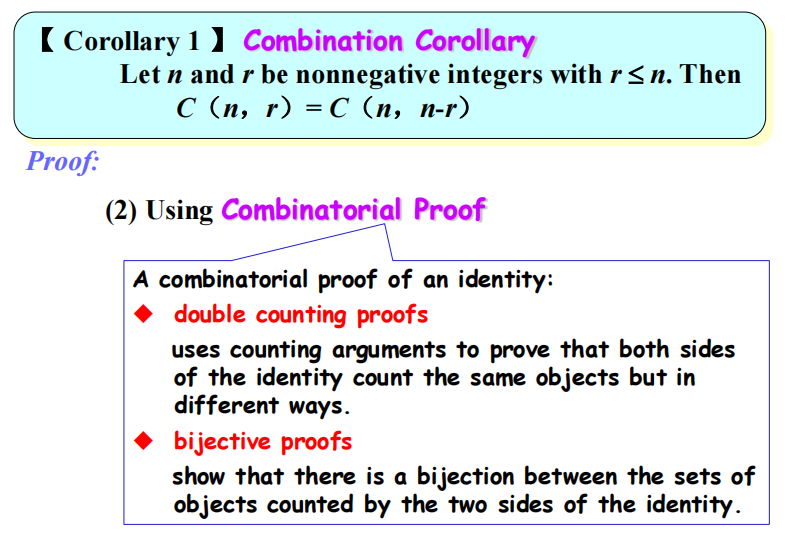


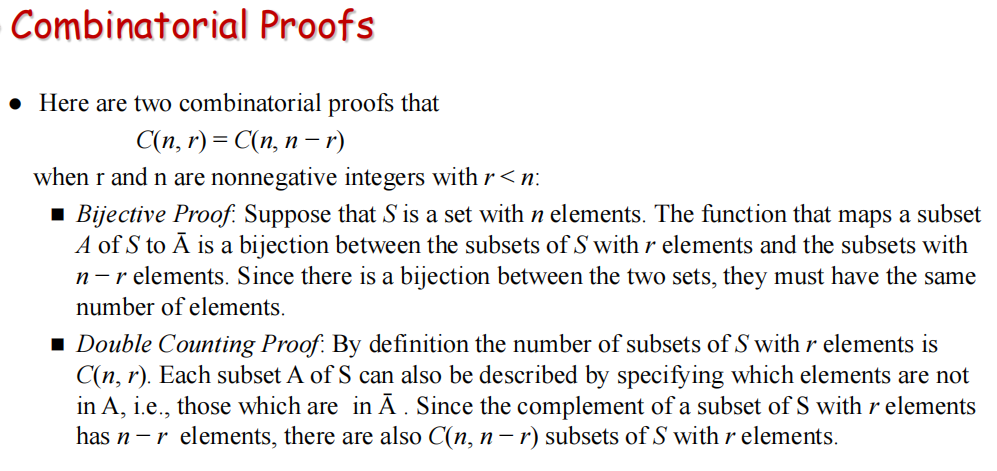
b2代表其是a1的敌人

**（6.3）Permutations（排列） and Combinations（组合）**





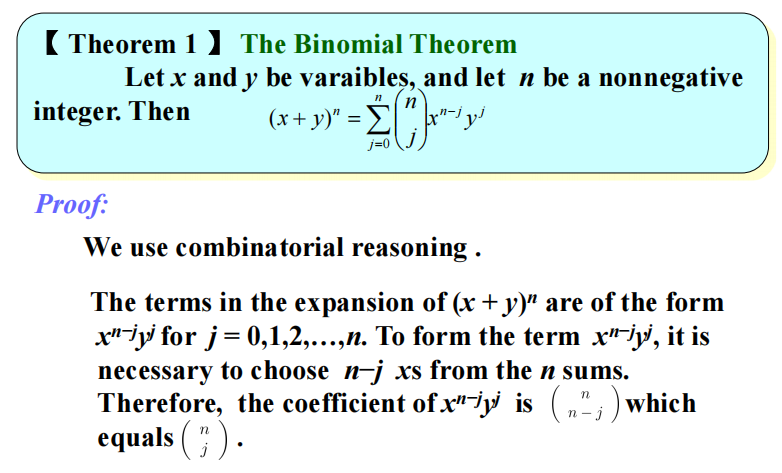


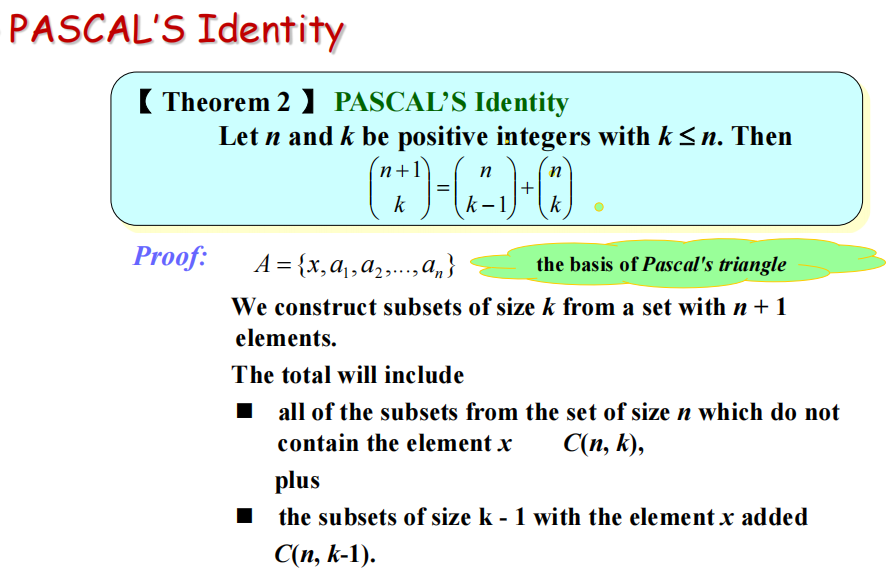


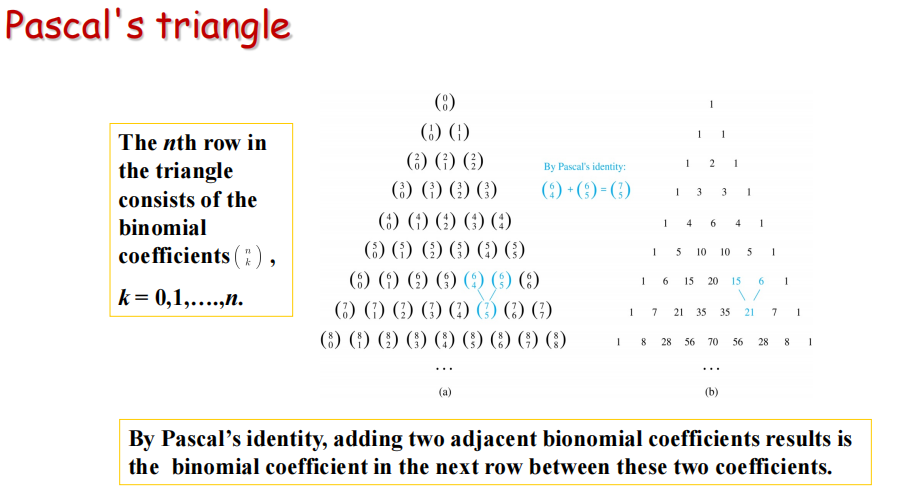
**（6.4）Binomial Coefficients（二项式系数）**

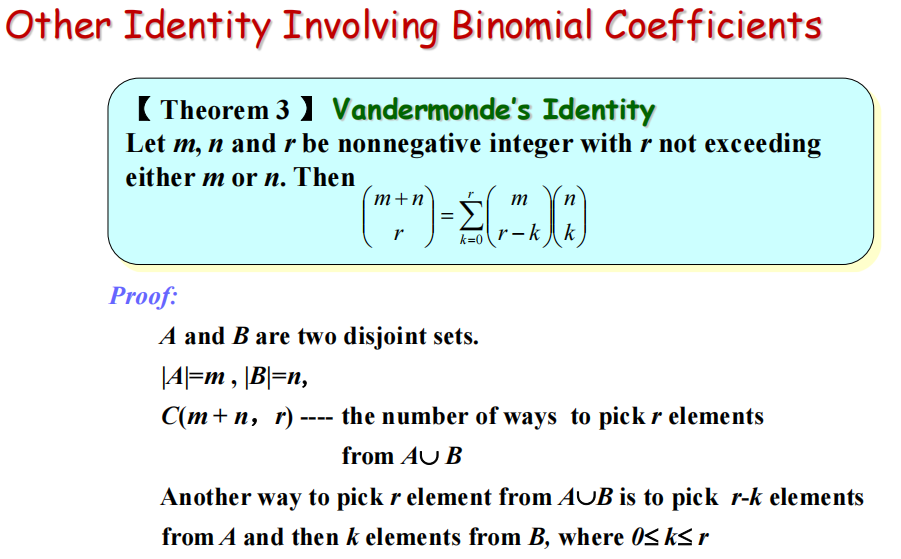
**Definition**: A ***binomial* expression（二项式）** is the sum of two terms, such as *x* + *y*. (More generally, these terms can be products of constants and variables.)

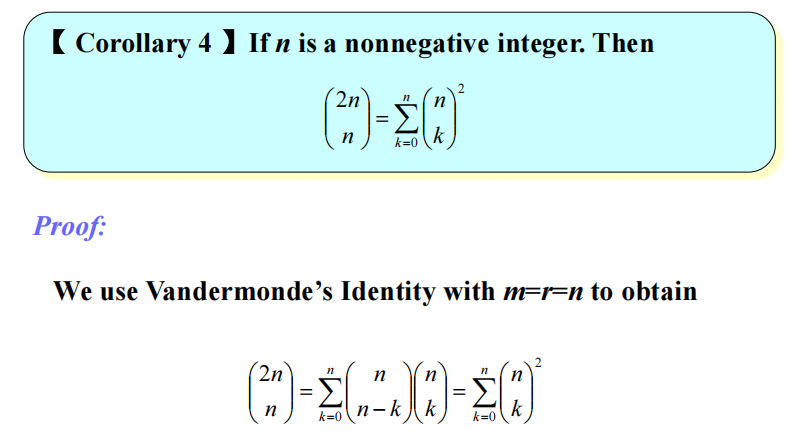
The Binomial Theorem（二项式定理）

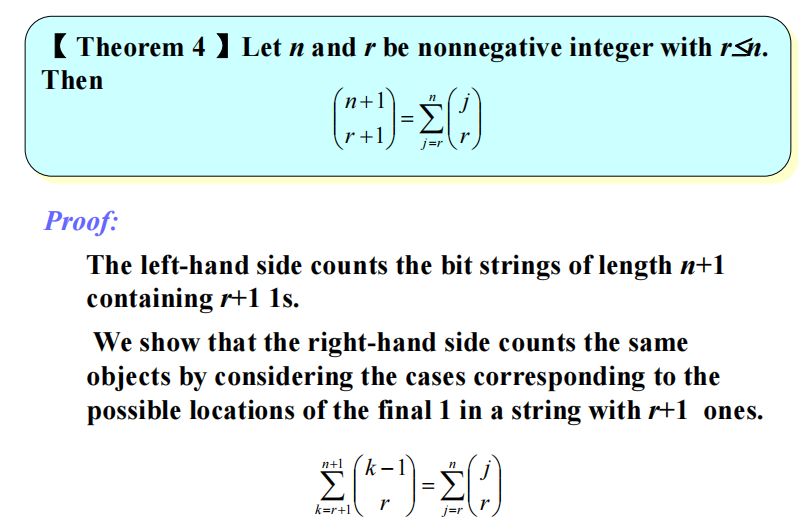






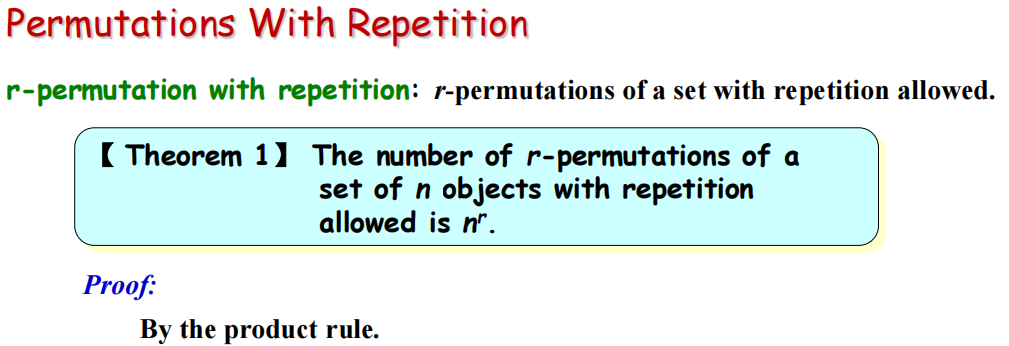


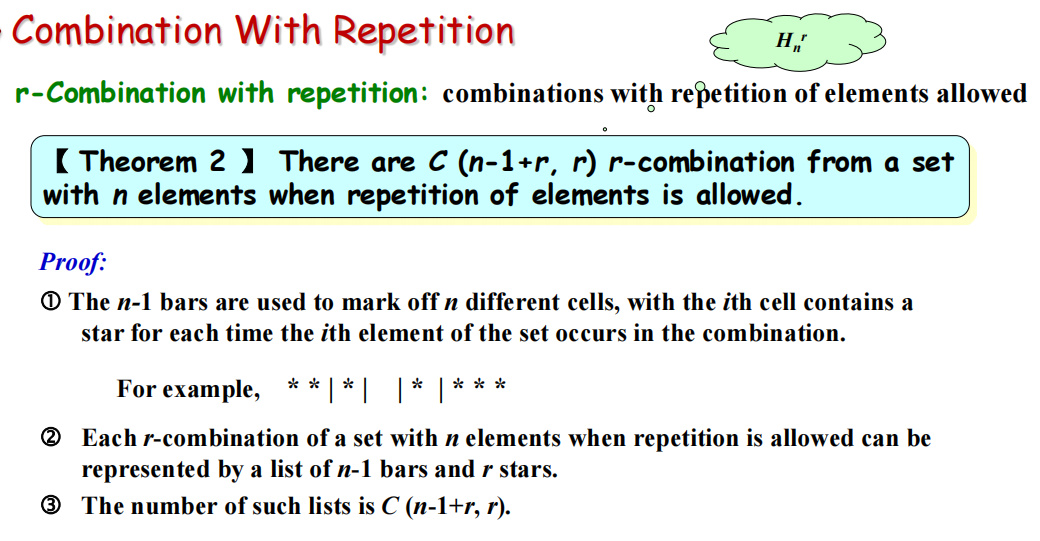


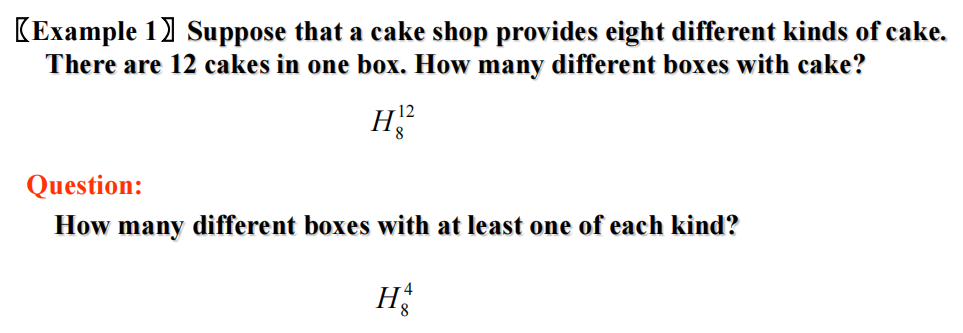


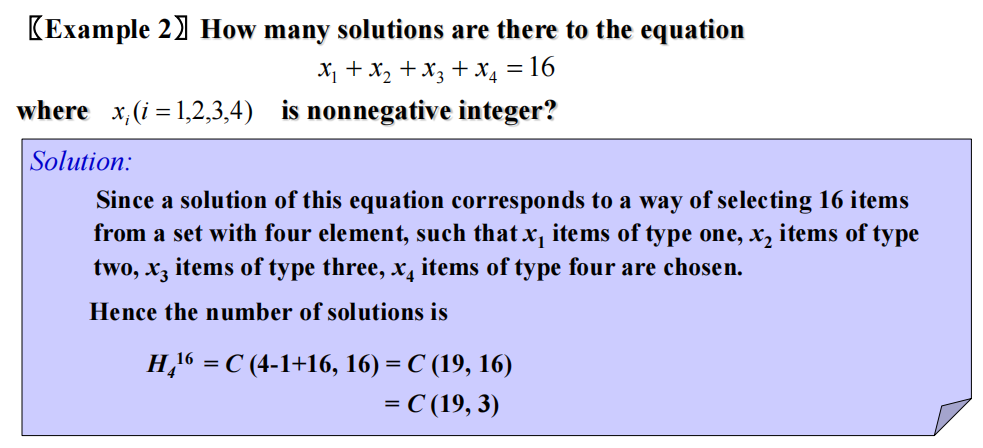
**（6.5）Generalized Permutations**

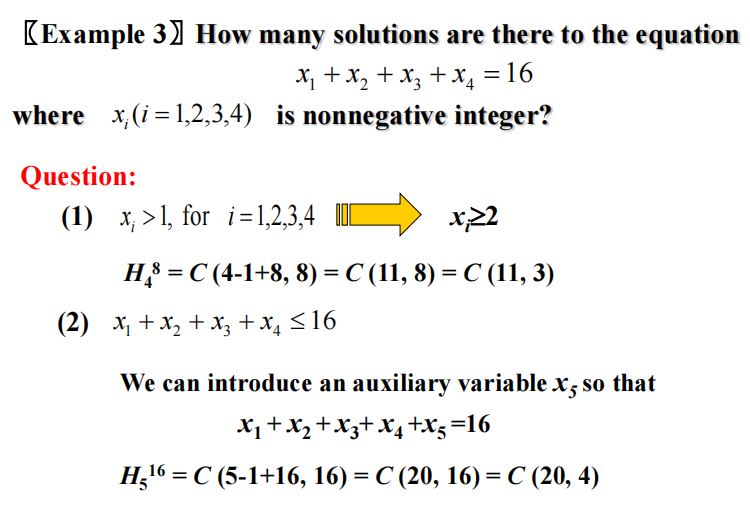
**and Combinations**

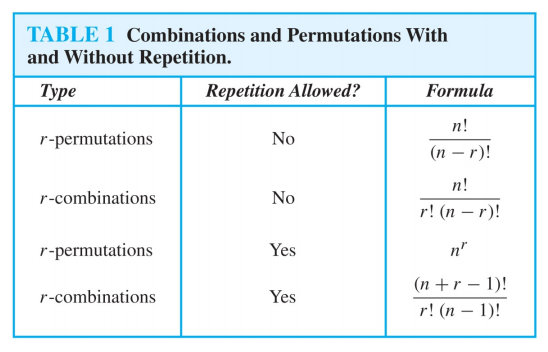


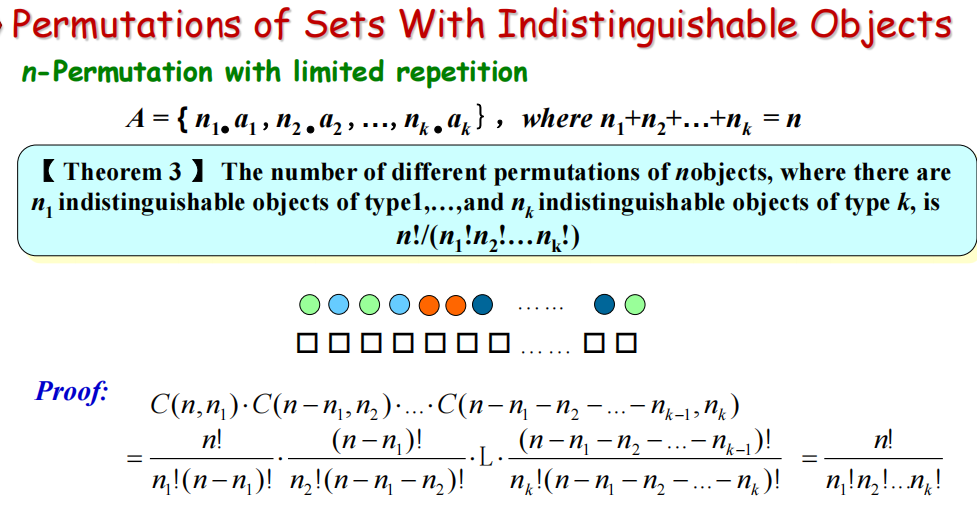


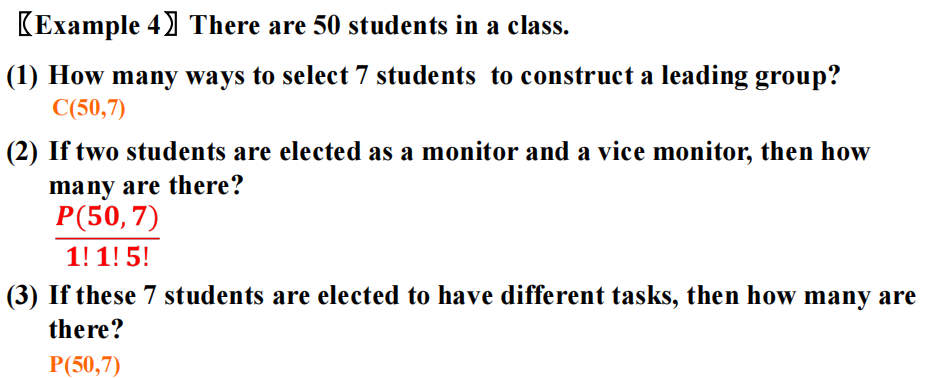


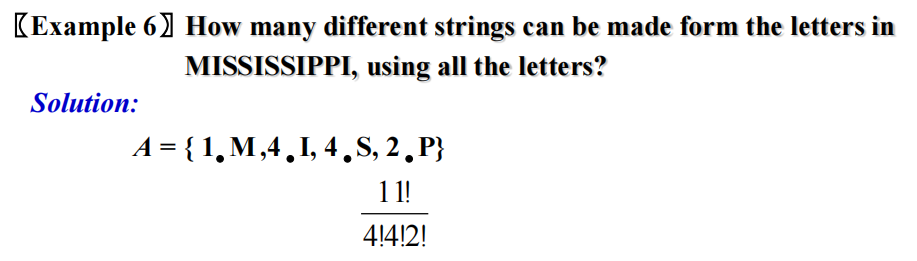


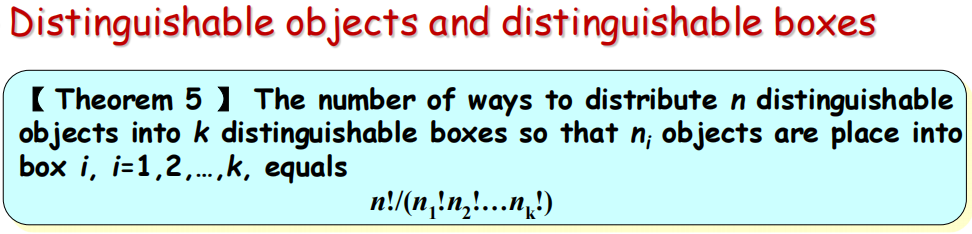


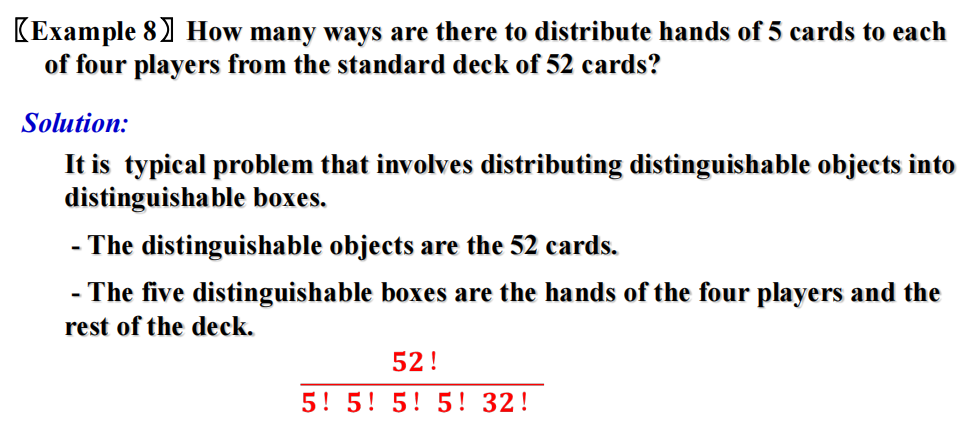


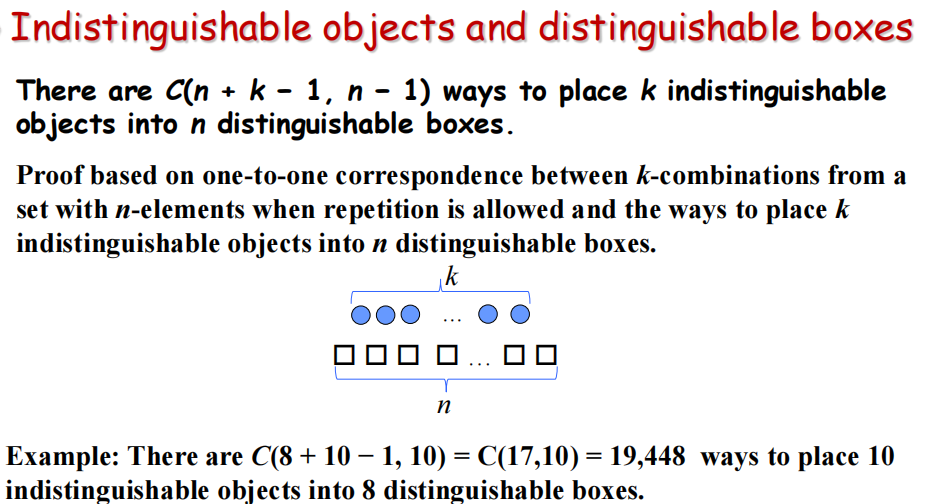


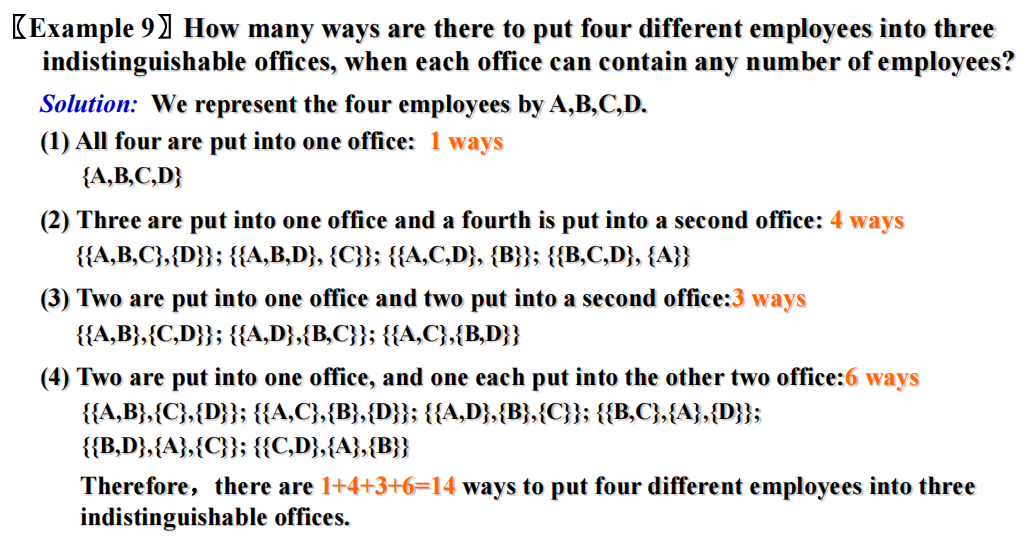


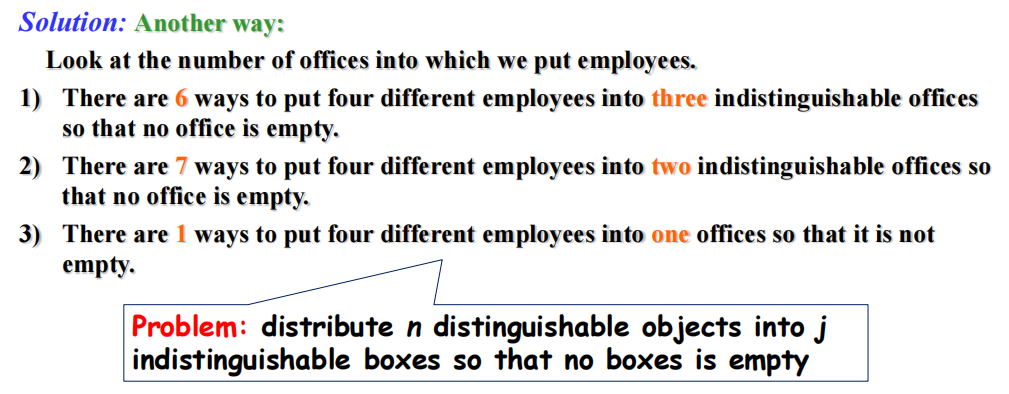












Stirling numbers(斯特林数) of the second kind



