



ПЕРВЫЕ ШАГИ В IT-СФЕРЕ

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VIZUALIZATION OF COMBINATORICS

В работе рассмотрены основные области применения комбинаторики. Установлена актуальность задач, возникающих в перечисленных областях. Разработан онлайн калькулятор для нахождения сочетаний, с выводом всех возможных комбинаций для любого конечного множества элементов.

Combinatorics is an area of mathematics primarily concerned with counting, both as a means and an end in obtaining results, and certain properties of finite structures. It is closely related to many other areas of mathematics and has many applications raising from logic to statistical physics, from evolutionary biology to computer science, etc.

Let us consider combinations and arrangements of discrete structures. There are five major branches application of combinatorics: enumeration, graph theory, Ramsey Theory, design theory, and coding theory.

When a statistician (or other mathematician) is calculating the “probability” of a particular outcome in circumstances where all outcomes are equally likely, what they usually do is enumerate all possible outcomes, and then figure out how many of these include the outcome they are looking for.

Many questions that have important real-world applications can be modeled with graphs such as: finding a good route for garbage trucks to take through a particular city; building a delivery route that visits every city in a particular area, without repetition; assignment each student a unique research topic that interests him, etc.

One of the major early motivation for design theory had the following context: given a fixed number of total treatments, and a fixed number of treatments we are willing to give to any subject, can we find combinations of the possible treatments so that each treatment is given to some fixed number of subjects, and any pair of treatments is given together some

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fixed number of times (often just once). This is the basic structure of a block design.

Coding theory is the study of encoding information into different symbols. One of its primary concerns is the ability to detect and correct errors in the code.

All listed issues are solved using the tools of combinatorics. So, the purpose of work is to develop a calculator for counting combinations with the ability to enter any finite number of initial data.