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GRAPHS AND THEIR USES

Nowadays the development of all fields of science and technology leads to a continuous research and solving of certain urgent problems facing the humanity. Very often in order to solve a certain problem it is necessary to solve it in the language of graphs, and then interpret the result in terms of a necessary source.

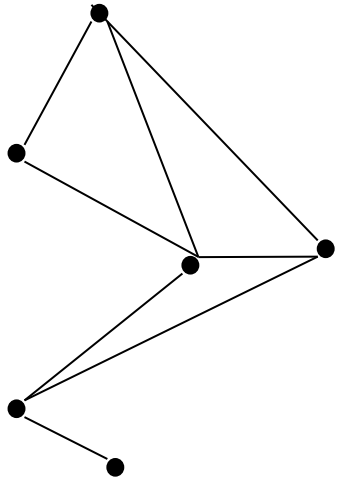

Fig. 1 Graph

The graph theory is a branch of mathematics which studies sets with the given elements and relations between them. Objects of this type can be graphically represented in the form of geometric configurations consisting of dots, circles or other shapes connected by lines. The points correspond to elements of the set, and the lines represent specific relation (relationship) between them. (Fig. 1) These images are usually called graphs, but this concept is much wider, and the pattern is just one of the forms of representation of the graph.

The graph theory has now become simple, affordable and powerful means of solving issues relating to a wide range of problems. In the form of graphs, for example, we can interpret the scheme of roads, electrical circuits, building challenges, maps and molecules of chemical compounds, the connection between people and groups of people.

This theory is also used in the design of integral circuits and the control circuits, in the study of machines, logical circuits, block diagrams of programs, in economics and statistics, chemistry and biology, in the theory of schedules. In mathematics the graph theory is used to solve geometric problems and problems of practical content. Graphs are the basis of many computer issues that make modern communications, and technological processes possible. Using graphs is the penetration of mathematical methods in science and technology. [1, p. 8]

Let us consider some applications of the theory in more detail. The graph theory and the related research methods are used in almost all sections of modern mathematics.

For example, graph is a tool of solving many problems in topology. A graph is called universal if it can be drawn in a single stroke, i.e. in a continuous movement, without passing through the same edge twice.

It is known that the solution of the Euler Konigsberg bridges problem (Fig. 2) using the graph, marked the formal beginning of topology as a branch of mathematics.

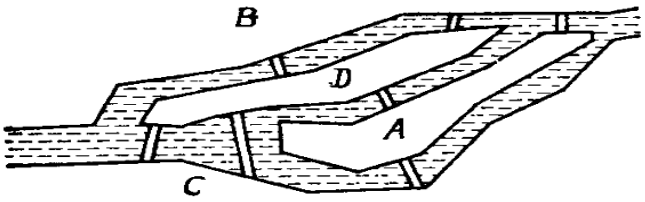

Fig. 2 Konigsberg bridges

Graphs in chemistry are used to solve a wide range of theoretical and practical problems. The application of the graph theory is based on the construction and analysis of various chemical and chemical-technological connections in the form of models. The edges and vertices of these graphs represent chemical concepts, phenomena, processes and objects and, respectively, qualitative and quantitative relations or certain connections between them.

The graph theory is widely used in psychology. In 1936, Kurt Lewin used graphs in the form of planar cards for representing the living environment of an individual, as it follows from Fig. 3.

The psychologists of the group dynamics research centre studied the psychological interpretation of a graph where people were represented by vertices, and their ralations by edges.[2]

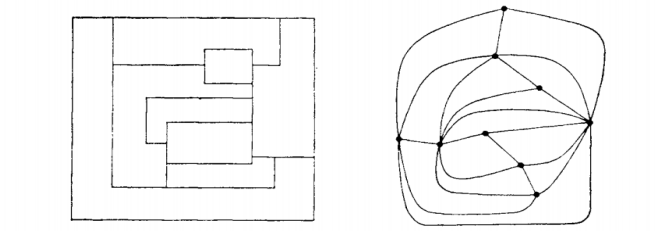

Fig. 3. Card and its graph

So, finding ways of applying graph theory stimulates scientific and technical progress. A graph is a universal means of visual presentation of a great variety of tasks from almost all fields of knowledge.

Our further research will be devoted to the study of using graphs in informatics, physics and architecture.

LITERATURE

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