Abstract

Graph theory is a branch of mathematics that studies structures made up of nodes (vertices) connected by links (edges). It began with Euler's solution to the famous Königsberg Bridge Problem, laying the foundation for the modern graph theory. Today, graphs helps in modelling complex networks—like social connections, road systems, and the internet. Imagine trying to place the fewest number of guards to watch over a museum—this is where problems like the Minimum Vertex Cover become useful. They help us manage resources wisely, whether it's placing security cameras, monitoring networks, or allocating staff. And when we wonder, "What happens if a road shuts down or a server crashes?"—graph connectivity reveals how resilient our systems truly are. Planar graphs are equally important when it comes to designing things neatly, like circuit layouts or clear, uncluttered maps.