

# Constructor-destructor game

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## Annotation

The paper discusses a well-known problem in which two players, in this case a constructor and a destructor, take turns coloring a vertices of an undirected graph using a given number of colors. According to the rules, adjacent vertices can not be colored with the same color. The goal of the constructor is to color the entire graph according to the rules, while the goal of the destructor is to color the vertices such a way to force a situation where it becomes impossible to legally color the entire graph.

The paper presents the idea behind this problem and its further development. It also discusses the significance of similar games in various fields. We created a program for this paper, in which it is possible to construct random or specific graphs with a specified number of vertices and colors. The constructed graph and the number of colors are then passed to two neural network models, which play the game on behalf of the constructor and destructor. During the game, the models are trained on their own experience to determine whether the artificial intelligence can find a known winning strategy for a given number of colors for specific graphs.