Some graph theoretic definitions will be helpful in discussing the game of Cliquer.

- A simple graph $G$ is an ordered pair $(V,E)$. $V$ is the set of vertices, and $E$ is the set of edges.
- For each edge $\{u, v\}$, $u, v \in V$, $u$ and $v$ are said to be adjacent. A vertex is adjacent to itself.
- The degree of a vertex $v \in V$ is the number of vertices to which $v$ is adjacent. By convention, we do not consider a vertex’s adjacency to itself when counting degree.
- A complete graph on $n$ vertices, $K_n$, is a graph where all vertices have degree $n - 1$.
- A planar graph is a graph where no edges intersect, or pass through vertices which are not part of the pair that define the edge, when the graph is drawn on a two dimensional surface.
- A subgraph of a graph $G$ is a noather graph formed from a subset of the vertices and edges of $G$. The vertex subset must include all endpoints of the edge subset.
- A clique is a complete subgraph of a graph $G$.

How to play Cliquer

- Start with $n$ dots (something small, like 8 or so when first learning the game).
- A move consists of drawing an edge between two dots. An edge cannot be drawn from a dot to itself. Only one edge between a pair of vertices is allowed.
- The graph must remain planar.
- For each new edge a player adds to the graph, they get 1 point added to their score. If a player completes a $K_3$, that is worth 3 points, plus the 1 point for putting down the edge. If a player completes a $K_4$, that is worth 5 points, plus 3 for any $K_3$’s that are completed, plus the 1 point for the edge.
• If you manage to draw a planar $K_5$, you are awarded 1 million points, plus a Fields Medal for revolutionizing graph theory.

• The game ends when no more edges can be put down, the winner is the player with the greatest number of points