In the game of Cops and Robbers on a graph $G = (V, E)$, $k$ cops try to catch a robber. On the cop turn, each cop may move to a neighboring vertex or remain in place. On the robber’s turn, he moves similarly. The cops win if there is some time at which a cop is at the same vertex as the robber. Otherwise, the robber wins. The minimum number of cops required to catch the robber is called the cop number of $G$, and is denoted $c(G)$. The game of Cops and Robbers has applications in robotics and in search and rescue operations.

A classic result of Aigner and Fromme shows that if $G$ is planar then $c(G) \leq 3$. We characterize the following families of planar graphs as having $c(G) \leq 2$: series parallel graphs, outerplanar graphs, maximal 2-outerplanar graphs, and maximal planar graphs with maximum degree at most 5. We also show that every graph $G$ with $|V| \leq 9$ has $c(G) \leq 2$. This bound is tight, since the Petersen graph (on 10 vertices) requires 3 cops. (Received September 21, 2010)