In a fantasy sports league, the draft is the first opportunity for team managers to gain an advantage over their opponents. We created a computer program in R that can maximize a team’s projected value gained from a fantasy football draft. The key feature of our program is its ability to predict when players will be taken in future rounds. This enables our team to draft the best players being considered by opposing teams in a given round and also draft players before there is a drop in value at a given position. Our program is able to learn the strategies of opposing teams as the draft progresses and therefore adjust its predictions for future rounds to increase its accuracy. Thus, even when our program starts with very little knowledge of the strategies used by the competing teams, it is able to finish with a competitive edge. We completed this project during the Dr. Albert H. & Greta A. Bryan Summer Research Program in Mathematics at Simpson College. (Received September 15, 2014)