

An Auction-Based Fantasy Football Draft Problem

You are participating in a fantasy football league whose draft is auction-style with slight twists: the price of the players are fixed before the draft by the league and multiple people can draft the same player. This is a similar structure to many of the one-week leagues that are becoming popular. In this league, your team is formed of one quarterback, one running back, and two wide receivers. Therefore, it is your goal to select a set of players that form your team (without worrying about who other people are drafting) and whose (i) total cost is less than or equal to your budget of \$200 and (ii) total expected points per game (PPG) is as large as possible. The following data gives you the available players that can be drafted to form your team.

Player	Initials	Position	Team	Cost	PPG
Peyton Manning	PM	Quarterback	Denver Broncos	\$56	23.0
Aaron Rodgers	AR	Quarterback	Green Bay Packers	\$52	21.7
Drew Brees	DB	Quarterback	New Orleans Saints	\$50	20.6
Matthew Stafford	MS	Quarterback	Detroit Lions	\$45	17.8
Jamaal Charles	JC	Running Back	Kansas City Chiefs	\$56	15.2
LeSean McCoy	LM	Running Back	Philadelphia Eagles	\$55	15.1
Matt Forte	MF	Running Back	Chicago Bears	\$50	14.7
Marshawn Lynch	ML	Running Back	Seattle Seahawks	\$49	14.3
Calvin Johnson	CJ	Wide Receiver	Detroit Lions	\$56	14.8
Demaryius Thomas	DT	Wide Receiver	Denver Broncos	\$43	13.5
AJ Green	AG	Wide Receiver	Cincinnati Bengals	\$41	12.4
Brandon Marshall	BM	Wide Receiver	Chicago Bears	\$36	12.2
Julio Jones	JJ	Wide Receiver	Atlanta Falcons	\$35	12.0
Jordy Nelson	JN	Wide Receiver	Green Bay Packers	\$31	11.8

In addition, you have decided that you would like to avoid putting too many eggs in one team's basket and would like to make sure that your team does not have multiple players from a single team. We will formulate this problem as a binary integer linear program - or, equivalently, a linear program where all variables can only take binary (0 or 1) values.