Express Riddler

27 August 2021

Riddle:

Football season is almost here, which means fantasy football season is already here.

You and your two best friends are in a three-person league, drafting just three positions each for your teams: quarterback, running back and wide receiver. Yes, this is a simplified version of fantasy football.

The following table shows the top three athletes in each position, as well as the number of fantasy points they are expected to earn over the course of the season. You and your friends must each select exactly one player from each position.

Quarterback	Points	Running Back	Points	Wide Receiver	Points
Matrick Pahomes	400	Caffrey McChristian	300	Avante Dadams	250
Osh Jallen	350	Calvin Dook	225	Hyreek Till	225
Myler Kurray	300	Herrick Denry	200	Defon Stiggs	175

The draft is a "snake draft." If person A drafts first, B drafts second and C drafts third, then the order of the picks is as follows: A-B-C-C-B-A-A-B-C.

Your friends—being the kind people that they are—agree that you can choose your pick number. Which draft position should you choose to maximize your expected fantasy score?

Solution:

When each person makes the first draft selection, there are three positions available to be filled. During the second selection, there are two positions, and during the third selection, there is one position remaining. I assume that for any given position, the drafter picks the best-available player in that position; this means that the drafters are only picking among positions, and not among all players. Each of drafters A, B, and C has $3 \times 2 \times 1 = 6$ possible ways to fill their team. With three drafters, there are $6^3 = 216$ possible "paths" toward choosing the teams.

But some of these paths are redundant. Specifically, A can reverse their second and third picks, leading to the same final result; similarly C can reverse the first and second picks. This means there are only 54 unique paths for drafting.

I manually listed each of the 54 possible paths and calculated the expected scores for each drafter. From there, I determined the optimal choice that each player would make, starting backwards from B's second pick. (Interestingly, A only has a single free choice; the second and third picks are whatever is leftover after B and C's second picks.) If two choices led to paths with the same expected score, I assumed that the drafter would choose either with 50% probability. This probability could factor into earlier choices by other players.

Working back all the way to A's first choice, I determine that the best drafter is **B**. With the following draft choices, A and C are expected to each score 800, while B is expected to score 825.

A: Matrick Pahomes
B: Caffrey McChristian
C: Osh Jallen/Avante Dadams
B: Hyreek Till
A: Calvin Dook/Defon Stiggs
B: Myler Kurray
C: Herrick Denry