Finding the Optimal Fantasy Football Team
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We used three models to predict the fantasy value of a player, given his previous performances and those of the opposing defense:

- **Linear Regression**
- **Random Forest**

An ensemble learning method that constructs a series of decision trees from the data. Given an input, the random forest runs it through each of the individual trees, and outputs the mean prediction.

- **Multivariate Adaptive Regression Splines**

A form of non-parametric regression that automatically models non-linearities and interactions between variables. Allows there to be 'kinks' in the regression lines.

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**Scoring System:**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Fantasy Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Yard</td>
<td>0.04</td>
</tr>
<tr>
<td>Pass TD</td>
<td>4</td>
</tr>
<tr>
<td>Interception</td>
<td>-1</td>
</tr>
</tbody>
</table>

**Weight Formula**

$w_i = \frac{\alpha^{(n_0 - n_i)}}{\sum \alpha^{(n_0 - n_j)}}$

where $w_i = \text{weight for data point } i$

$\alpha = \text{week we are trying to predict}$

$n_0 = \text{historical season}$