# Pol Sci 630: Problem Set 2 - XXXX - Solutions

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Due Date: Tuesday, XXX, 2015, 10 AM (Beginning of Class)

SOLUTION

$$
\begin{aligned}
&\frac{Pr(k\ heads)}{Pr(k\ heads) + Pr(k-1\ heads)} \\
&= \frac{\binom{n}{k}0.5^k 0.5^{n-k}}{\binom{n}{k}0.5^k 0.5^{n-k} + \binom{n}{k-1}0.5^{k-1}0.5^{n-(k-1)}} \\
&= \frac{\binom{n}{k}0.5^n}{\binom{n}{k}0.5^n + \binom{n}{k-1}0.5^n} \\
&= \frac{\binom{n}{k}}{\binom{n}{k} + \binom{n}{k-1}} \\
&= \frac{\frac{n!}{(n-k)!k!}}{\frac{n!}{(n-k)!k!} + \frac{n!}{(n-(k-1))!(k-1)!}} \\
&= \frac{\frac{n!}{(n-k)!k!} * \frac{n-k+1}{n-k+1}}{\frac{n!}{(n-k)!k!} * \frac{n-k+1}{n-k+1} + \frac{n!}{(n-k+1)!(k-1)!} * \frac{k}{k}} \\
&= \frac{\frac{n!(n-k+1)}{(n-k+1)!k!}}{\frac{n!(n-k+1)}{(n-k+1)!k!} + \frac{n!}{(n-k+1)!k!}} \\
&= \frac{n!(n-k+1)}{n!(n-k+1) + n!k} \\
&= \frac{n-k+1}{n-k+1+k} \\
&= \frac{n-k+1}{n+1}
\end{aligned}
$$