This time:  probability models for sums  
next time:  

Due: Wed 3 May  take home mid-term 
handed out Wed 3 May, due Wed 10 May

CS 8 (roulette) \( (1/38) \) pop. mean  

\[
\bar{x} = \frac{-1 + (-1) + \ldots + (-1) + (+35)}{38} = \frac{-2}{38} = -0.0526
\]

\[\text{I expect to lose a nickel on average (} \mu \text{), give or take about } \pm 85.76 \]

\[\sigma = \sqrt{ \frac{(-1) - (-0.05))^2 + \ldots + ((-1) - (-0.05))^2 + \ldots + (+35) - (-0.05))^2}{38} = 85.76 \]
$S =$ my net gain after 1,000 spins

$P($ coming out ahead after 1,000 spins $) = P(S > 0)$

$P($ coming out ahead on any single play $) = \frac{1}{38}$
Expected value of $S' = E(V)$ of $S' = E(S')$

$= E_{	ext{IID}}(S') = \eta \mu = (\text{# draws})(\text{# mean})$

$= (1000)(-0.052) = -52$ so after $1000$ spins I expect to be behind by about $52$,

Standard Error of $S' = SE(S')$

$SE_{\text{IID}}(S') = \frac{\sigma \sqrt{n}}{\sqrt{1}} = \sigma \sqrt{n}$

$= (\text{# SD}) \sqrt{\text{# draws}}$

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<thead>
<tr>
<th>$N$</th>
<th>$X$</th>
<th>$\sigma$</th>
<th>$\sigma \sqrt{SE(S')}$</th>
<th>$\text{# draws}$</th>
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<tr>
<td>$M$</td>
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