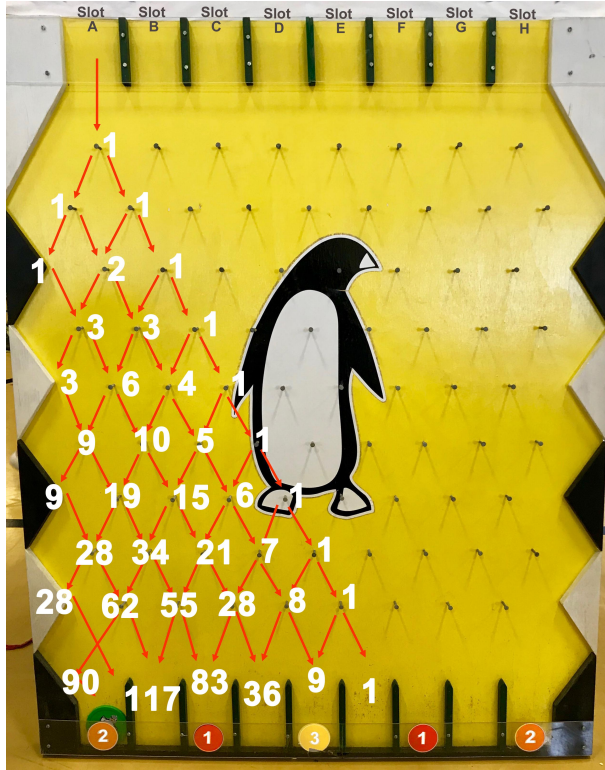


## I want to win - Extension: Expected Outcomes

We can also try to calculate what the expected outcome is for each of the possibilities. Expected Outcome is like a weighted average. Another way of thinking of this might require playing the game many, many times (like maybe one hundred times) and finding the **average** outcomes. To do this we need to find out the possible values of our outcomes and multiply each value by the probability of it occurring.

Here's an example: If we drop the puck in slot A, after cascading down the game board it could finally land in a pocket worth 0 points, 1 point, 2 points, or 3 points. Here's a picture of the slot A possibilities.



Puck placed in slot A

Outcome possibilities	0	1	2	3	Sum of the weighted outcomes
Probability of outcome	$\frac{154}{336}$	$\frac{83}{336}$	$\frac{90}{336}$	$\frac{9}{336}$	
Weighted outcome	0	$\frac{83}{336}$	$\frac{180}{336}$	$\frac{27}{336}$	$\frac{190}{336} = 0.5655$

You can use the probabilities that you found in the original activity to calculate the weighted outcomes for each of the other slots that you used to drop the puck and decide which slot, on average, gives you the highest outcome.

Sources: <http://cswnetwork.org/projects/pdf/242.pdf>  
<http://www.statisticshowto.com/probability-and-statistics/expected-value/>  
[https://www.youtube.com/watch?v=DAjVAEDil\\_Q&feature=youtu.be](https://www.youtube.com/watch?v=DAjVAEDil_Q&feature=youtu.be)