

Blotto Game

1. What's your entry?

Castles	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10
My Allocation	13	31	26	15	8	4	2	0	1	0

2. How did you go about coming up with it?

The first thought would be to try finding all possible allocation combinations. But it would have been impossible to run it. I preferred to use a high number of allocation simulations, where an allocation is a set of 10 integers whose sum is 100 soldiers. To do that, I have separated the process into 3 main steps.

- a) The first step is about finding what would be the best distribution to simulate a winning allocation. Then I took 4 possible distributions:
 - A right skewed normal distribution that concentrates the probability weights on castles 1, 2, 3 and 4.
 - A left skewed normal distribution that concentrates the probability weights on castles 7, 8, 9 and 10.
 - A uniform distribution with the same weight probability for each castle, e.g. a probability of 0.1 for each castle.
 - A normal distribution that concentrates the highest probability on castles 3, 4, 5 and 6.

With a sample of 1000 allocations per distribution, the best distribution obtained was the right skewed normal distribution. (see the graphic of the right skewed normal distribution in annex)

- b) The second step is to find the best allocation with the best distribution found. From the right skewed normal distribution, I simulated 40000 allocations and determined the best with the maximum average score.
- c) The third step allows to test the robustness of the best allocation versus a massive number of random allocation (4 million). The average score obtained from my best allocation with the simulated sample was 53.6 points with a probability of 97.62% to win.

Annex:

