8. Consider the basketball shooting game, define success rate as number of successful shoots divided by number of total shoots. Assume the successful rate rising from below 0.5 to above 0.5, is there a moment which has exactly success rate 0.5.

There is a moment which has exactly success rate 0.5.

Suppose there is no such moment, we can consider the following situation:

n/(2n+m) < 0.5 with n>=0, and m>=1;

then with one more shoot, the success rate is larger than 0.5, which means (n+1)/(2n+m+1)>0.5.

Then we must have m<1, which is contradictory with m>=1. So there must be a moment that the success rate is 0.5.

9. Given two strategies A and B, as well as the corresponding P&L of these strategies on each day. If one is going to be shut down, how to decide which one to shut?

We may compare the Sharpe ratio to decide which one is more proper to keep.

Sharpe ratio is the expected excess return divided by the volatility. The Sharpe ratio characterizes how well the return of an asset compensates the investor for the risk taken. The one with a higher Sharpe ratio provides better return for the same risk.