Monte Carlo Add-in v.1.1

General

I have tried some Monte Carlo add-ins to simulate my bankroll after following a system with known payoffs for various betting fractions, and to evaluate the expected time to reach a goal without risking too much on the way (without having big drawdown). This add-ins are excellent (my favorite is @Risk from Palisade), but are not designated for the specified job so additional steps must be programmed to perform the task and for that reason I created this simple but quick stand alone add-in that I hope you find useful.

Troubleshooting

This is a Monte Carlo add-in that I have created for personal use. It runs fine on excel 2002 version but I didn't do extensive debugging, testing on other excel version, or creating error handling routines so a number of error messages could be appearing during usage for reasons including:

- Renaming the original worksheets (sheet1, sheet2 ….)
- Improper use of input values (for example using payoff probabilities that sums greater than 1)
- Choosing to perform a function from *Monte Carlo* menu when in fact the worksheet containing payoff distribution <u>is not activated</u>. This worksheet MUST always be activated when you perform a menu function.

Usage

<u>It is better to demonstrate usage through an example</u>.

Consider the payoff of the coin example in Ed Seykota's web site. There is 50% chance that we win two times the amount betted and 50% chance that we loose the amount betted. To simulate this we must first install the add-in.

<u>Installing the add-in</u>

From Excel's *Tools* menu choose *Add-ins* and then browse to find the add-in MonteCarlo.xla. When you install it you should see a splash screen and a *Monte Carlo* menu just before Excel's *Help* menu.

<u>Creating a payoff worksheet</u>

Choose from *Monte Carlo* menu 'Create Payoff Sheet' and input payoff values from Ed Seykota's example.

null

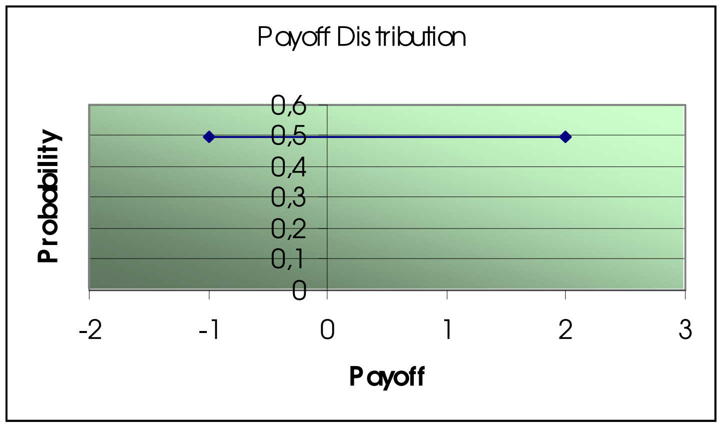
Index	Probability	Payoff
	0,5	2
	0,5	-1

……………..

<u>View payoff statistics</u>

Choose from *Monte Carlo* menu 'Payoff Statistics' to perform a numerical evaluation of important system values including Kelly optimal betting fraction.

mean	0,5
variance	2,25
standard deviation	1,5
skewness	0
kurtosis	1
Kelly fraction	0,25



<u>Simulation Settings</u>

Choose from *Monte Carlo* menu 'Simulation Settings'. We will simulate 1000 trials of 20 tosses each from the pervious payoff distribution betting each time half Kelly (12,5% of our bankroll), so we enter the appropriate values to the settings.

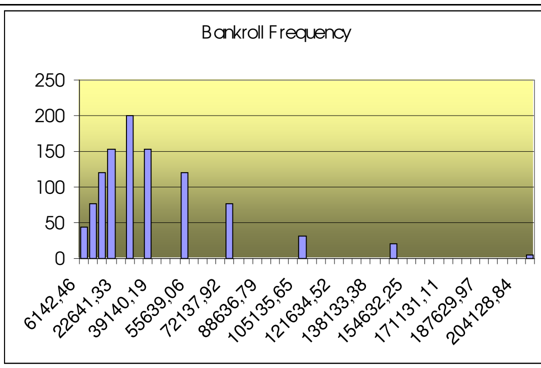
Initial Capital	10000	
Nbr of Iterations	1000	
Nbr of Trades per Iteration	20	
Fixed Fraction	Yes	0,125
Fixed Amount	No	1000
a	0,5	
b	2	

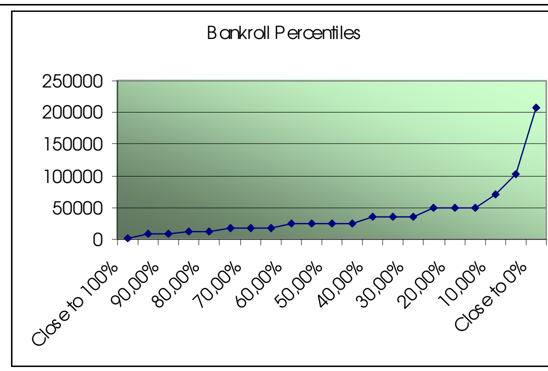
Note: Values **a** and **b** will be explained later.

That's it! Now we are READY to proceed to Monte Carlo Simulation and view the results.

<u>Final Bankroll Simulation</u>

Choose from *Monte Carlo* menu 'Final Bankroll Simulation'. We will get our final bankroll distribution after 20 trades from the 1000 trials simulated when at each trade we bet 12.5% of our current bankroll.

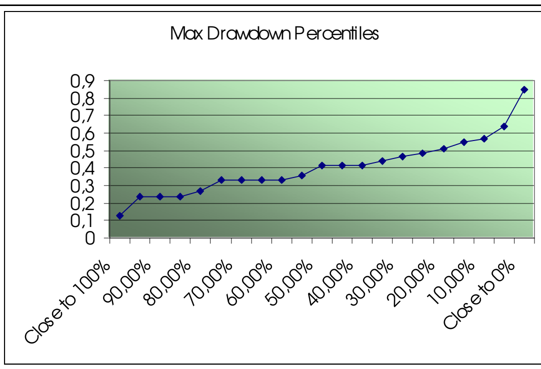


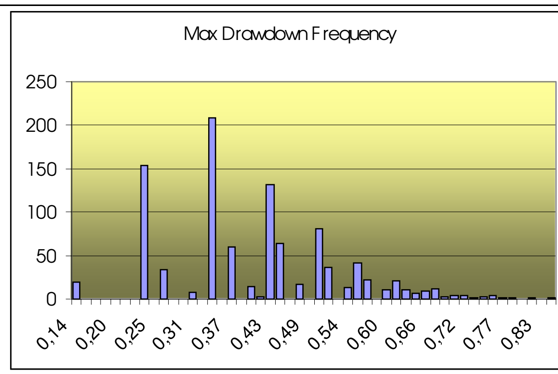


Geometric Growth Rate **0,045912**
Average Final Bankroll **33843,32**

<u>Expected Maximum Drawdown</u>

Choose from *Monte Carlo* menu 'Expected Maximum Drawdown'. We will get our expected maximum Drawdown during the period of the 20 trades.





Average Max Drawdown **0,398977**

There are many other functions that can be performed and that are explained below including **Sampling from continuous** payoff distribution functions such as **Normal**, **Uniform** and **Triangular**.

Sampling from a Normal Distribution function

Create a new payoff sheet. Instead of **null** in cell A1 of the payoff sheet type **normal** and then type the mean of the distribution in cell A2 and the standard deviation of the distribution in cell A3. Don't fill the payoff matrix manually. All other steps remain the same as previous discrete example.

Sampling from a Uniform Distribution function

Create a new payoff sheet. Instead of **null** in cell A1 of the payoff sheet type **uniform** and then type the minimum of the distribution in cell A2 and the maximum of the distribution in cell A3. Don't fill the payoff matrix manually. All other steps remain the same as previous discrete example.

Sampling from a Triangular Distribution function

Create a new payoff sheet. Instead of **null** in cell A1 of the payoff sheet type **triangular** and then type the minimum of the distribution in cell A2 and the maximum of the distribution in cell A3 and the most likely value in cell A4. Don't fill the payoff matrix manually. All other steps remain the same as previous discrete example.

> ** Type the distribution's name in lowercase letters*
> *** The statistics and Kelly fraction in the continuous case are calculated from a discrete approximation of the functions so it may be slightly different from actual values (to be corrected). In any case however the sampling has been made from the continuous distribution.*

Expected Time to reach a Goal

Select again the sheet containing our initial coin example. Choose from *Monte Carlo* menu 'Expected Time to Reach a Goal'. We will get 1000 simulations and each of this will stop when our bankroll reaches **b**=2 times our initial bankroll and the required number of trades for this to happen will be recorded and presented. If in some of the iterations our bankroll reaches zero (can not happen in fractional betting but can happen if you choose to perform a fixed amount betting) then a blowing-up probability will be recorded. In this case expected time to reach our goal is virtually infinity but for simplicity reasons I simply choose these paths to contribute a very large expected time to the average of expected time.

The add-in can also compute

- The percentage from these 1000 iterations that our bankroll reaches **b** (2 in this case) times our initial bankroll before reaching **a** (0.5 (half) in this case) times our initial bankroll.
- The probability that after 20 (in this case) trades we will be above **b** without reaching **a** before (this probability will be estimated in this case from 1000 iterations).
- The probability that after 20 (in this case) trades we will be between **b** and **a** (this probability will be estimated in this case from 1000 iterations).
- The probability that **during** those 20 (in this case) trades we will hit **b** (this probability will be estimated in this case from 1000 iterations).
- The probability that **during** those 20 (in this case) trades we will hit **a** (this probability will be estimated in this case from 1000 iterations).

Final Note: **I DON'T MAKE ANY CLAIM FOR THE ACCURACY OF THE ADD-IN.**