

Identification of logical errors through Monte Carlo simulation

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DECISIONEERING
CRYSTAL BALL SOFTWARE

DECISIONEERING



- Providers of general-purpose, quantitative decision-making tools, training, and consulting since 1986
- Flagship product Crystal Ball- Monte Carlo simulation
- Over 100,000 users worldwide, 85% of Fortune 1000, and taught in top 50 US MBA programs
- Ranked one of Colorado's Fastest 50 Growing companies last six years by Deloitte and Touche

What is Monte Carlo Simulation?

- A system that uses random numbers to measure the effects of uncertainty
- Analogy: picking out golf balls from a large basket



What is Crystal Ball?

CB enhances spreadsheets by letting you:



Describe the uncertainty for any model input (e.g., costs, returns, time, variability) by using probability distributions



Quantify risk by calculating the effect of uncertainty on your variable of interest (e.g., profit, sigma level, process efficiency).

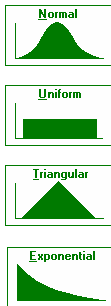
Helps you to understand, quantify and reduce the effects of variability inherent in spreadsheet applications.

What is Crystal Ball?

Crystal Ball

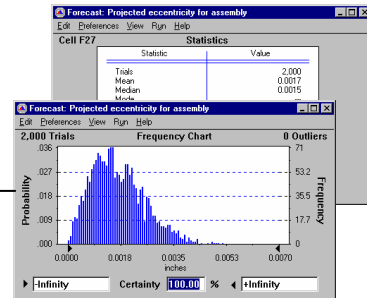
- An Excel add-in to perform Monte Carlo Simulation
- Enables use of a gallery of input distributions
- Enables quick what-if analyses

Inputs



Crystal Ball applied to a model described as formulas in Excel

Outputs



Primary Benefits of Monte Carlo

- Process of experimenting with a model to measure performance and behavior of inputs in a system
- Gain general insight into the nature of a process
- Manage risk by understanding costs and benefits

But wait!



Monte Carlo simulation often compounds overconfidence in spreadsheet results.

In reality it adds NOTHING if the underlying spreadsheet logic is faulty!

What we find

- Most CB customers are using high risk spreadsheets
- Inherited applications with poor documentation
- Few have formal development process
- Few have a formal auditing process
- Version control is non-existent

- Haphazard use of spreadsheets



Identification of logical errors through Monte Carlo simulation

- Automates what if testing
- Encourages critical thinking
- Reveals manipulation
- Encourages good design

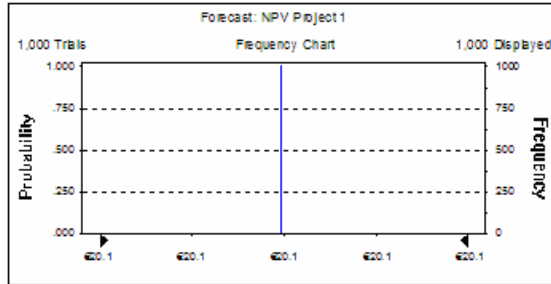


Benefits of automated what if testing

Moving beyond well behaved inputs allows you to find:

- Rounding errors
- Divide by zero
- General calculation errors

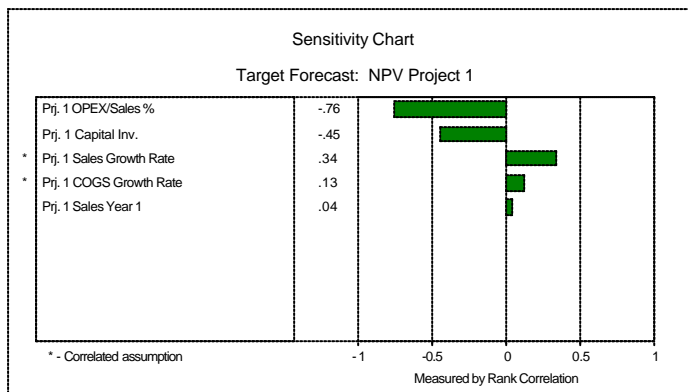
Example- no variance in forecast



Potential Causes:

- Broken Links
- Macros requiring automatic recalculation

Example- sensitivity and the "smell" test



Potential Causes:

- Manipulation of formulas, input distributions, etc.
- Basic mechanical errors