Assignment Project Exam Help

Add WeChat edu_assist_pro

Monte Carlo

Assignment Project Exam Help

https://eduassistpro.github.io/

n

Add WeChat edu_assist_pro

CIS

Assignment Project Exam Help

Monte Carlo Simulation

Add WeChat edu_assist_pro

- ***Simulation*** is any analytical nt to imitate a real-life system, especially when other analyses are too mathematically complex or too difficult to reproduce.

Assignment Project Exam Help

- ***Monte Carlo simulation:*** pseudo-random numbers are generated accor iated with a source of uncertainty, e.g. tes, etc. Outcomes associated with these random dr hen analyzed to determine the likely results and d risk.

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

Example: New product profitability

Add WeChat edu_assist_pro

Spinners company is planning to sell for $6. The company carried out a market survey that showed the following:

- The expected number of spinners that would be sold is 900,000 units.
- The expected fixed cost is $700,000.
- The expected unit variable cost is $3.
- The expected

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Our goal: to create a predictive model to calculate the product profitability.

Assignment Project Exam Help

Calculate given what we know

Add WeChat edu_assist_pro

Spinners profitability	
Data	
	Expected
Revenue per spinner	$ 6.00
# of units	
Fixed cost	$
Variable cost	$
Selling expenses	$ 940,000.00
Expected profit	$ 1,060,000.00

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

(Re cost)X(# of units) – Fixed cost – Selling expenses

Is that the expected profit?

Assignment Project Exam Help

Model the profitability using probability distributions

Add WeChat edu_assist_pro

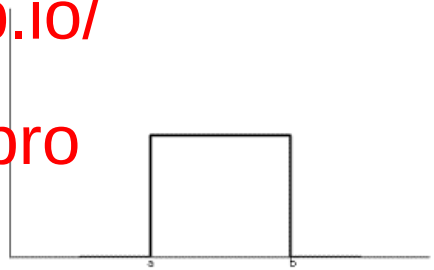
Suppose we knew that the number of sold units and the selling expenses were random, and could be modeled with some probability distributions

Number of sold units is normally distributed with mean of 900,000 and standard deviation of 300,000.

Assignment Project Exam Help

https://eduassistpro.github.io/

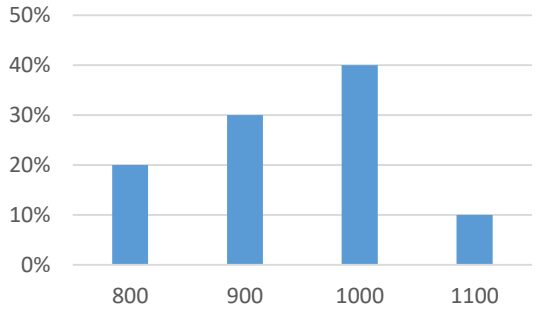
Variable costs are uniform between $2.5 and $3.5.



Add WeChat edu_assist_pro

Selling expenses are discrete costume (general) distributed:

Selling expences	probability
800	20%
900	30%
1000	40%
1100	10%



Assignment Project Exam Help

More essential distributions

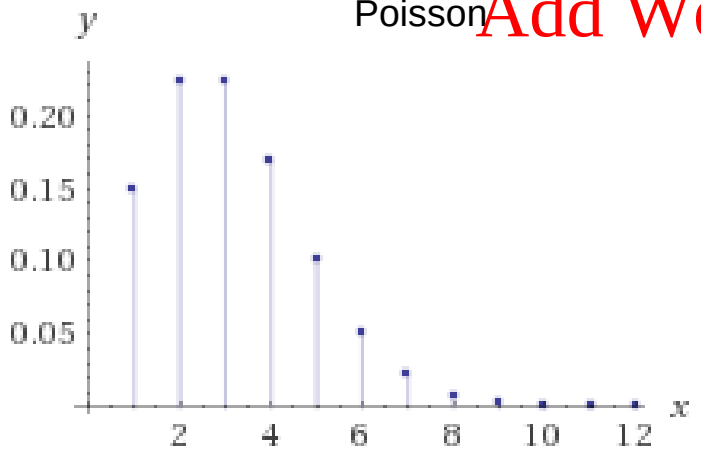
Add WeChat edu_assist_pro

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Poisson



Exponential

Assignment Project Exam Help

Profit distribution

Add WeChat edu_assist_pro

The profit will also be random, and can by a probability distribution

If we knew how the profit is distributed we could answer a variety of questions, e.g.

- what is the expected profit (mean)?
- what is the probability that profit exceeds $2M?

Assignment Project Exam Help

https://eduassistpro.github.io/

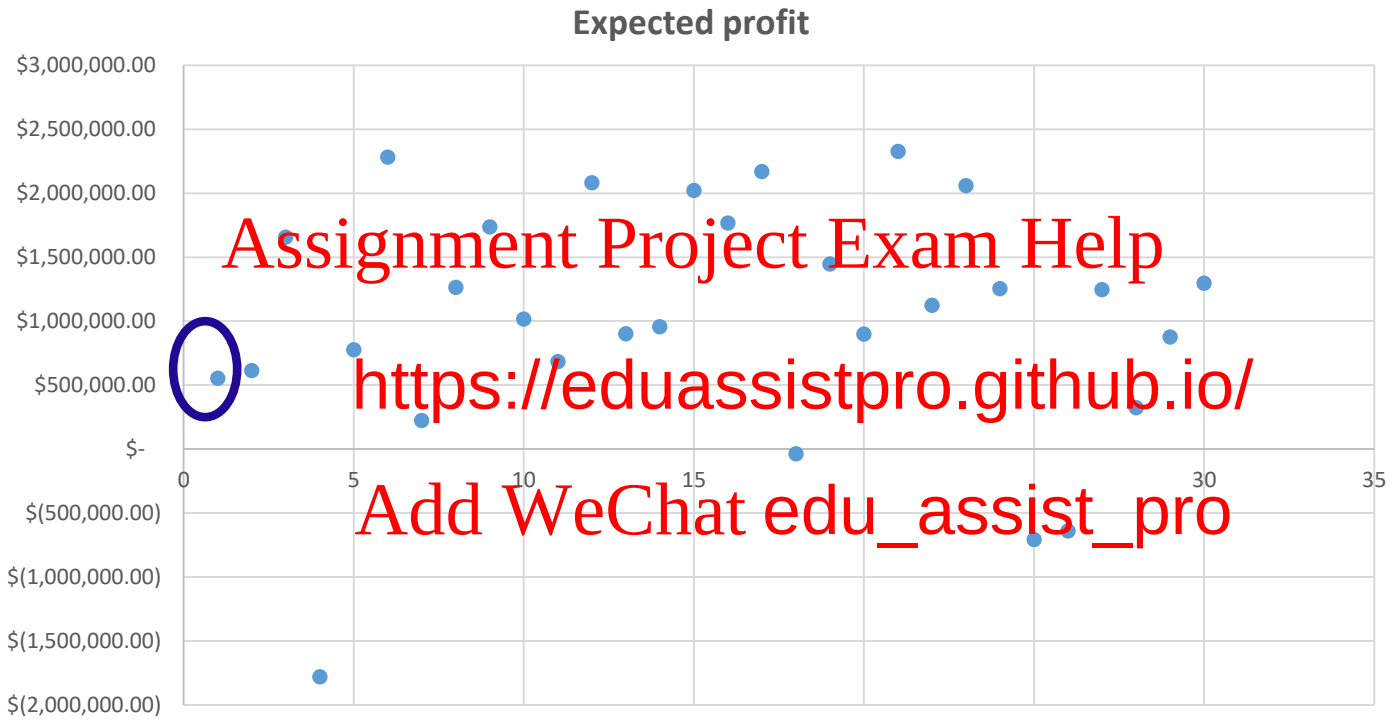
Add WeChat edu_assist_pro

We start by finding a random value for the

- # of sold units
- Variable cost
- Selling expenses

All we did so far is generate a single number from the distribution tha s the profit

Assignment Project Exam Help
Add WeChat edu_assist_pro



Assignment Project Exam Help
https://eduassistpro.github.io/
Add WeChat edu_assist_pro

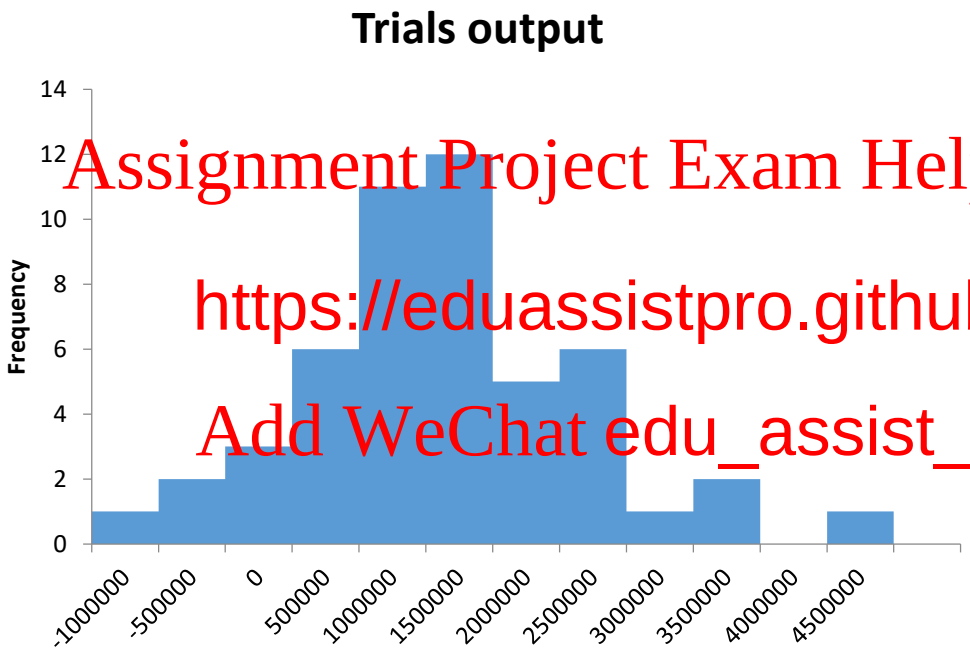
We need to generate more outcomes that are possible so that we can better describe the random profit

Assignment Project Exam Help

If we generate more trials, we improve our prediction

Add WeChat edu_assist_pro

Profit is a random number from a conti tion, so the more trials we run the smoother the histogram



Assignment Project Exam Help
https://eduassistpro.github.io/
Add WeChat edu_assist_pro

The output of Monte Carlo simulation is a distribution, which assigns different probabilities to different outcomes

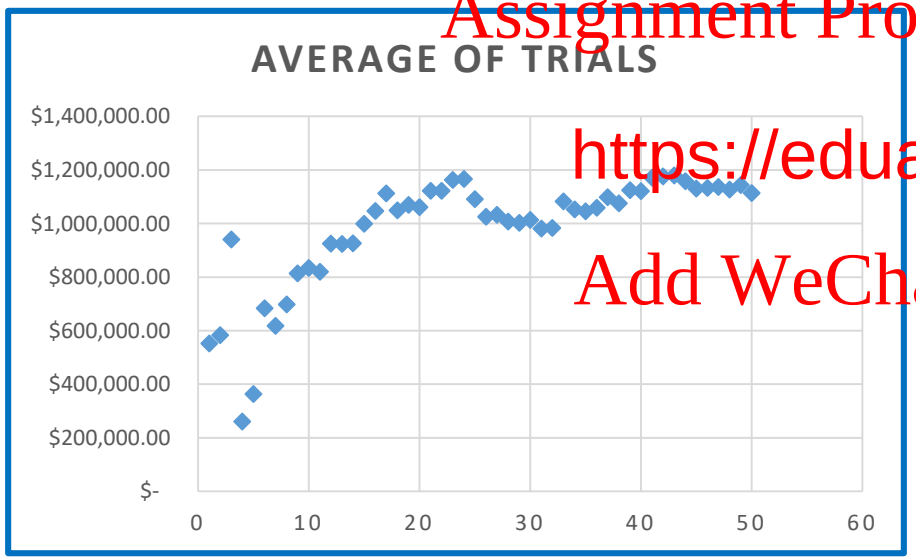
Assignment Project Exam Help

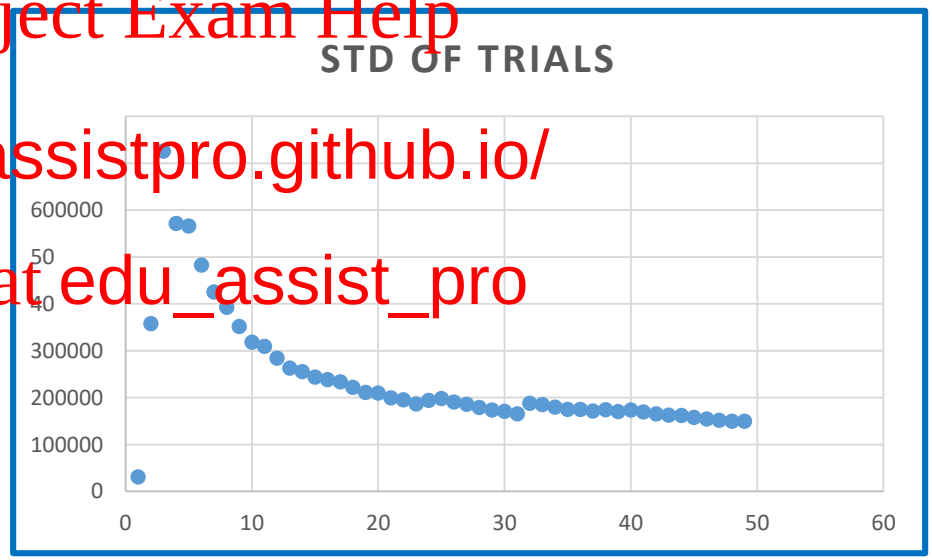
More trails, better estimation

Add WeChat edu_assist_pro

The more replications (trials, scenario ore accurate our estimates will be

Assignment Project Exam Help





https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

The law of large numbers

Add WeChat edu_assist_pro

- The law of large numbers is a math em.
- By the theorem, as the number of trials of a random process increases, the percentage difference between the **expected** and **actual** values goes to zero.
- In other words: as the number of trails increases, the average of the trails outcomes converges to the real mean of the population.
- On the same time, t decreases and converges to zero.

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

- We can demonstrate that by flipping a n!
- http://www.virtualcointoss.com

- You can also watch the following demonstrations: https://www.youtube.com/watch?v=6YDHBFVIvIs
- https://www.youtube.com/watch?v=3m4bxse2JEQ

Assignment Project Exam Help

Steps to Monte Carlo Simulation

Add WeChat edu_assist_pro

1. Generate *n*-sets of input variables iate probability distributions to run *n* simulation trials
2. Collect *n* values of output, each one resulting from a separate simulation run
3. Analyze the probability distribution that describes the output

Assignment Project Exam Help

https://eduassistpro.github.io/

Go to the excel file "Spinners" and gene bers using one of two methods:

Add WeChat edu_assist_pro

a) Using Excel's data analysis add-in

b) Using Excel's function RAND and NORMINV

Generate input random variables using Excel's Data add-in

Assignment Project Exam Help
Add WeChat edu_assist_pro

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

Concluding remarks

Add WeChat edu_assist_pro

- We use Monte Carlo simulation t life systems when we have uncertain parameters

- We model the parameters as random variables that can be derived from a specific distribution

Assignment Project Exam Help

- We generate rand model outcome

https://eduassistpro.github.io/

- We repeat the process many time

Add WeChat edu_assist_pro

- The average of our outcome results from many trails would converge to the real outcome
- We can learn from the simulation the outcome distribution