LEARN EXCEL WHAT-IF ANALYSIS

	A	B	C
1			
2		Current Sales Volume (units)	1000
3			
4		Current Customer Demand	High
5		Increase in Volume	10%
6			
7		Revised Sales Volume (units)	1100
8			
9		Price per unit	₹ 100
10			
11		Revenue	₹ 1,10,000

Goal Seek

Data Table

Compound Interest Calculator			Years			
			$232	3	4	5
Initial investment	$200	Investment	$200	$232.29	$244.18	$256.67
Annual interest rate	5%		$400	$464.59	$488.36	$513.34
Compounding periods per year	12		$600	$696.88	$732.54	$770.02
Years	3		$800	$929.18	$976.72	$1,026.69
			$1,000	$1,161.47	$1,220.90	$1,283.36
Balance	$232		$1,200	$1,393.77	$1,465.07	$1,540.03

Data Table ? ×
Row input cell: C4
Column input cell: C7
OK Cancel

Scenario Manager

Scenario Summary								
	Current Values:		Growth		Base		Profit	
Changing Cells:								
B1	Growth		Growth		Base		Profit	
B3	$	1,200	$	1,200	$	1,000	$	800
B4	$	1,500	$	1,500	$	800	$	500
Result Cells:								
B6	$	(300)	$	(300)	$	200	$	300

Solver

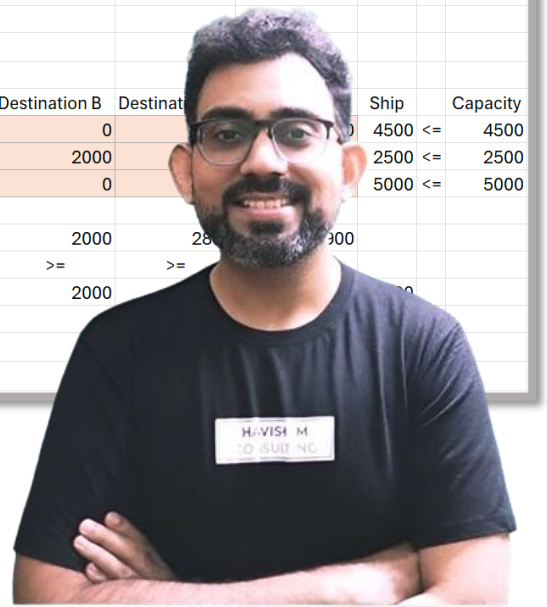
Cost per unit to deliver

	Destination A	Destination B	Destination C	Destination D
Origin A	₹ 1.10	₹ 1.60	₹ 1.40	₹ 1.20
Origin B	₹ 2.50	₹ 2.00	₹ 2.60	₹ 2.80
Origin C	₹ 1.80	₹ 2.10	₹ 1.70	₹ 1.90

Recommended Shipping Model

	Destination A	Destination B	Destinat	Ship		Capacity
Origin A	1600	0		4500	<=	4500
Origin B	500	2000		2500	<=	2500
Origin C	2200	0		5000	<=	5000
Received	4300	2000	28	900		
	>=	>=	>=			
Demand	4300	2000				

Total Cost ₹ 19,210.00



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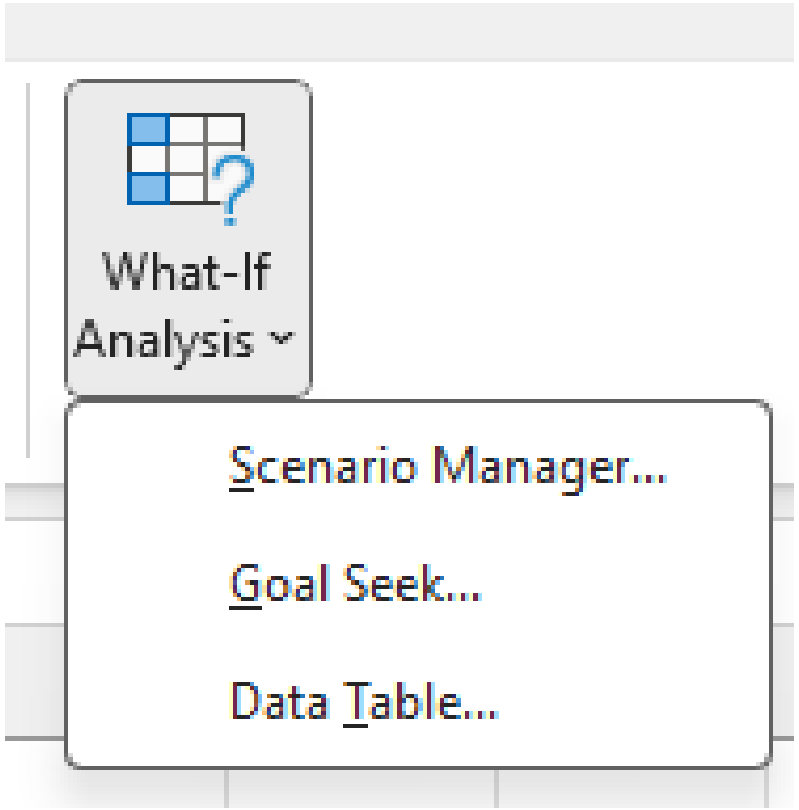
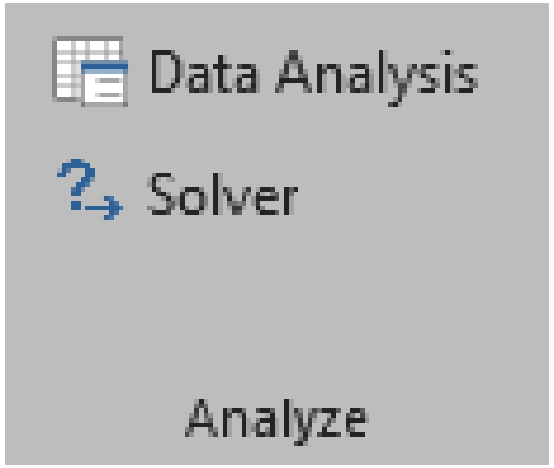
SCENARIO MANAGER	The key takeaway from the scenario analysis problem statement for Chaayos is to evaluate how different pricing strategies for a new range of premium teas impact overall revenue across optimistic, moderate, and pessimistic customer demand scenarios.
GOAL SEEK	The key takeaway from Tata Motors' goal seek problem statement is to calculate the number of new electric vehicles they need to sell to meet a profit target of INR 500 crore in the first quarter, factoring in both fixed and variable costs.
DATA TABLE	The key takeaway from the data table problem statement for Gensol is to analyze how changes in installation costs and monthly energy savings affect the payback period for solar panel installations, enabling the creation of tailored sales strategies for different customer financial profiles.
SOLVER	The key takeaway from Unilever's transportation problem statement is to optimize the distribution of products from three warehouses to four distributors by minimizing transportation costs and ensuring each distributor's demand is met without exceeding warehouse capacities.

What – If Analysis

What-If Analysis tools in Excel allow you to use several different sets of values in one or more formulas to explore all the various results.

What – If Analysis – Finding it in the Data Tab



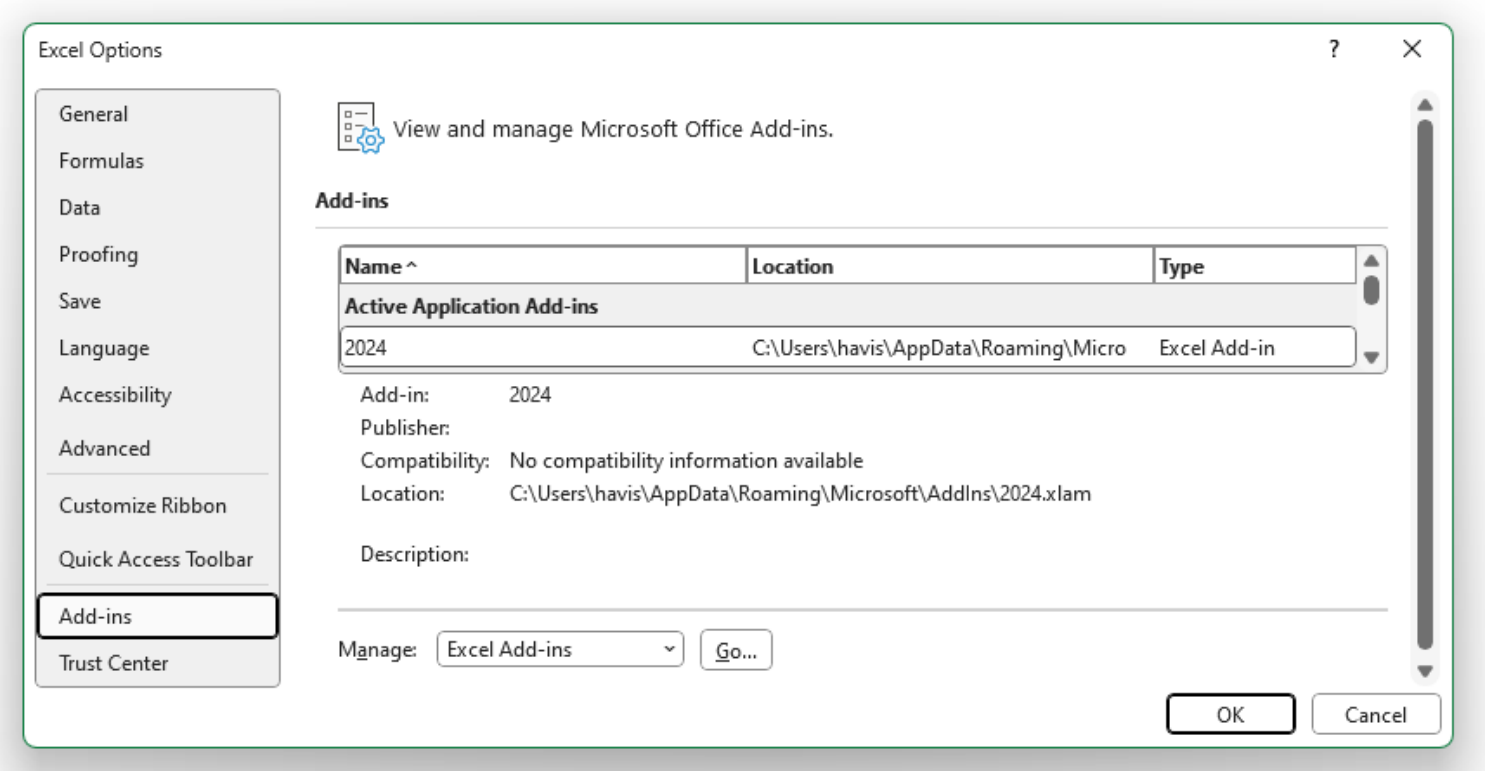


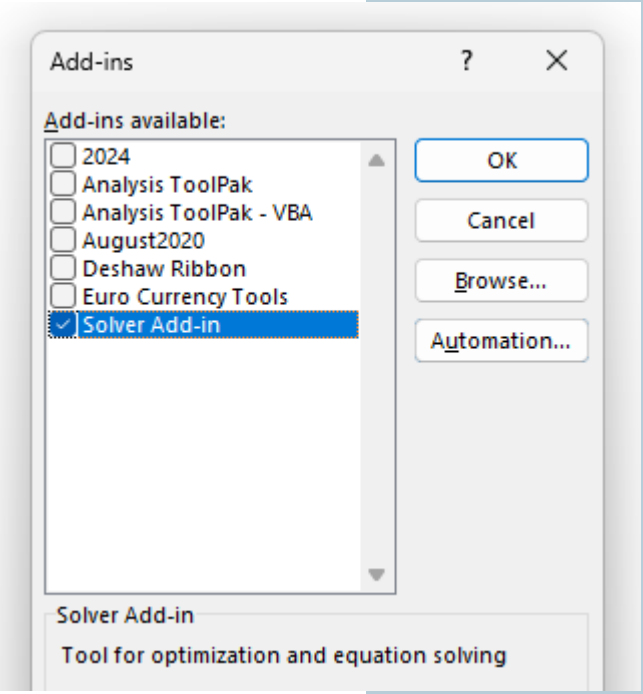
NOTES

Data > Forecast

Data > Analyze

What – If Analysis – How to Enable Solver





NOTES

File > Options > Add-ins > Excel Add-ins > Solver Add-in

SCENARIO ANALYSIS

Problem Statement

Chaayos, a popular chai cafe chain, wants to analyze the financial impact of launching a new range of premium teas across its outlets.

The management is interested in understanding how different pricing strategies and varying levels of customer demand would affect their overall revenue.

The finance team at Chaayos needs to evaluate three potential scenarios:

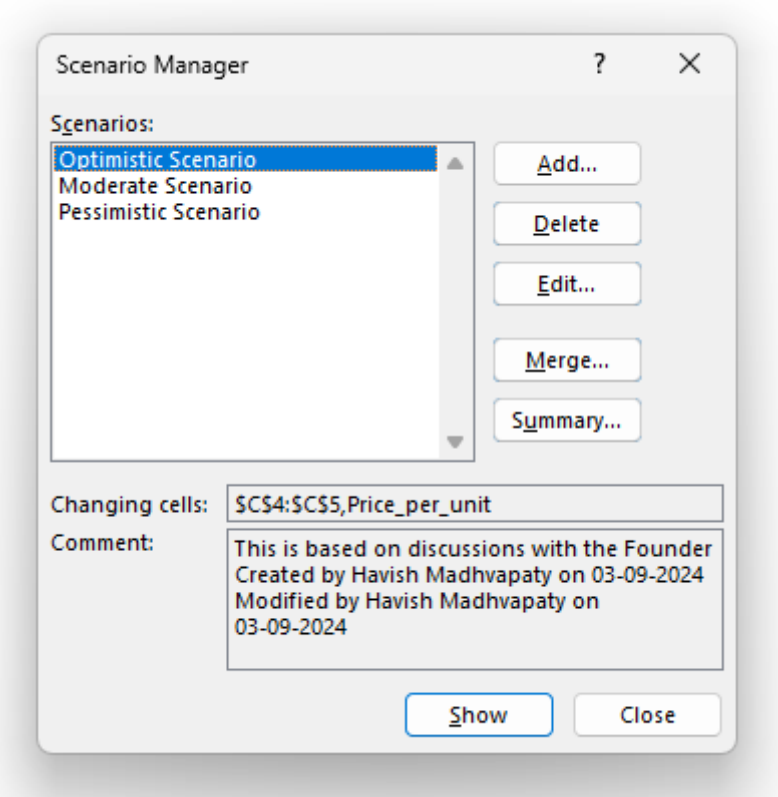
- **Optimistic Scenario:** High customer demand with a 20% increase in sales volume, pricing the premium tea at ₹150 per cup.
- **Moderate Scenario:** Moderate customer demand with a 10% increase in sales volume, pricing the premium tea at ₹130 per cup.
- **Pessimistic Scenario:** Low customer demand with a 5% increase in sales volume, pricing the premium tea at ₹120 per cup.

Scenario Analysis

	A	B	C
1			
2		Current Sales Volume (units)	1000
3			
4		Current Customer Demand	High
5		Increase in Volume	10%
6			
7		Revised Sales Volume (units)	1100
8			
9		Price per unit	₹ 100
10			
11		Revenue	₹ 1,10,000

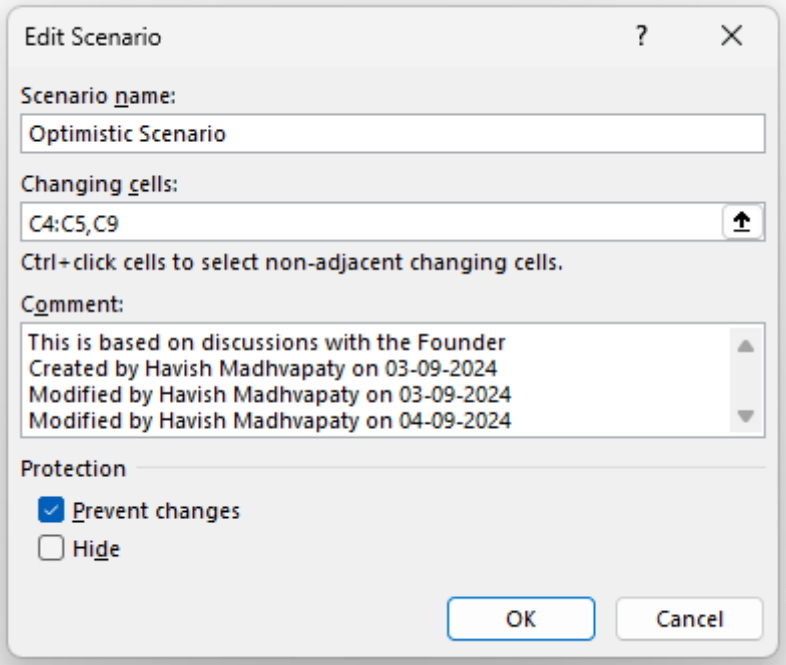
NOTES

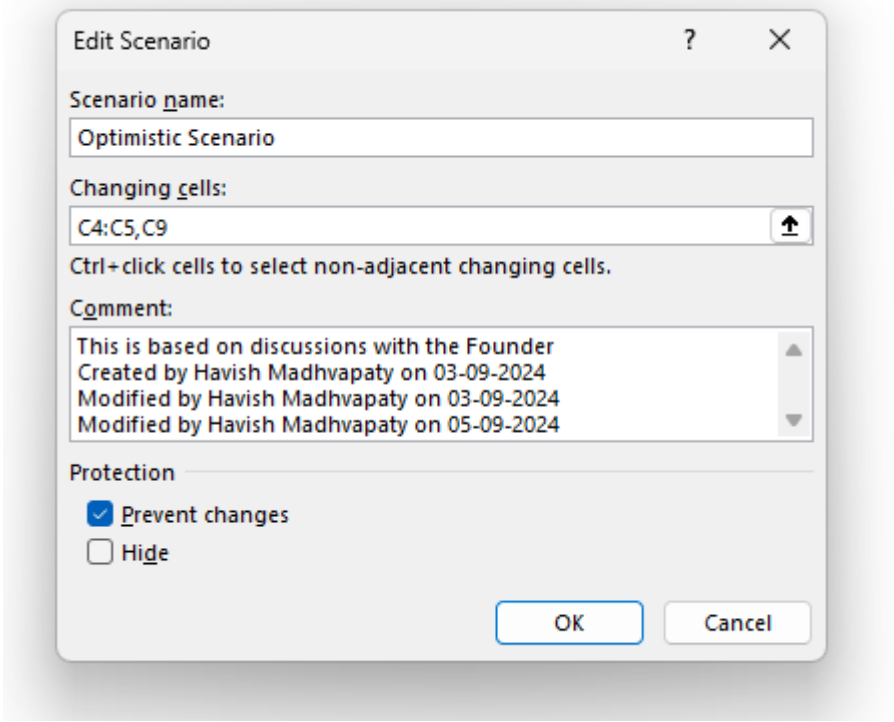
Scenario Analysis



NOTES

Scenario Analysis





NOTES

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Scenario Analysis

NOTES

Scenario Summary				
	Current Values:	Optimistic Scenario	Moderate Scenario	Pessimistic Scenario
Changing Cells:				
Current_Customer_Demand	High	High	Medium	Low
Increase_In_Volume	20%	20%	11%	5%
Price_per_unit	150	150	130	120
Result Cells:				
C11	₹ 1,80,000	₹ 1,80,000	₹ 1,44,300	₹ 1,26,000

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

GOAL SEEK

Problem Statement

Tata Motors is launching a new electric vehicle (EV) model and aims to achieve a target profit of INR 500 crore in the first quarter.

The company's cost structure includes a fixed cost of INR 50 crore for the quarter, covering R&D, marketing, and overhead expenses.

The variable cost per vehicle, which includes materials and labor, is INR 10 lakh. Tata Motors plans to sell each EV for INR 14 lakh.

The company needs to determine how many units of the EV they must sell to meet their profit target.

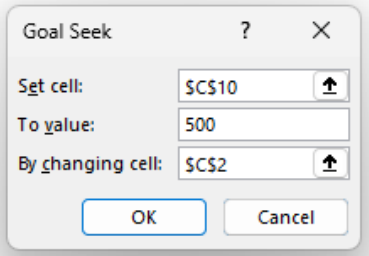
Goal Seek

	A	B	C
1			
2		Unit Projected Sales	1000
3		Price per unit (Lakhs)	₹ 14
4		Cost per unit (Lakhs)	₹ 10
5		Fixed Costs (Cr)	₹ 50
6			
7		Total Revenue (Cr)	₹ 140
8		Total Cost (Cr)	₹ 150
9			
10		Target Profit (Cr)	₹ -10

NOTES

Goal Seek

	A	B	C	D
1				
2		Unit Projected Sales	7500	
3		Price per unit (Lakhs)	₹ 14	
4		Cost per unit (Lakhs)	₹ 10	
5		Fixed Costs (Cr)	₹ 50	
6				
7		Total Revenue (Cr)	₹ 1,050	
8		Total Cost (Cr)	₹ 800	
9				
10		Target Profit (Cr)	₹ 250	
11				



NOTES

Goal Seek

i want a vba code
i want to run goal seek
take an input from the user between 0 and 5000

change the cell C10 to make it the same as the input by changing the cell C2

Show drafts

VBA Code to Automate Goal Seek

Here's the VBA code that will prompt the user for an input between 0 and 5000 and use Goal Seek to adjust cell C2 to make cell C10 equal the input:

VB.Net

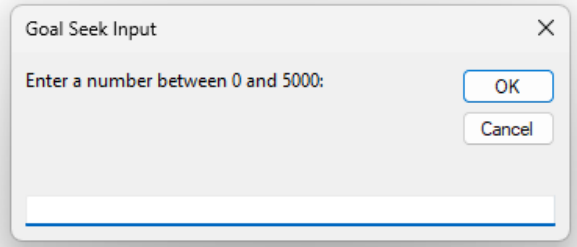
```
Sub GoalSeekUserInput()
    Dim userInput As Integer

    ' Prompt the user for input
    userInput = InputBox("Enter a number between 0 and 5000:", "Goal See

    ' Check if the input is valid
    If userInput >= 0 And userInput <= 5000 Then
        ' Run Goal Seek
        Range("C10").GoalSeek Goal:=userInput, ChangingCell:=Range("C2")
        MsgBox "Goal Seek completed successfully."
    Else
        MsgBox "Please enter a valid number between 0 and 5000."
    End If
End Sub
```

Use code with caution.

NOTES

Goal Seek

	A	B	C	D	E	F
1						
2		Unit Projected Sales	7500			
3		Price per unit (Lakhs)	₹ 14			
4		Cost per unit (Lakhs)	₹ 10			
5		Fixed Costs (Cr)	₹ 50			
6						
7		Total Revenue (Cr)	₹ 1,050			
8		Total Cost (Cr)	₹ 800			
9						
10		Target Profit (Cr)	₹ 250			
11						



NOTES

DATA TABLE

Problem Statement

Gensol, a solar energy solutions provider, wants to understand how varying two key variables simultaneously — installation costs and monthly energy savings — will impact the payback period of solar panel installations for different customer segments.

Gensol's management team needs a comprehensive, data-driven approach to estimate the financial return under various scenarios, helping them tailor their sales pitches to potential clients with differing financial profiles.

Data Table

NOTES

	A	B	C	D	E	F
1						
2		Installation Cost	₹ 50,000		Current Monthly Cost	Payback Period (years)
3		Current Monthly Cost	₹ 1,500			
4		Energy Reduction (%)	75%		₹ 1,500	
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000	
6					₹ 2,500	
7		Monthly Energy Savings	₹ 375		₹ 3,000	
8		Annual Savings	₹ 4,500		₹ 3,500	
9					₹ 4,000	
10		Payback Period (years)	11.11		₹ 4,500	
11					₹ 5,000	

Data Table

NOTES

	A	B	C	D	E	F
1						
2		Installation Cost	₹ 50,000		Current Monthly Cost	Payback Period (years)
3		Current Monthly Cost	₹ 1,500			11.11
4		Energy Reduction (%)	75%		₹ 1,500	11.11
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000	8.33
6					₹ 2,500	6.67
7		Monthly Energy Savings	₹ 375		₹ 3,000	5.56
8		Annual Savings	₹ 4,500		₹ 3,500	4.76
9					₹ 4,000	4.17
10		Payback Period (years)	11.11		₹ 4,500	3.70
11					₹ 5,000	3.33

Data Table

	A	B	C	D	E	F	G	H	I	J
1										
2		Installation Cost	₹ 50,000		Current Monthly Cost	Energy Reduction				
3		Current Monthly Cost	₹ 1,500			25%	35%	50%	75%	90%
4		Energy Reduction (%)	75%		₹ 1,500					
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000					
6					₹ 2,500					
7		Monthly Energy Savings	₹ 375		₹ 3,000					
8		Annual Savings	₹ 4,500		₹ 3,500					
9					₹ 4,000					
10		Payback Period (years)	11.11		₹ 4,500					
11					₹ 5,000					

NOTES

Data Table

NOTES

	A	B	C	D	E	F	G	H	I	J
1										
2		Installation Cost	₹ 50,000		Current Monthly Cost	Energy Reduction				
3		Current Monthly Cost	₹ 1,500			25%	35%	50%	75%	90%
4		Energy Reduction (%)	75%		₹ 1,500	3.70	4.27	5.56	11.11	27.78
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000	2.78	3.21	4.17	8.33	20.83
6					₹ 2,500	2.22	2.56	3.33	6.67	16.67
7		Monthly Energy Savings	₹ 375		₹ 3,000	1.85	2.14	2.78	5.56	13.89
8		Annual Savings	₹ 4,500		₹ 3,500	1.59	1.83	2.38	4.76	11.90
9					₹ 4,000	1.39	1.60	2.08	4.17	10.42
10		Payback Period (years)	11.11		₹ 4,500	1.23	1.42	1.85	3.70	9.26
11					₹ 5,000	1.11	1.28	1.67	3.33	8.33

Data Table

NOTES

	A	B	C	D	E	F	G
1							
2		Installation Cost	₹ 50,000		Current Monthly Cost	Annual Savings	Payback Period (years)
3		Current Monthly Cost	₹ 1,500				
4		Energy Reduction (%)	75%		₹ 1,500		
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000		
6					₹ 2,500		
7		Monthly Energy Savings	₹ 375		₹ 3,000		
8		Annual Savings	₹ 4,500		₹ 3,500		
9					₹ 4,000		
10		Payback Period (years)	11.11		₹ 4,500		
11					₹ 5,000		

Data Table

NOTES

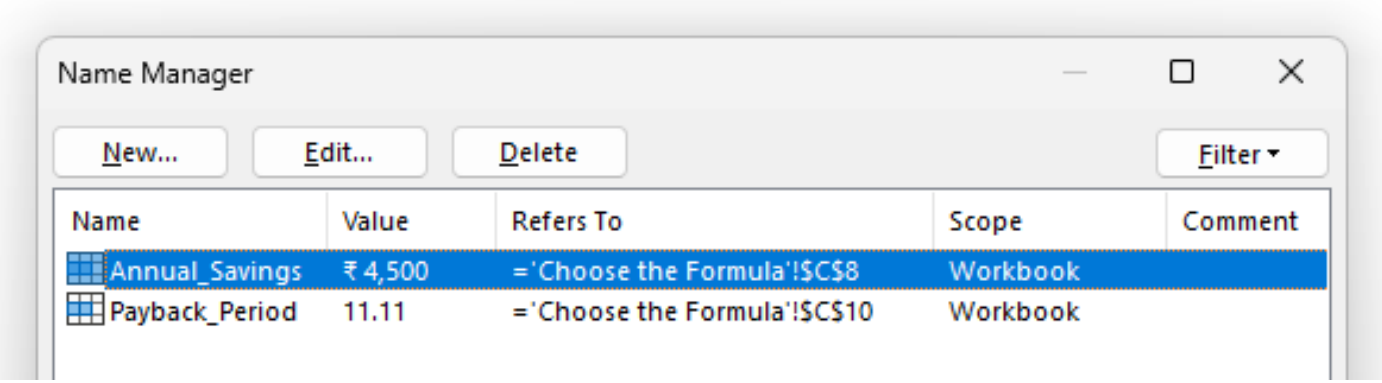
	A	B	C	D	E	F	G
1							
2		Installation Cost	₹ 50,000		Current Monthly Cost	Annual Savings	Payback Period (years)
3		Current Monthly Cost	₹ 1,500			₹ 4,500	11.11
4		Energy Reduction (%)	75%		₹ 1,500	₹ 4,500	11.11
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000	₹ 6,000	8.33
6					₹ 2,500	₹ 7,500	6.67
7		Monthly Energy Savings	₹ 375		₹ 3,000	₹ 9,000	5.56
8		Annual Savings	₹ 4,500		₹ 3,500	₹ 10,500	4.76
9					₹ 4,000	₹ 12,000	4.17
10		Payback Period (years)	11.11		₹ 4,500	₹ 13,500	3.70
11					₹ 5,000	₹ 15,000	3.33

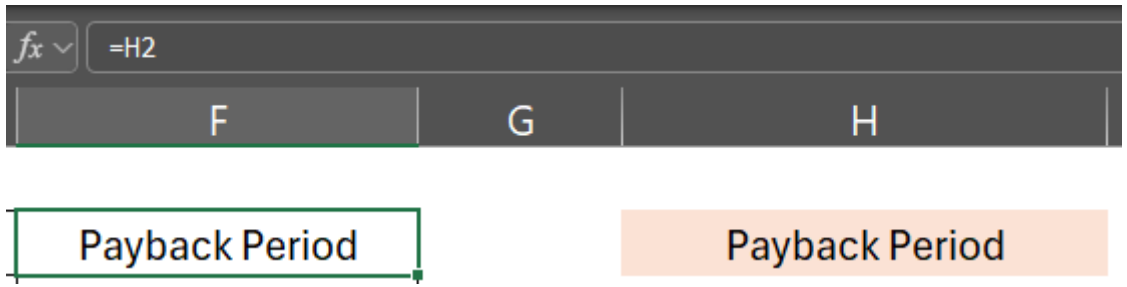
Data Table

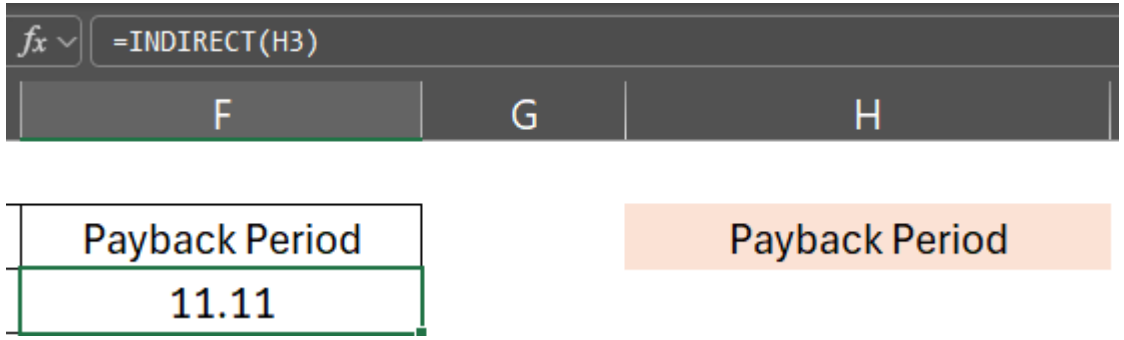
NOTES

	A	B	C	D	E	F	G	H
1								
2		Installation Cost	₹ 50,000		Current Monthly Cost	Payback Period		Payback Period
3		Current Monthly Cost	₹ 1,500			11.11		
4		Energy Reduction (%)	75%		₹ 1,500			
5		Monthly Cost with Solar installed	₹ 1,125		₹ 2,000			
6					₹ 2,500			
7		Monthly Energy Savings	₹ 375		₹ 3,000			
8		Annual Savings	₹ 4,500		₹ 3,500			
9					₹ 4,000			
10		Payback Period	11.11		₹ 4,500			
11					₹ 5,000			

Data Table







NOTES

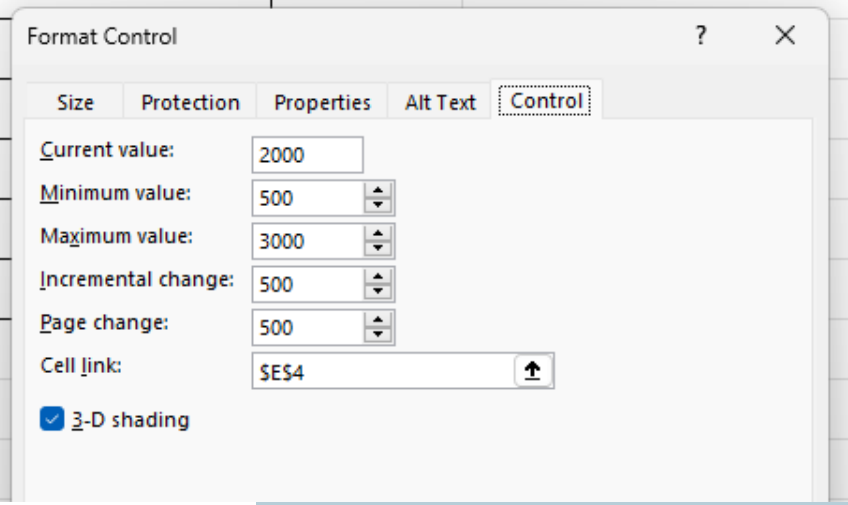
Data Table

NOTES

	B	C
2	Installation Cost	₹ 50,000
3	Current Monthly Cost	₹ 1,500
4	Energy Reduction (%)	75%
5	Monthly Cost with Solar installed	₹ 1,125
6		
7	Monthly Energy Savings	₹ 375
8	Annual Savings	₹ 4,500
9		
10	Payback Period	11.11

Current Monthly Cost	Payback Period
₹ 2,000	11.11
₹ 2,500	
₹ 3,000	
₹ 3,500	
₹ 4,000	
₹ 4,500	
₹ 5,000	
₹ 5,500	

Payback Period



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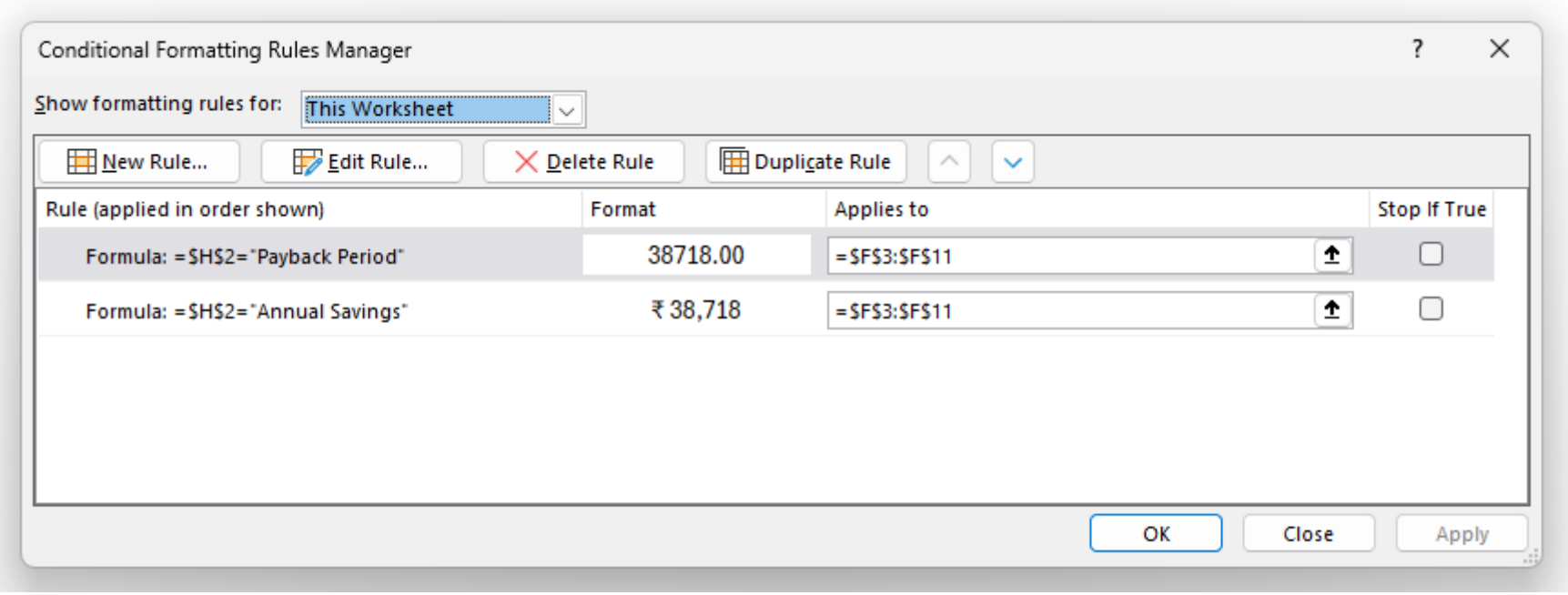
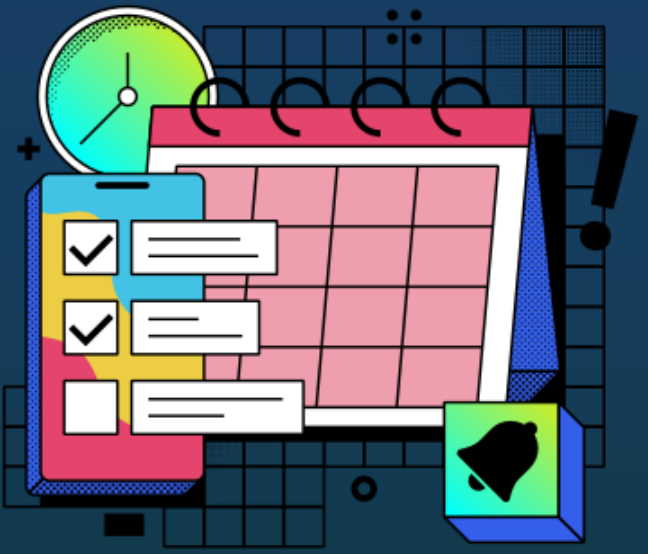
Data Table



NOTES

TRANSPORTATION

Problem Statement



Unilever is facing a complex transportation problem involving the efficient distribution of products from three of its warehouses (Origin A, B, C) to four distinct distributors (Destination A, B, C, D). Each warehouse has a specific capacity: Warehouse A can handle 4500 units, B 2500 units, and C 5000 units.

The distributors have varying demands: Distributor A requires 4300 units, B 2000 units, C 2800 units, and D 2900 units.

The transportation costs per unit vary significantly across different routes, impacting overall logistics expenses.

Unilever seeks to minimize these costs while ensuring that each distributor's demand is fully met without exceeding the capacities of each warehouse.

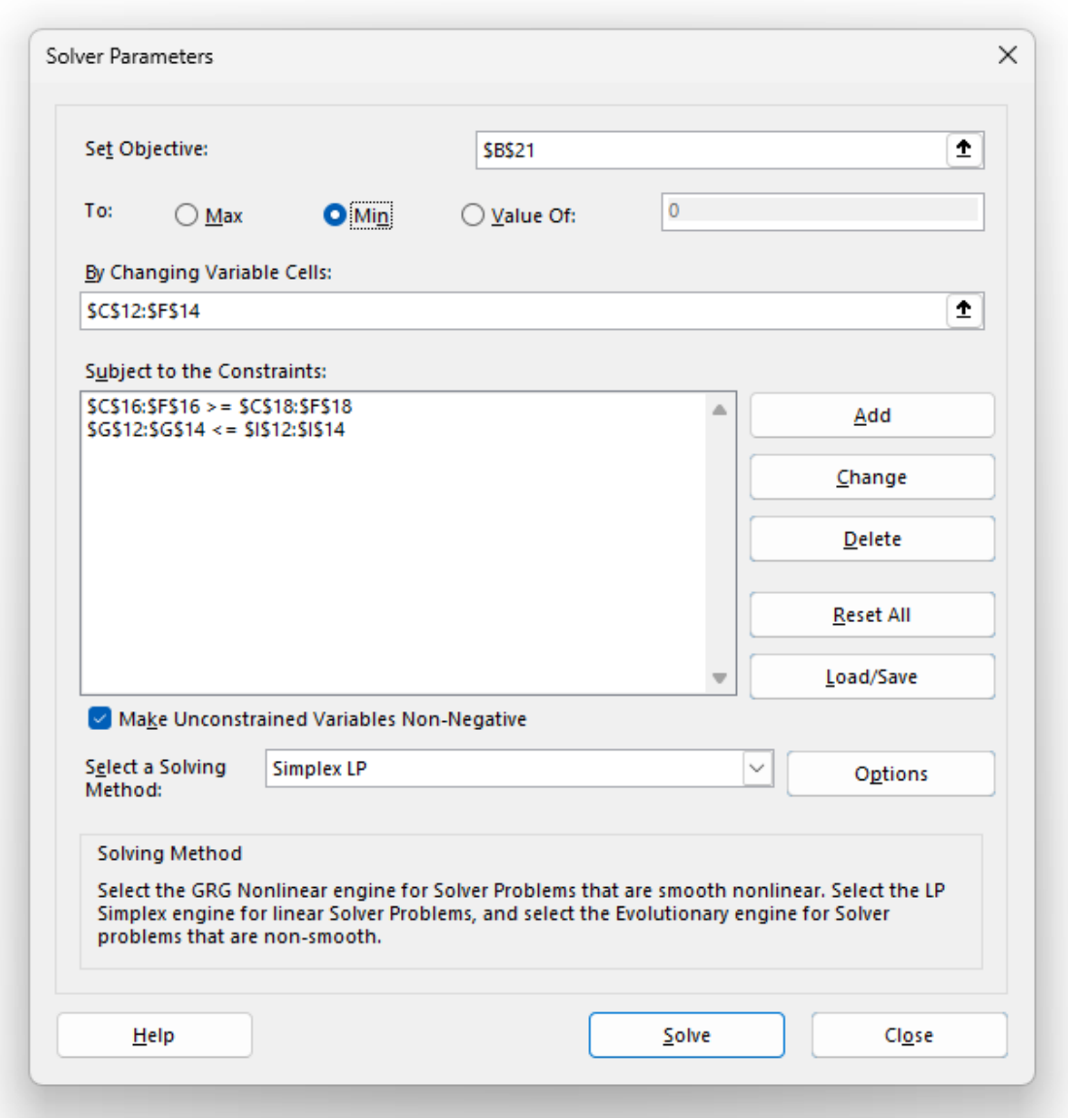
NOTES

	A	B	C	D	E	F	G	H	I
1									
2	**Cost per unit to deliver**								
3			Destination A	Destination B	Destination C	Destination D			
4		Origin A	₹ 1.10	₹ 1.60	₹ 1.40	₹ 1.20			
5		Origin B	₹ 2.50	₹ 2.00	₹ 2.60	₹ 2.80			
6		Origin C	₹ 1.80	₹ 2.10	₹ 1.70	₹ 1.90			
7									
8									
9	**Recommended Shipping Model**								
10									
11			Destination A	Destination B	Destination C	Destination D	Ship		Capacity
12		Origin A					0	<=	4500
13		Origin B					0	<=	2500
14		Origin C					0	<=	5000
15									
16		Received	0	0	0	0			
17			>=	>=	>=	>=			
18		Demand	4300	2000	2800	2900	12000		
19									
20									
21	**Total Cost**								

NOTES

	A	B	C	D	E	F	G	H	I
1									
2	**Cost per unit to deliver**								
3			Destination A	Destination B	Destination C	Destination D			
4		Origin A	₹ 1.10	₹ 1.60	₹ 1.40	₹ 1.20			
5		Origin B	₹ 2.50	₹ 2.00	₹ 2.60	₹ 2.80			
6		Origin C	₹ 1.80	₹ 2.10	₹ 1.70	₹ 1.90			
7									
8									
9	**Recommended Shipping Model**								
10									
11			Destination A	Destination B	Destination C	Destination D	Ship		Capacity
12		Origin A	1600	0	0	2900	4500	<=	4500
13		Origin B	500	2000	0	0	2500	<=	2500
14		Origin C	2200	0	2800	0	5000	<=	5000
15									
16		Received	4300	2000	2800	2900			
17			>=	>=	>=	>=			
18		Demand	4300	2000	2800	2900	12000		
19									
20									
21	**Total Cost**	**₹ 19,210.00**							

Transportation



NOTES

Transportation

Gemini Advanced

i want to run linear optimization to minimize my cost
use pulp on python

this is my capacity constraint:
origin a 4500
origin b 2500
origin c 5000

this is the demand
demand a 4300
demand b 2000
demand c 2800
demand d 2900

the cost matrix has been provided in the image

	Destination A	Destination B	Destination C	Destination D
Origin A	₹ 1.10	₹ 1.60	₹ 1.40	₹ 1.20
Origin B	₹ 2.50	₹ 2.00	₹ 2.60	₹ 2.80
Origin C	₹ 1.80	₹ 2.10	₹ 1.70	₹ 1.90

NOTES

Transportation

```
!pip install pulp
import pulp

# Define the problem
prob = pulp.LpProblem("Minimize_Transportation_Cost", pulp.LpMinimize)

# Define the origins, destinations, costs, capacities, and demands
origins = ["Origin A", "Origin B", "Origin C"]
destinations = ["Destination A", "Destination B", "Destination C", "Destination D"]

costs = {
    ("Origin A", "Destination A"): 1.10,
    ("Origin A", "Destination B"): 1.60,
    ("Origin A", "Destination C"): 1.40,
    ("Origin A", "Destination D"): 1.20,
    ("Origin B", "Destination A"): 2.50,
    ("Origin B", "Destination B"): 2.00,
    ("Origin B", "Destination C"): 2.60,
    ("Origin B", "Destination D"): 2.80,
    ("Origin C", "Destination A"): 1.80,
    ("Origin C", "Destination B"): 2.10,
    ("Origin C", "Destination C"): 1.70,
    ("Origin C", "Destination D"): 1.90,
}

capacities = {
    "Origin A": 4500,
    "Origin B": 2500,
    "Origin C": 5000,
}

demands = {
    "Destination A": 4300,
    "Destination B": 2000,
    "Destination C": 2800,
    "Destination D": 2900,
}

# Define the decision variables
x = pulp.LpVariable.dicts("x", [(i, j) for i in origins for j in destinations], lowBound=0, cat='Continuous')

# Define the objective function
prob += pulp.lpSum(costs[(i, j)] * x[(i, j)] for i in origins for j in destinations)

# Define the constraints
# Capacity constraints
for i in origins:
    prob += pulp.lpSum(x[(i, j)] for j in destinations) <= capacities[i]

# Demand constraints
for j in destinations:
    prob += pulp.lpSum(x[(i, j)] for i in origins) >= demands[j]

# Solve the problem
prob.solve()

# Print the status of the solution
print("Status:", pulp.LpStatus[prob.status])

# Print the optimal solution and the minimum cost
if pulp.LpStatus[prob.status] == 'Optimal':
    print("Minimum Cost:", pulp.value(prob.objective))
    for i in origins:
        for j in destinations:
            if x[(i, j)].varValue > 0:
                print(f"Transport {x[(i, j)].varValue} units from {i} to {j}")
```

```
Status: Optimal
Minimum Cost: 19210.0
Transport 3800.0 units from Origin A to Destination A
Transport 700.0 units from Origin A to Destination D
Transport 500.0 units from Origin B to Destination A
Transport 2000.0 units from Origin B to Destination B
Transport 2800.0 units from Origin C to Destination C
Transport 2200.0 units from Origin C to Destination D
```

NOTES

THANK YOU!

HAVISH M CONSULTING