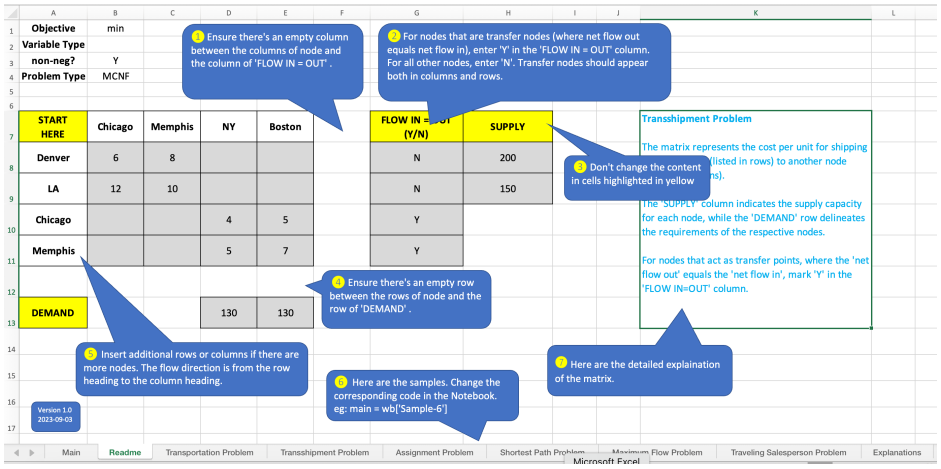
Handbook of TOOL 1
Excel to Gurobi for Network Models

STEP 1:

Input the data into the cells of the chosen sheet of the attached Excel file.



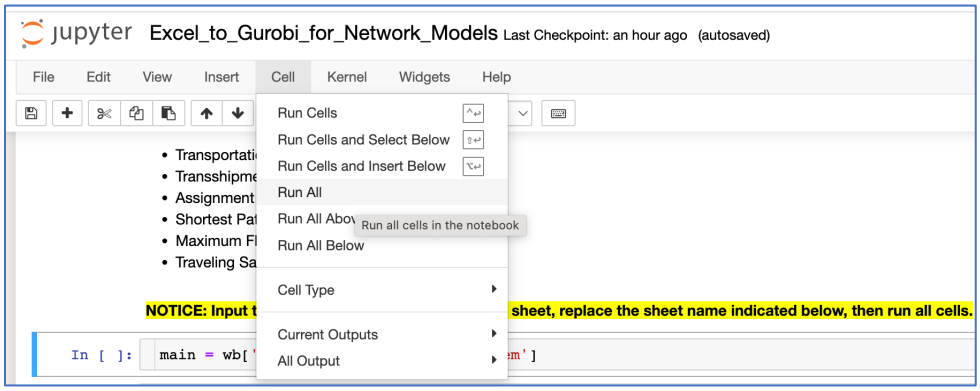
STEP 2:

Replace the sheet name in the Jupyter Notebook file.

```
main = wb['Transportation Problem']
```

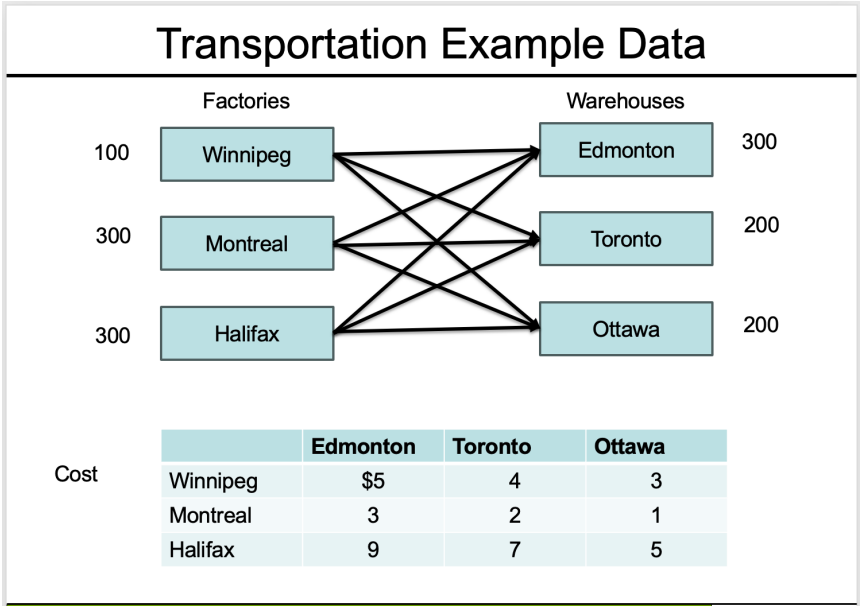
STEP 3:

Run all cells.



Appendix

Example 1: Transportation Problem

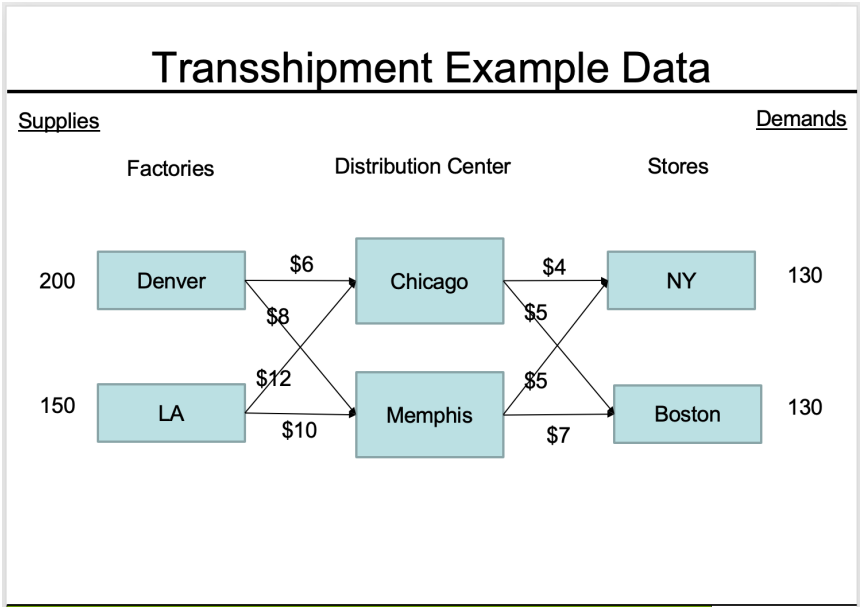


Cost

	Edmonton	Toronto	Ottawa
Winnipeg	$5	4	3
Montreal	3	2	1
Halifax	9	7	5

	A	B	C	D	E	F	G
1	**Objective**	min					
2	**Variable Type**						
3	**non-neg?**	Y					
4	**Problem Type**	MCNF					
5							
6							
7	**START HERE**	**Edmonton**	**Toronto**	**Ottawa**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**Winnipeg**	5	4	3		N	100
9	**Montreal**	3	2	1		N	300
10	**Halifax**	9	7	5		N	300
11							
12	**DEMAND**	300	200	200			

Example 2: Transshipment Problem



	A	B	C	D	E	F	G	H
1	**Objective**	min						
2	**Variable Type**							
3	**non-neg?**	Y						
4	**Problem Type**	MCNF						
5								
6								
7	**START HERE**	**Chicago**	**Memphis**	**NY**	**Boston**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**Denver**	6	8				N	200
9	**LA**	12	10				N	150
10	**Chicago**			4	5		Y	
11	**Memphis**			5	7		Y	
12								
13	**DEMAND**			130	130			

Example 3: Assignment Problem

Assignment Example Data

- The time it would take each employee to complete each task is given by this table. How to minimize total hours worked?

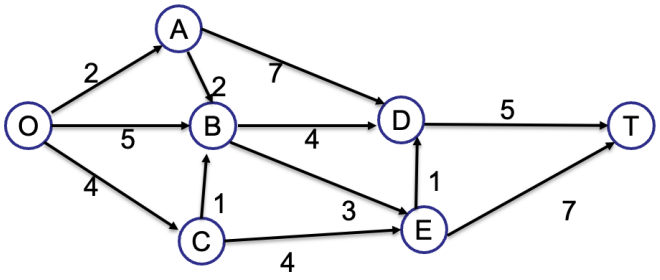
	Task 1	Task 2	Task 3	Task 4
Employee 1	7	3	4	8
Employee 2	5	4	6	5
Employee 3	6	7	15	6
Employee 4	8	6	7	4

	A	B	C	D	E	F	G	H
1	**Objective**	min						
2	**Variable Type**							
3	**non-neg?**	Y						
4	**Problem Type**	MCNF						
5								
6								
7	**START HERE**	**Task_1**	**Task_2**	**Task_3**	**Task_4**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**Employee_1**	7	3	4	8		N	1
9	**Employee_2**	5	4	6	5		N	1
10	**Employee_3**	6	7	15	6		N	1
11	**Employee_4**	8	6	7	4		N	1
12								
13	**DEMAND**	1	1	1	1			

Example 4: Shortest Path Problem

Shortest Path Problem Example Data

- Find the shortest path from station O to station T

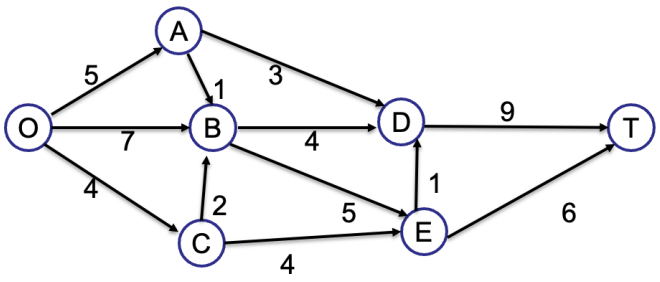


	A	B	C	D	E	F	G	H	I	J
1	**Objective**	min								
2	**Variable Type**									
3	**non-neg?**	Y								
4	**Problem Type**	MCNF								
5										
6										
7	**START HERE**	**A**	**B**	**C**	**D**	**E**	**T**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**O**	2	5	4					N	1
9	**A**		2		7				Y	
10	**B**				4	3			Y	
11	**C**		1			4			Y	
12	**D**						5		Y	
13	**E**				1		7		Y	
14										
15	**DEMAND**						1			

Example 5: Maximum Flow Problem

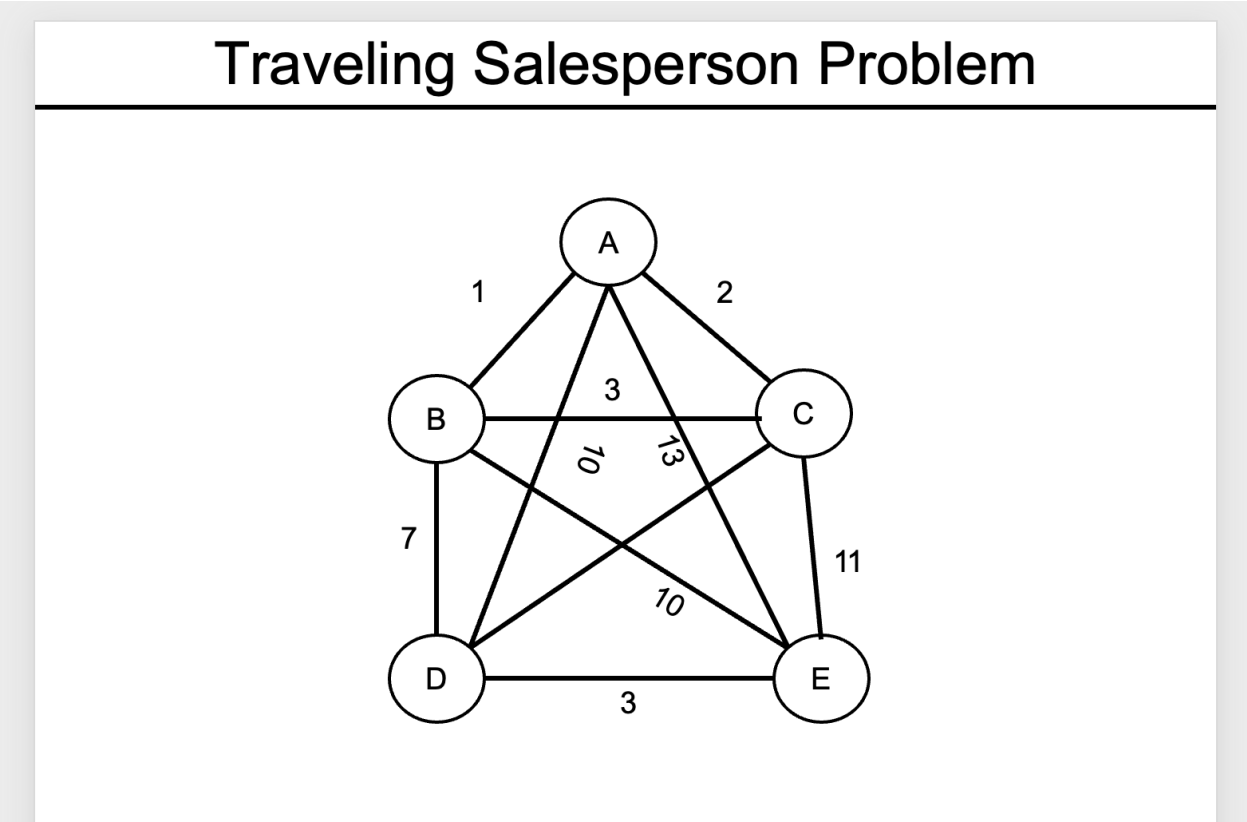
Maximum Flow Problem Example Data

- Determine the maximum flow from O to T, the limit between the nodes shown in the diagram:



	A	B	C	D	E	F	G	H	I	J	K
1	**Objective**	min									
2	**Variable Type**										
3	**non-neg?**	Y									
4	**Problem Type**	MFP									
5											
6											
7	**START HERE**	**A**	**B**	**C**	**D**	**E**	**T**	**O**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**O**	5	7	4						Y	
9	**A**		1		3					Y	
10	**B**				4	5				Y	
11	**C**		2			4				Y	
12	**D**						9			Y	
13	**E**				1		6			Y	
14	**T**							9999999		Y	
15											
16	**DEMAND**										

Example 6: Traveling Salesperson Problem



	A	B	C	D	E	F	G	H	I
1	**Objective**	min							
2	**Variable Type**	int							
3	**non-neg?**	Y							
4	**Problem Type**	TSP							
5									
6									

7	**START HERE**	**A**	**B**	**C**	**D**	**E**		**FLOW IN = OUT (Y/N)**	**SUPPLY**
8	**A**		1	2	10	13		Y	1
9	**B**	1		3	7	10		Y	1
10	**C**	2	3		9	11		Y	1
11	**D**	10	7	10		3		Y	1
12	**E**	8	9	11	4			Y	1
13									
14	**DEMAND**	1	1	1	1	1			