NORTHEASTERN UNIVERSITY

MECHANICAL & INDUSTRIAL ENGINEERING DEPARTMENT

PARTIAL EXAM	1

COURSE	CODE	DATE
SUPPLY CHAIN ENGINEERING **Dr. César Martínez Olvera**	**IE 7200**	**02/02/2024**
NAME	**ID NUMBER**	**GRADE**

"I pledge to comply with the Code of Ethics of Northeastern University – Department of Mechanical & Industrial Engineering, while working in the solving of the problems present in the current homework

1.- Using the LP model covered in class (Appendix A), modify it to include Germany at Operation 5, with the following operational costs (see tables below). Present the result obtained from this modification, following the 1stPartialExamAnswerFormat, already discussed in class. Value: 5 points.

- Transformation Operations cost

Manufacturing Country	Operation #
	5
GER	50

- Shipping costs among Manufacturing Country per Operation #

	Shipment #					
	2: Op#2 – Op#5	4: Op#4 – Op#5	5: Op#5 – Op#6		6: Op#5 – Op#7	
	GER	GER	MEX	BRA	MEX	BRA
MEX	450	150				
BRA	350	400				
GER			100	600	100	350

- Maximum delivery capacity among Manufacturing Country per Operation #

	Shipment #					
	2: Op#2 – Op#5	4: Op#4 – Op#5	5: Op#5 – Op#6		6: Op#5 – Op#7	
	GER	GER	MEX	BRA	MEX	BRA
MEX	8000	6000				
BRA	5000	5000				
GER			6000	7000	8000	6000

2.- If you had the option of increasing the maximum delivery capacity among Manufacturing Countries and Operation #, as shown in the following table:

	Shipment #					
	2: Op#2 – Op#5	4: Op#4 – Op#5	5: Op#5 – Op#6		6: Op#5 – Op#7	
	GER	GER	MEX	BRA	MEX	BRA
MEX	from 8000 to 9000					
BRA		from 5000 to 6000				
GER				from 7000 to 8000	from 8000 to 9000	

, which combination (ONE and ONLY ONE) you would chose and why? Justify in detail your answer***. Value: 5 points.

***comply with the 1stPartialExamAnswerFormat, already discussed in class.

3.- The modified LP model of point 1 allows to find the combination Operation # - Country which guarantees the maximum flow, from beginning points Operations #1 and #3 to ending points Operations # 6 and #7. Modifify it so now there can be ONE and ONLY ONE beginning point (either Operation #1 or Operation #3, but not both), and ONE and ONLY ONE ending point (either Operation #6 or Operation #7, but not both). Present your results following the 1stPartialExamAnswerFormat, already discussed in class. Value: 5 points.

Instructions for submitting* your First Partial Exam

1.- Save the elaborated document as a .pdf file

2.- Label this .pdf file with the name label **IE7200PE#1**.

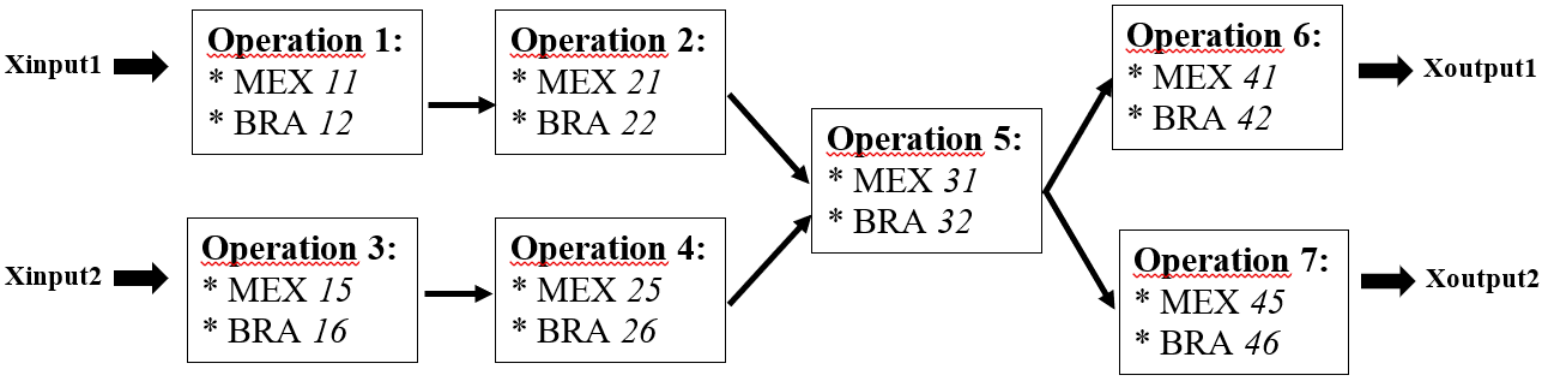
34.- Send your .pdf file to the Instructor's email address (**do not send anything through Canvas**):

ce.martinez@northeastern.edu

*Note: just send one document per team.

APPENDIX A

You have the following logistic network, composed of seven Transformation Operations, that can take place in two different Manufacturing countries (i.e. in MEX or in BRA, but not in both):



Also, you have the following operational conditions:

- Transformation Operations cost per Manufacturing Country

Manufacturing Country	Operation #						
	1	2	3	4	5	6	7
MEX	10	20	40	30	30	10	50
BRA	20	10	30	40	40	20	30

- Shipping costs among Manufacturing Country per Operation #

	Shipment #											
	1: Op#1 - Op		2: Op#2 – O		3: Op#3 – O		4: Op#4 – O		5: Op#5 – O		6: Op#5 – O	
	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA
MEX	500	300	200	250	300	150	100	200	200	300	150	200
BRA	200	100	300	500	200	400	250	300	500	400	250	400

- Maximum delivery capacity among Manufacturing Country per Operation #

	Shipment #											
	1: Op#1 - Op		2: Op#2 – O		3: Op#3 – O		4: Op#4 – O		5: Op#5 – O		6: Op#5 – O	
	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA	MEX	BRA
MEX	3000	2000	6000	4000	5000	6000	5000	2000	4000	4000	6000	5000
BRA	1000	4000	3000	2000	2000	4000	3000	4000	5000	6000	4000	2000

- The maximum delivery capacity at Xinput1 = 7000, Xinput2 = 6000, Xoutput1 = 4000, and Xoutput2 = 5000.