PRÁCTICA 14: Resolución de problemas de Programación Lineal

PROBLEMA 1

Variable -->	X1	X2	Direction	R. H. S.
Minimize	40	60		
C1	1	0.5	>=	2
C2	20	20	>=	60
C3	10	20	>=	40
LowerBound	0	0		
UpperBound	M	M		
VariableType	Continuous	Continuous		

	19:59:44		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	2,0000	40,0000	80,0000	0	basic	30,0000	60,0000
2	X2	1,0000	60,0000	60,0000	0	basic	40,0000	80,0000
	Objective	Function	(Min.) =	140,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	2,5000	>=	2,0000	0,5000	0	-M	2,5000
2	C2	60,0000	>=	60,0000	0	1,0000	53,3333	80,0000
3	C3	40,0000	>=	40,0000	0	2,0000	30,0000	50,0000

PROBLEMA 2

Variable -->	X1	X2	Direction	R. H. S.
Minimize	60	210		
C1	1000	2000	>=	3000
C2	25	100	>=	100
LowerBound	0	0		
UpperBound	M	M		
VariableType	Continuous	Continuous		

	20:02:07		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	2,0000	60,0000	120,0000	0	basic	52,5000	105,0000
2	X2	0,5000	210,0000	105,0000	0	basic	120,0000	240,0000
	Objective	Function	(Min.) =	225,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	3.000,0000	>=	3.000,0000	0	0,0150	2.000,0000	4.000,0000
2	C2	100,0000	>=	100,0000	0	1,8000	75,0000	150,0000

PROBLEMA 3

Variable -->	X1	X2	X3	X4	X5	X6	Direction	R. H. S.
Minimize	5	4	3	3	5	2		
C1	1	0	1	0	1	0	>=	8
C2	0	1	0	1	0	1	>=	9
C3	1	1	0	0	0	0	<=	4
C4	0	0	1	1	0	0	<=	7
C5	0	0	0	0	1	1	<=	6
LowerBound	0	0	0	0	0	0		
UpperBound	M	M	M	M	M	M		
VariableType	Integer	Integer	Integer	Integer	Integer	Integer		

	20:07:00		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c(j)	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c(j)	Allowable Max. c(j)
1	X1	1,0000	5,0000	5,0000	0	basic	4,0000	7,0000
2	X2	3,0000	4,0000	12,0000	0	basic	2,0000	5,0000
3	X3	7,0000	3,0000	21,0000	0	basic	-M	4,0000
4	X4	0	3,0000	0	1,0000	at bound	2,0000	M
5	X5	0	5,0000	0	2,0000	at bound	3,0000	M
6	X6	6,0000	2,0000	12,0000	0	basic	-M	4,0000
	Objective	Function	(Min.) =	50,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	8,0000	>=	8,0000	0	5,0000	7,0000	8,0000
2	C2	9,0000	>=	9,0000	0	4,0000	6,0000	9,0000
3	C3	4,0000	<=	4,0000	0	0	4,0000	M
4	C4	7,0000	<=	7,0000	0	-2,0000	7,0000	8,0000
5	C5	6,0000	<=	6,0000	0	-2,0000	6,0000	9,0000

PROBLEMA 4

Variable -->	X1	X2	X3	Direction	R. H. S.
Minimize	25	50	300		
C1	0.8	0.2	0	>=	3
C2	1	1.5	3	>=	6
C3	0.1	0.6	2	>=	4
C4	1	1	1	<=	6
LowerBound	0	0	0		
UpperBound	M	M	M		
VariableType	Continuous	Continuous	Continuous		

	20:10:24		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	3,5135	25,0000	87,8378	0	basic	-39,2857	M
2	X2	0,9459	50,0000	47,2973	0	basic	-M	92,5000
3	X3	1,5405	300,0000	462,1621	0	basic	152,1739	M
	Objective	Function	(Min.) =	597,2972				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	3,0000	>=	3,0000	0	121,6216	1,1429	3,3684
2	C2	9,5541	>=	6,0000	3,5541	0	-M	9,5541
3	C3	4,0000	>=	4,0000	0	195,9460	2,1000	4,8750
4	C4	6,0000	<=	6,0000	0	-91,8919	5,5625	8,4783

PROBLEMA 5

Variable -->	X1	X2	Direction	R. H. S.
Minimize	3	2		
C1	5	1	>=	10
C2	2	2	>=	12
C3	1	4	>=	12
LowerBound	0	0		
UpperBound	M	M		
VariableType	Integer	Integer		

	20:12:28		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	1,0000	3,0000	3,0000	0	basic	2,0000	10,0000
2	X2	5,0000	2,0000	10,0000	0	basic	0,6000	3,0000
	Objective	Function	(Min.) =	13,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	10,0000	>=	10,0000	0	0,2500	6,0000	22,0000
2	C2	12,0000	>=	12,0000	0	0,8750	8,2105	20,0000
3	C3	21,0000	>=	12,0000	9,0000	0	-M	21,0000

PROBLEMA 6

Variable -->	X1	X2	X3	Direction	R. H. S.
Maximize	2	2	4		
C1	0	1	2	<=	230
C2	2	1	1	<=	360
C3	1	1	0	>=	160
LowerBound	0	0	0		
UpperBound	M	M	M		
VariableType	Integer	Integer	Integer		

	20:14:36		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	110,0000	2,0000	220,0000	0	basic	0	6,0000
2	X2	50,0000	2,0000	100,0000	0	basic	-2,0000	2,5000
3	X3	90,0000	4,0000	360,0000	0	basic	3,0000	M
	Objective	Function	(Max.) =	680,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	230,0000	<=	230,0000	0	1,3333	80,0000	560,0000
2	C2	360,0000	<=	360,0000	0	1,3333	195,0000	435,0000
3	C3	160,0000	>=	160,0000	0	-0,6667	122,5000	295,0000

PROBLEMA 7

Variable -->	X1	X2	X3	X4	X5	X6	Direction	R. H. S.
Maximize	3	2.5	3.5	4	5	4.5		
C1	1	1	1	1	1	1	<=	100
C2	0.6	0.6	-0.4	-0.4	-0.4	-0.4	>=	0
C3	-0.35	-0.35	0.65	0.65	-0.35	-0.35	<=	0
C4	-0.35	-0.35	-0.35	-0.35	0.65	0.65	<=	0
LowerBound	0	0	0	0	0	0		
UpperBound	M	M	M	M	M	M		
VariableType	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous		

	20:18:17		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	40,0000	3,0000	120,0000	0	basic	2,5000	4,0000
2	X2	0	2,5000	0	-0,5000	at bound	-M	3,0000
3	X3	0	3,5000	0	-0,5000	at bound	-M	4,0000
4	X4	25,0000	4,0000	100,0000	0	basic	3,5000	5,0000
5	X5	35,0000	5,0000	175,0000	0	basic	4,5000	M
6	X6	0	4,5000	0	-0,5000	at bound	-M	5,0000
	Objective	Function	(Max.) =	395,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	100,0000	<=	100,0000	0	3,9500	0	M
2	C2	0,0000	>=	0	0	-1,0000	-10,0000	25,0000
3	C3	-10,0000	<=	0	10,0000	0	-10,0000	M
4	C4	0,0000	<=	0	0	1,0000	-10,0000	25,0000

PROBLEMA 8

Variable -->	X1	X2	Direction	R. H. S.
Minimize	3000	3500		
C1	10	5	>=	230
C2	15	15	>=	450
C3	5	10	>=	110
LowerBound	0	0		
UpperBound	M	M		
VariableType	Continuous	Continuous		

	20:20:18		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c(j)	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c(j)	Allowable Max. c(j)
1	X1	30,0000	3.000,0000	90.000,0000	0	basic	0	3.500,0000
2	X2	0	3.500,0000	0	500,0000	at bound	3.000,0000	M
	Objective	Function	(Min.) =	90.000,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	300,0000	>=	230,0000	70,0000	0	-M	300,0000
2	C2	450,0000	>=	450,0000	0	200,0000	345,0000	M
3	C3	150,0000	>=	110,0000	40,0000	0	-M	150,0000

PROBLEMA 9

Variable -->	X1	X2	Direction	R. H. S.
Maximize	200	300		
C1	8	10	<=	10000
C2	100	50	<=	150000
LowerBound	0	0		
UpperBound	M	M		
VariableType	Integer	Integer		

	20:23:40		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c(j)	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c(j)	Allowable Max. c(j)
1	X1	0	200,0000	0	-40,0000	at bound	-M	240,0000
2	X2	1.000,0000	300,0000	300.000,0000	0	basic	250,0000	M
	Objective	Function	(Max.) =	300.000,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	10.000,0000	<=	10.000,0000	0	30,0000	0	30.000,0000
2	C2	50.000,0000	<=	150.000,0000	100.000,0000	0	50.000,0000	M

PROBLEMA 10

Variable -->	X1	X2	Direction	R. H. S.
Maximize	4.2	3		
C1	0.5	1	<=	100
C2	2	1	<=	160
C3	1	0	<=	50
LowerBound	0	0		
UpperBound	M	M		
VariableType	Integer	Integer		

	20:25:31		Wednesday	December	08	2010		
	Decision Variable	Solution Value	Unit Cost or Profit c[j]	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c[j]	Allowable Max. c[j]
1	X1	40,0000	4,2000	168,0000	0	basic	1,5000	6,0000
2	X2	80,0000	3,0000	240,0000	0	basic	2,1000	8,4000
	Objective	Function	(Max.) =	408,0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	100,0000	<=	100,0000	0	1,2000	85,0000	160,0000
2	C2	160,0000	<=	160,0000	0	1,8000	100,0000	175,0000
3	C3	40,0000	<=	50,0000	10,0000	0	40,0000	M