OR LAB Assignment 2

Nikita-18AE30029

**Sol 1.**

Tableau from iteration 0

1.000000 4.000000 24.000000

3.000000 1.000000 21.000000

1.000000 1.000000 9.000000

-2.000000 -5.000000 0.000000

Tableau from iteration 1

0.250000 0.250000 6.000000

2.750000 -0.250000 15.000000

0.750000 -0.250000 3.000000

-0.750000 1.250000 30.000000

Tableau from iteration 2

-0.333333 0.333333 5.000000

-3.666667 0.666667 4.000000

1.333333 -0.333333 4.000000

1.000000 1.000000 33.000000

x3 = 5.000000 x1 = 4.000000

Other variables are non-basic, i.e, 0.

Optimal solution z = 33.000000

Unique optimal solution - no alternate solution.

**Sol. 2**

Tableau from iteration 0

2.000000 3.000000 2.000000 440.000000

4.000000 0.000000 3.000000 470.000000

2.000000 5.000000 0.000000 430.000000

-4.000000 -3.000000 -6.000000 0.000000

Tableau from iteration 1

-0.666667 3.000000 -0.666667 126.666667

1.333333 0.000000 0.333333 156.666667

2.000000 5.000000 -0.000000 430.000000

4.000000 -3.000000 2.000000 940.000000

Tableau from iteration 2

-0.222222 0.333333 -0.222222 42.222222

1.333333 -0.000000 0.333333 156.666667

3.111111 -1.666667 1.111111 218.888889

3.333333 1.000000 1.333333 1066.666667

x1 = 156.666667 x2 = 218.888889

Other variables are non-basic, i.e, 0.

Optimal solution z = 1066.666667

Unique optimal solution - no alternate solution

**Sol.3**

**Iteration no: 0**

CB Ci/basic\_variables 12 15 14 0 0 0 solution ratio

0 4-1 1 0 1 0 0 0 0

0 50 -1 2 0 1 0 0 -0

0 61 1 1 0 0 1 100 100

Z\_i    0 0 0 0 0 0

Z-i - C\_i  -12 -15 -14 -0 -0 -0

Minimum ratio is : 0 and is coming at pivot row : 1

Minimum Z-i - C\_i is : -15 and is coming at pivot column: 2

value of z is :0

**Iteration no: 1**

CB Ci/basic\_variables 12 15 14 0 0 0 solution ratio

15 2-1 1 0 1 0 0 0 -0

0 5-1 0 2 1 1 0 0 -0

0 62 0 1 -1 0 1 100 50

Z\_i    -15 15 0 15 0 0

Z-i - C\_i  -27 -0 -14 15 -0 -0

Minimum ratio is : -0 and is coming at pivot row : 1

Minimum Z-i - C\_i is : -27 and is coming at pivot column: 1

value of z is :0

**Iteration no: 2**

CB Ci/basic\_variables 12 15 14 0 0 0 solution ratio

12 11 -1 -0 -1 -0 -0 -0 0

0 50 -1 2 0 1 0 0 -0

0 60 2 1 1 0 1 100 50

Z\_i    12 -12 0 -12 0 0

Z-i - C\_i  -0 -27 -14 -12 -0 -0

Minimum ratio is : 0 and is coming at pivot row : 1

Minimum Z-i - C\_i is : -27 and is coming at pivot column: 2

value of z is :0

**Iteration no: 4**

CB Ci/basic\_variables 12 15 14 0 0 0 solution ratio

12 11 -1 -0 -1 -0 -0 -0 0

0 50 -1 2 0 1 0 0 -0

0 60 2 1 1 0 1 100 50

Z\_i    12 -12 0 -12 0 0

Z-i - C\_i  -0 -27 -14 -12 -0 -0

Minimum ratio is : 0 and is coming at pivot row : 1

Minimum Z-i - C\_i is : -27 and is coming at pivot column: 2

value of z is :0

**Iteration no: 5**

CB Ci/basic\_variables 12 15 14 0 0 0 solution ratio

15 2-1 1 0 1 0 0 0 -0

0 5-1 0 2 1 1 0 0 -0

0 62 0 1 -1 0 1 100 50

Z\_i    -15 15 0 15 0 0

Z-i - C\_i  -27 -0 -14 15 -0 -0

Minimum ratio is : -0 and is coming at pivot row : 1

Minimum Z-i - C\_i is : -27 and is coming at pivot column: 1

value of z is :0

The final optimal values are :  x\_ 2 = 0  x\_ 5 = 0  x\_ 6 = 100

And rest all are 0

And the optimal value of Z is : 0

**Sol. 4**

Tableau from iteration 0

3.000000 -1.000000 2.000000 7.000000

0.000000 2.000000 -4.000000 12.000000

-4.000000 3.000000 8.000000 10.000000

-1.000000 3.000000 -3.000000 0.000000

Tableau from iteration 1

4.000000 -1.750000 -0.250000 4.500000

-2.000000 3.500000 0.500000 17.000000

-0.500000 0.375000 0.125000 1.250000

-2.500000 4.125000 0.375000 3.750000

Tableau from iteration 2

0.250000 -0.437500 -0.062500 1.125000

0.500000 2.625000 0.375000 19.250000

0.125000 0.156250 0.093750 1.812500

0.625000 3.031250 0.218750 6.562500

x1 = 1.125000 x3 = 1.812500

Other variables are non-basic, i.e, 0.

Optimal solution z = 6.562500

Unique optimal solution - no alternate solution.

**Sol. 5** . For this problem the last constraint is multiplied by -1 on both the sides to solve with just the use of slack variables.

Tableau from iteration 0

5.000000 7.000000 4.000000 7.000000

4.000000 -7.000000 -5.000000 2.000000

-3.000000 -4.000000 6.000000 -3.000000

-3.000000 -2.000000 -2.000000 0.000000

Tableau from iteration 1

-1.250000 15.750000 10.250000 4.500000

0.250000 -1.750000 -1.250000 0.500000

0.750000 -9.250000 2.250000 -1.500000

0.750000 -7.250000 -5.750000 1.500000

Tableau from iteration 2

-0.079365 0.063492 0.650794 0.285714

0.111111 0.111111 -0.111111 1.000000

0.015873 0.587302 8.269841 1.142857

0.174603 0.460317 -1.031746 3.571429

Tableau from iteration 3

-0.080614 0.017274 -0.078695 0.195777

0.111324 0.119002 0.013436 1.015355

0.001919 0.071017 0.120921 0.138196

0.176583 0.533589 0.124760 3.714012

x2 = 0.195777 x1 = 1.015355 x3 = 0.138196

Other variables are non-basic, i.e, 0.

Optimal solution z = 3.714012

Unique optimal solution - no alternate solution.