Lab 3 Assignment solution

Dibya Prakash Das
16MA20017

I have fully completed the simplex algorithm for maximization optimization problem.
I have stored the inputs to the program in a text file and redirect the input to the program for brevity.

Q1.

Enter the number of eqns :- Enter the number of vars :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter optimizing function as (= 0) :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :-
BS:-
0 6
0 9 -- Not a feasible solution

4 5
5.45455 4.63636 -- Not a feasible solution

6 3
7 0
9 0 -- Not a feasible solution

24 0 -- Not a feasible solution

BFS:-
0 0
0 6
4 5
6 3
7 0
Enter optimizing expression with (= 0) as the type and bias:- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter 1 for maximize and -1 for minimize :-
The optimum solution for the system is :-
4 5

Initial Simplex Tableau
New iteration

1	4	24
3	1	21
1	1	9
-2	-5	0

Pivot element is 4.000000 at :- (0,1)

Tableau with ratios :-

1	4	24	6
3	1	21	21
1	1	9	9
-2	-5	0	0

0.25	0.25	6
2.75	-0.25	15
0.75	-0.25	3
-0.75	1.25	30

New iteration

0.25	0.25	6
2.75	-0.25	15
0.75	-0.25	3
-0.75	1.25	30

Pivot element is 0.750000 at :- (2,0)

Tableau with ratios :-

0.25	0.25	6	24
2.75	-0.25	15	5.45455
0.75	-0.25	3	4
-0.75	1.25	30	0

-0.333333	0.333333	5
-3.66667	0.666667	4
1.33333	-0.333333	4

1	1	33

New iteration

-0.333333	0.333333	5
-3.66667	0.666667	4
1.33333	-0.333333	4
1	1	33

Solved

Q2.

Enter the number of eqns :- Enter the number of vars :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter optimizing function as (= 0) :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :-

BS:-

0 0 0

0.75 0 0

0.75 0.166667 0

1 0 0

BFS:-

0 0 0

0.75 0 0

0.75 0.166667 0

1 0 0

Enter optimizing expression with (= 0) as the type and bias:- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter 1 for maximize and -1 for minimize :- The optimum solution for the system is :-

1 0 0

Initial Simplex Tableau

New iteration

2 3 2 440
4 0 3 470
2 5 0 430
-4 -3 -6 0

Pivot element is 3.000000 at :- (1,2)

Tableau with ratios :-
2 3 2 440 220
4 0 3 470 156.667
2 5 0 430 0
-4 -3 -6 0 0

-0.666667 3 -0.666667 126.667
1.33333 0 0.333333 156.667
2 5 -0 430
4 -3 2 940
New iteration

-0.666667 3 -0.666667 126.667
1.33333 0 0.333333 156.667
2 5 -0 430
4 -3 2 940

Pivot element is 3.000000 at :- (0,1)

Tableau with ratios :-
-0.666667 3 -0.666667 126.667 42.2222
1.33333 0 0.333333 156.667 0
2 5 -0 430 86
4 -3 2 940 0

-0.222222 0.333333 -0.222222 42.2222
1.33333 -0 0.333333 156.667
3.11111 -1.66667 1.11111 218.889
3.33333 1 1.33333 1066.67
New iteration

-0.222222 0.333333 -0.222222 42.2222
1.33333 -0 0.333333 156.667

3.11111	-1.66667	1.11111	218.889
3.33333	1	1.33333	1066.67

Solved

Q3.

Enter the number of eqns :- Enter the number of vars :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter optimizing function as (= 0) :- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :-

BS:-
0 0 0
0 0 3.76926e+08 -- Not a feasible solution

3.76927e+08 0 3.76927e+08 -- Not a feasible solution

BFS:-
0 0 0

Enter optimizing expression with (= 0) as the type and bias:- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter 1 for maximize and -1 for minimize :- The feasible solution for the system is :-
0 0 0

Initial Simplex Tableau

New iteration

-1	1	0	0
0	-1	2	0
1	1	1	100
-12	-15	-14	0

Pivot element is 1.000000 at :- (0,1)

Tableau with ratios :-

-1	1	0	0	0
0	-1	2	0	0
1	1	1	100	100
-12	-15	-14	0	0

-1	1	0	0
-1	1	2	0
2	-1	1	100
-27	15	-14	0

New iteration

-1	1	0	0
-1	1	2	0
2	-1	1	100
-27	15	-14	0

Pivot element is 2.000000 at :- (2,0)

Tableau with ratios :-

-1	1	0	0	0
-1	1	2	0	0
2	-1	1	100	50
-27	15	-14	0	0

0.5	0.5	0.5	50
0.5	0.5	2.5	50
0.5	-0.5	0.5	50
13.5	1.5	-0.5	1350

New iteration

0.5	0.5	0.5	50
0.5	0.5	2.5	50
0.5	-0.5	0.5	50
13.5	1.5	-0.5	1350

Pivot element is 2.500000 at :- (1,2)

Tableau with ratios :-

0.5	0.5	0.5	50	100

0.5 0.5 2.5 50 20
0.5 -0.5 0.5 50 100
13.5 1.5 -0.5 1350 0

0.4 0.4 -0.2 40
0.2 0.2 0.4 20
0.4 -0.6 -0.2 40
13.6 1.6 0.2 1360
New iteration

0.4 0.4 -0.2 40
0.2 0.2 0.4 20
0.4 -0.6 -0.2 40
13.6 1.6 0.2 1360
Solved

Q4
BS:-
0 0
0.666667 0 0

BFS:-
0 0 0
0.666667 0 0
Enter optimizing expression with (= 0) as the type and bias:- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter 1 for maximize and -1 for minimize :- The feasible solution for the system is :-
0 0 0

Minimize not taught

Q5

BS:-
0 0 0 -- Not a feasible solution

0 0.650794 0 -- Not a feasible solution

0.8 0 0 -- Not a feasible solution

Enter optimizing expression with (= 0) as the type and bias:- Enter co-efficient for 0 :- Enter co-efficient for 1 :- Enter co-efficient for 2 :- Enter the sign (0 for <, 1 for <=, 2 for >, 3 for >=, 4 for =) of the equation :- Enter b of the eqn :- Enter 1 for maximize and -1 for minimize :- The feasible solution for the system is :-
No optimum solution

Artificial Variables not taught