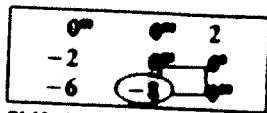


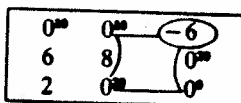
An example to show the equivalence between the transportation algorithm and the simplex algorithm.



Shift 20 units around the loop.

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-280	0	0	2	-2	0	0	-6	-8	0
10	0	1	1	-1	0	0	-1	0	0
0	0	0	1	0	0	1	-1	-1	0
20	0	0	0	0	0	0	1	1	1
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	1	0	1	0	0

Pivot to get  $x_{32}$  up to 20.



Shift 0 units around the loop.

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-160	0	0	-6	6	8	0	2	0	0
10	0	1	1	-1	0	0	-1	0	0
20	0	0	0	1	1	1	0	0	0
0	0	0	0	-1	-1	0	0	0	1
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	1	0	1	1	0

Perform the degenerate pivot to make  $x_{13}$  basic.

$0^{opt}$	$0^{opt}$	$0^p$
0	2	$0^{opt}$
2	$0^{opt}$	6

Optimal form

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-160	0	0	0	0	2	0	2	0	6
10	0	1	0	0	1	0	-1	0	-1
20	0	0	0	1	1	1	0	0	0
0	0	0	1	-1	-1	0	0	0	1
10	1	0	0	1	0	0	1	0	0
20	0	0	0	0	0	0	1	1	1

Optimal form

For example, from Figure 7.2 we see that  $x_{11} = 10$ , so we pivot in the  $x_{11}$  column of the preceding simplex tableau to increase  $x_{11}$  up to 10, which gives the following tableau:

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-20	0	4	3	-1	5	2	-1	1	6
10	0	①	1	-1	0	0	-1	0	0
20	0	0	0	1	1	1	0	0	0
20	0	0	0	0	0	0	1	1	1
10	1	0	0	1	0	0	1	0	0
30	0	1	0	0	1	0	0	1	0
20	0	0	1	0	0	1	0	0	1

Continuing down the arcs in Figure 7.2, we now need to increase  $x_{12}$  up to 10, which is accomplished by performing the circled pivot in the preceding tableau to give the following tableau:

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-60	0	0	-1	3	5	2	3	1	6
10	0	1	1	-1	0	0	-1	0	0
20	0	0	0	1	1	1	0	0	0
20	0	0	0	0	0	0	1	1	1
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	①	0	1	1	0
20	0	0	1	0	0	1	0	0	1

In this tableau we can increase  $x_{22}$  up to 20 by pivoting in row 2 or in row 5. Because we want to have  $x_{23} = 0$  on the next pivot, we chose row 5 as the pivot row. This (circled) pivot yields the following tableau:

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-160	0	0	4	-2	0	2	-2	-4	6
10	0	1	1	-1	0	0	-1	0	0
0	0	0	1	0	0	①	-1	-1	0
20	0	0	0	0	0	0	1	1	1
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	1	0	1	1	0
20	0	0	1	0	0	1	0	0	1

Two more pivots to obtain  $x_{23} = 0$  and  $x_{33} = 20$  as basic variables give the following two tableaus:

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-160	0	0	2	-2	0	0	0	-2	6
10	0	1	1	-1	0	0	-1	0	0
0	0	0	1	0	0	1	-1	-1	0
20	0	0	0	0	0	0	1	1	①
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	1	0	1	1	0
20	0	0	0	0	0	0	1	1	1

	$x_{11}$	$x_{12}$	$x_{13}$	$x_{21}$	$x_{22}$	$x_{23}$	$x_{31}$	$x_{32}$	$x_{33}$
-280	0	0	2	-2	0	0	-6	-8	0
10	0	1	1	-1	0	0	-1	0	0
0	0	0	1	0	0	1	-1	-1	0
20	0	0	0	0	0	0	1	1	1
10	1	0	0	1	0	0	1	0	0
20	0	0	-1	1	1	0	1	1	0
0	0	0	0	0	0	0	0	0	0

Eliminating the row of zeros (corresponding to a redundant constraint) gives a canonical form tableau whose associated basic feasible solution is precisely the

Trying to get initial basis.  
 Problem.  
 Transportation