Exercise Set 3

Problem 1

For each of the following tableaus, determine the next pivot using the simplex algorithm with Bland's rule.

$T_1 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
1	4	1	0	3	0	0	5
0	-2	2	1	5	0	0	4
0	7	2/3	0	8	1	0	2
0	10	-5	0	3	0	1	23

$T_2 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
0	-6	0	-3/2	-1	1	0	2
1	4	0	-1	1	0	0	23
0	2	1	-3	-2	0	0	1
0	0	0	-2	3/2	0	1	12

$T_3 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
4	7	0	0	1	4	0	4
2	8	0	1	0	3	0	0
-2	9	1	0	0	2	0	0
5	-2	0	0	0	-5	1	3

$T_4 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
5	0	0	1	4	1	0	1
-3	0	1	-7	5	0	0	14
2	1	0	8	2	0	0	8
8	0	1	-3	-2	0	1	-4

$T_5 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
1	2	0	5	0	3	0	10
0	-4	0	3	1	6	0	2
0	5	1	4	0	5	0	3
0	4	0	2	0	0	1	20

$T_6 =$

x_1	x_2	x_3	x_4	x_5	x_6	z	
3	3	1	0	4	0	0	0
2	2	0	0	3	1	0	1
0	5	0	1	2	0	0	4
-8	4	0	0	-1	0	1	2

Problem 2

Solve the following LP with the simplex algorithm:

$$\begin{array}{lrcrcl} \text{Max } z & = & x_1 & + & 4x_2 & \\ s.t. & & x_1 & - & x_2 & \leq 1 \\ & & -3x_1 & + & x_2 & \leq 0 \\ & & x_1 & , & x_2 & \geq 0 \end{array}$$

Problem 3

Solve the following LP with the simplex algorithm:

$$\begin{array}{lrcrcl} \text{Max} & z = & 2x_1 & + & 3x_2 & \\ \text{s.t.} & & x_1 & - & x_2 & \leq 2 \\ & & x_1 & + & 2x_2 & \geq 1 \\ & & 2x_1 & - & 3x_2 & \geq 6 \\ & & x_1 & , & x_2 & \geq 0 \end{array}$$

Problem 4

The table below contains possible schedules for drivers of a bus company. The latter would like to determine the schedules at the lowest cost which guarantee that at least one driver is present from 9 am to 5 pm.

Schedule	9 am to 11 am	9 am to 1 pm	11 am to 4 pm	12 pm to 3 pm	1 pm to 4 pm	2 pm to 5 pm	4 pm to 5 pm
Cost	18	30	38	14	22	16	9

Formulate this problem as an **integer** LP