

IE441 Planning for Engineers
 Boğaziçi University
 Department of Industrial Engineering
 Spring 2018

Assignment 1
Due March 7, Wednesday 11:55 pm

In this assignment, you are going to solve a multiple objective linear program to find **as many of its efficient extreme points** as possible. You can work in groups of two students. Each group is going to get a different data set.

The setting is an allocation problem. The problem is trying to maximize 5 objective functions (each corresponding to a performance measure) with 5 variables (corresponding to activities) subject to 5 constraints.

Consider the following example data set:

```

MODE = 3, KSEED TO RE-CREATE IS 6467
5001      5      5      5      0      0      0      0
9
1 1      2.000 1 2      7.000 1 3      7.000 1 4      1.000
1 5      4.000 2 1      4.000 3 2      -3.000 4 3      -4.000
5 4      4.000
5
1      1378.000 2      520.000 3      102.000 4      232.000
5      412.000
0
0
0
0
11
1 1      1.000 1 3      3.000 1 5      2.000 2 1      6.000
2 3      5.000 3 1      -3.000 3 4      5.000 4 2      5.000
4 4      4.000 5 2      6.000 5 5      3.000
0
    
```

This corresponds to the following MOLP:

cons 1	$2x_1$	$+7x_2$	$+7x_3$	$+x_4$	$+4x_5$	\leq	1378
cons 2	$4x_1$					\leq	520
cons 3		$-3x_2$				\leq	102
cons 4			$-4x_3$			\leq	232
cons 5				$4x_4$		\leq	412
<hr/>							
max $z_1 =$	x_1		$+3x_3$		$+2x_5$		
max $z_2 =$	$6x_1$		$+5x_3$				
max $z_3 =$	$-3x_1$			$+5x_4$			
max $z_4 =$		$5x_2$		$+4x_4$			
max $z_5 =$		$6x_2$			$+3x_5$		

1. Obtain your individual data sets from Engin Yıldız.
2. Using the weighting method find as many of the efficient extreme points of your problem as possible.
3. Using the Constraints method, find as many of the efficient extreme points of your problem as possible.
4. Is the solution set different than in part (2)? Why/why not?