BOĞAZİÇİ UNIVERSITY — Department of Industrial Engineering

Course Code : IE 310
Course Title : Operations Research
Semester : Fall 2016
Lecturer : Asst. Prof. Dr. Hakan Yaşarcan
Teaching Assitants: Ahmet Çağrı Düzgün, B.Sc.; Elif Konyar (3rd year student)

Assignment 3
Due Date : 7 November 2016
Due Time : 23:59

In this assignment, you will write a JAVA code that accomplishes the following tasks:

1. Read the values given in a text file named "input.txt". Note that, the values will be given in the format of the following example:

```
Problem Type (minimization or maximization):
maximization

n (# of all variables; # of columns in matrix A):
8

m (# of constraints excluding the sign restrictions; # of rows in matrix A):
3

vector c transpose (objective function coefficients) for Phase 1:
0 0 0 0 0 0 -1 -1

vector c transpose (objective function coefficients) for Phase 2:
2 3 1 0 0 0 0 0

matrix A (technological coefficients):
1 1 1 1 0 0 0 0
2 1 -1 0 -1 0 1 0
0 -1 1 0 0 -1 0 1

vector b (right-hand side coefficients):
40
10
10
```

2. Report the initial Simplex Tableau for Phase 1 (all row zero values should be zero for basic variables) in a text file named "out1ini.txt". Your output should look like the following:

Row	z	x1	x2	x3	x4	x5	x6	x7	x8	RHS	Basic Variables
0	1	-2	0	0	0	1	1	0	0	-20	z
1	0	1	1	1	1	0	0	0	0	40	x4
2	0	2	1	-1	0	-1	0	1	0	10	x7
3	0	0	-1	1	0	0	-1	0	1	10	x8

3. Use the Revised-Simplex Method to obtain a solution for Phase 1 and report it in a text file named "out1opt.txt".

4. Use the solution that you obtained for Phase 1 in obtaining the initial solution for Phase 2 and report it in a text file named "out2ini.txt".

5. Use the Revised-Simplex Method to obtain a solution for Phase 2 and report it in a text file named "out2opt.txt".

Remarks:
* This assignment depends on the previous assignments (i.e. Assignments 1 and 2). Thus, you can use the code that you submitted for the previous assignments in this assignment too.
* The assignment is very critical for your understanding. Therefore, we encourage you to do it perfectly.
* Do not code the Simplex Method!!! That's more difficult to do so. You need to code the Revised-Simplex Method.
* Note that, we will use different input files to test your code. Your code must also be able to identify special cases such as unbounded solution, infeasible solution, and multiple optima.
* Your code must be able to identify the initial basic variables from the input.
* Do not forget to format your output. The example output file is uploaded to the moodle page of the course.
* The example input file is also uploaded to the moodle page of the course.
* For the platform for your assignments, see the related announcement on the moodle page of the course.
* The Java project folder including your Java code must be uploaded to the moodle page of the course.
* Use only ".zip" format to archive your assignment files. Please do not use other compression methods such as ".rar".
* Example zip file names: Group 5 lacivert.zip; Group 12 oldies but goldies.zip; Group 7 EFI.zip
* Your zip file will include project folder and information.txt
* Project folder is the Eclipse project folder including your Java code.
* You need to write a text file as a part of your assignment. The ".txt" file should contain the following information:
  a. The number and name of the group.
  b. The names, surnames, student IDs, and the contribution percentages of the group members.