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 5
Due Date : 6 December 2016
Due Time : 23:59

In this assignment, you will write a JAVA code that obtains at least one of the local optimums of a function that has the form $f(x) = c_1 \cdot x^3 + c_2 \cdot x^2 + c_3 \cdot x + c_4$ for a given interval ($l \leq x \leq u$). Your program should read the details of the problem from a file named "input.txt". Three example input files are provided on the next page.

Remarks:
* Note that, we will use different input files to test your code.
* Do not forget to format your output. You need to state wheter you are reporting a local maximum or minimum and the value of the objective function.
* 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.
* Note that the last three assignments (5, 6, and 7) are easier than the previous ones. Thus, you can improve your assignment scores easily. Also, for this semester only, I will not use two of your worst assignment scores in obtaining your average assignment score value.
* Please note that, all of your efforts are highly appreciated! ☺

EXAMPLE PROBLEMS

Example 1:

```
input.txt
---------
Problem type (min or max)
max

f(x) coefficients (c1, c2, c3, c4)
3.2, 4.2, -5, -12.3

Subject to (l, u)
-1, 1

The acceptable maximum level of uncertainty (ε)
0.01

The method that will be employed
(1. Bisection, 2. Golden Section)
2
```

Example 2:

```
input.txt
---------
Problem type (min or max)
min

f(x) coefficients (c1, c2, c3, c4)
-2.112, 4.221, 21.24, -9.1

Subject to (l, u)
3.457, 121.96

The acceptable maximum level of uncertainty (ε)
0.00001

The method that will be employed
(1. Bisection, 2. Golden Section)
2
```

Example 3:

```
input.txt
---------
Problem type (min or max)
min

f(x) coefficients (c1, c2, c3, c4)
20, -12, 41.5, -100

Subject to (l, u)
-7.89542, 102

The acceptable maximum level of uncertainty (ε)
0.0001

The method that will be employed
(1. Bisection, 2. Golden Section)
1
```