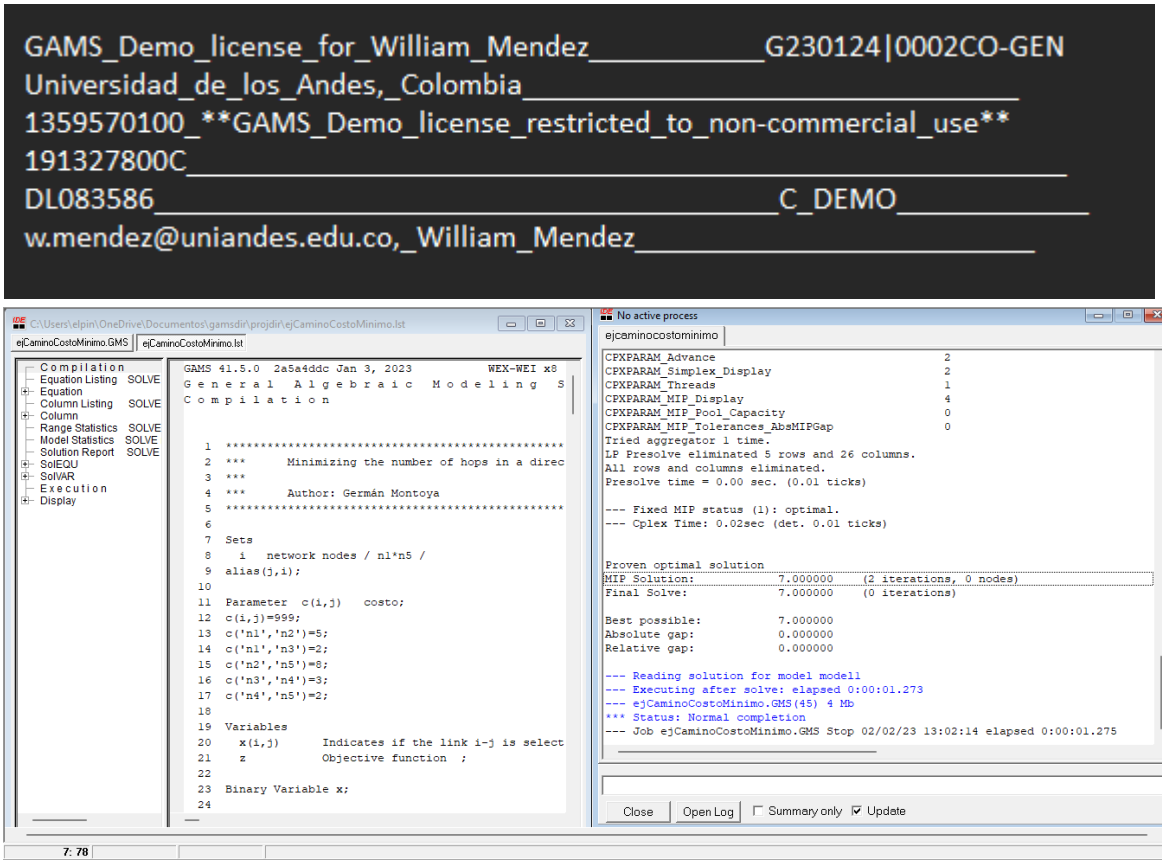
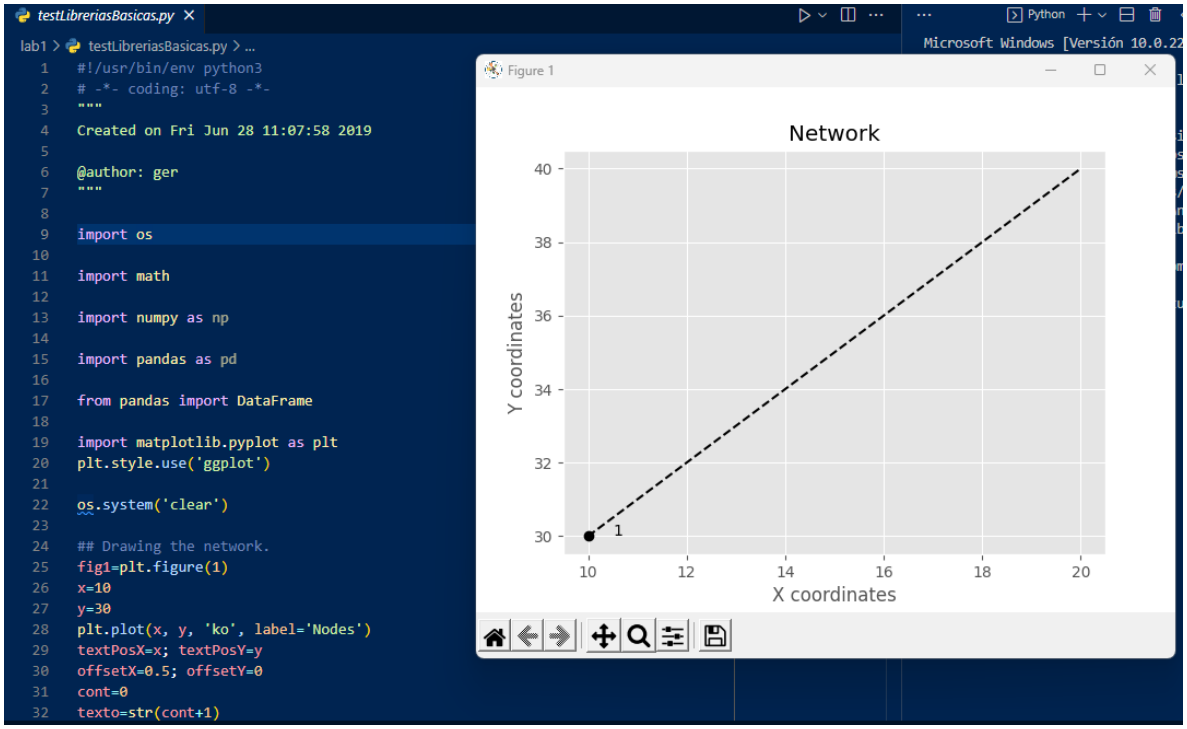
William Mendez – 202012662

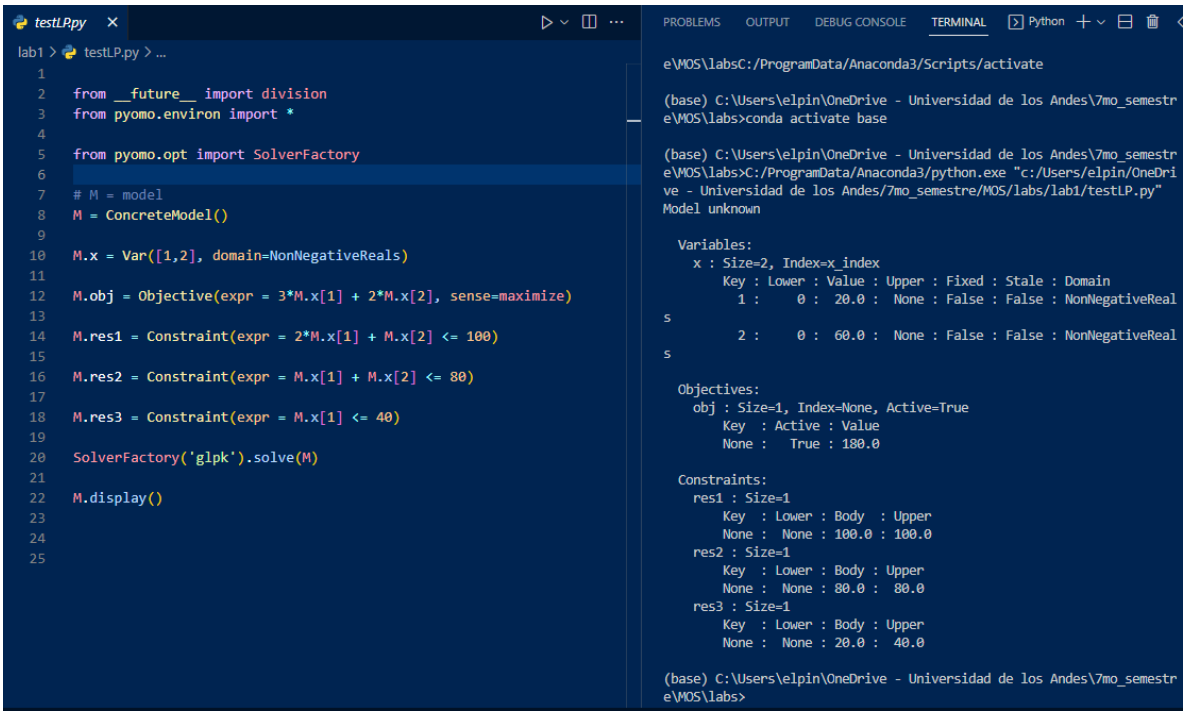
Lab 0

Ejercicio 1



Ejercicio 2:


testLibreriasBasicas.py
lab1 > testLibreriasBasicas.py > ...
#!/usr/bin/env python3
-*- coding: utf-8 -*-
"""
Created on Fri Jun 28 11:07:58 2019
@author: ger
"""
import os
import math
import numpy as np
import pandas as pd
from pandas import DataFrame
import matplotlib.pyplot as plt
plt.style.use('ggplot')
os.system('clear')
Drawing the network.
fig1=plt.figure(1)
x=10
y=30
plt.plot(x, y, 'ko', label='Nodes')
textPosX=x; textPosY=y
offsetX=0.5; offsetY=0
cont=0
texto=str(cont+1)
Figure 1
Network
Y coordinates
X coordinates
1
Python
Microsoft Windows [Versión 10.0.22


testLP.py
lab1 > testLP.py > ...
from __future__ import division
from pyomo.environ import *
from pyomo.opt import SolverFactory
# M = model
M = ConcreteModel()
M.x = Var([1,2], domain=NonNegativeReals)
M.obj = Objective(expr = 3*M.x[1] + 2*M.x[2], sense=maximize)
M.res1 = Constraint(expr = 2*M.x[1] + M.x[2] <= 100)
M.res2 = Constraint(expr = M.x[1] + M.x[2] <= 80)
M.res3 = Constraint(expr = M.x[1] <= 40)
SolverFactory('glpk').solve(M)
M.display()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
Python
e\MOS\labsC:/ProgramData/Anaconda3/Scripts/activate
(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>conda activate base
(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>C:/ProgramData/Anaconda3/python.exe "c:/Users/elpin/OneDri
ve - Universidad de los Andes/7mo_semestre/MOS/labs/lab1/testLP.py"
Model unknown
Variables:
x : Size=2, Index=x_index
Key : Lower : Value : Upper : Fixed : Stale : Domain
1 : 0 : 20.0 : None : False : False : NonNegativeReal
s
2 : 0 : 60.0 : None : False : False : NonNegativeReal
s
Objectives:
obj : Size=1, Index=None, Active=True
Key : Active : Value
None : True : 180.0
Constraints:
res1 : Size=1
Key : Lower : Body : Upper
None : None : 100.0 : 100.0
res2 : Size=1
Key : Lower : Body : Upper
None : None : 80.0 : 80.0
res3 : Size=1
Key : Lower : Body : Upper
None : None : 20.0 : 40.0
(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>

testMIP.py

```
lab1 > testMIP.py > ...
1
2  from __future__ import division
3  from pyomo.environ import *
4
5  from pyomo.opt import SolverFactory
6
7  import sys
8  import os
9
10 os.system("clear")
11
12 #sys.exit("Stopped")
13
14 Model = ConcreteModel()
15
16 # SETS & PARAMETERS**********************************************
17 numNodes=5
18
19 N=RangeSet(1, numNodes)
20
21 cost={(1,1):999, (1,2):5,   (1,3):2,   (1,4):999, (1,5):999,\
22       (2,1):999, (2,2):999, (2,3):999, (2,4):999, (2,5):8,\
23       (3,1):999, (3,2):999, (3,3):999, (3,4):3,   (3,5):999,\
24       (4,1):999, (4,2):999, (4,3):999, (4,4):999, (4,5):2,\
25       (5,1):999, (5,2):999, (5,3):999, (5,4):999, (5,5):999}
26
27
28 # VARIABLES*******************************************************
29 Model.x = Var(N,N, domain=Binary)
30
31 # OBJECTIVE FUNCTION**********************************************
```

```
PROBLEMS 2  OUTPUT  DEBUG CONSOLE  TERMINAL  Python

      (3, 1) :     0 :   0.0 :     1 : False : False : Binary
      (3, 2) :     0 :   0.0 :     1 : False : False : Binary
      (3, 3) :     0 :   0.0 :     1 : False : False : Binary
      (3, 4) :     0 :   1.0 :     1 : False : False : Binary
      (3, 5) :     0 :   0.0 :     1 : False : False : Binary
      (4, 1) :     0 :   0.0 :     1 : False : False : Binary
      (4, 2) :     0 :   0.0 :     1 : False : False : Binary
      (4, 3) :     0 :   0.0 :     1 : False : False : Binary
      (4, 4) :     0 :   0.0 :     1 : False : False : Binary
      (4, 5) :     0 :   1.0 :     1 : False : False : Binary
      (5, 1) :     0 :   0.0 :     1 : False : False : Binary
      (5, 2) :     0 :   0.0 :     1 : False : False : Binary
      (5, 3) :     0 :   0.0 :     1 : False : False : Binary
      (5, 4) :     0 :   0.0 :     1 : False : False : Binary
      (5, 5) :     0 :   0.0 :     1 : False : False : Binary

  Objectives:
    obj : Size=1, Index=None, Active=True
        Key  : Active : Value
        None :   True :   7.0

  Constraints:
    source : Size=1
        Key : Lower : Body : Upper
          1 :   1.0 :  1.0 :   1.0
    destination : Size=1
        Key : Lower : Body : Upper
          5 :   1.0 :  1.0 :   1.0
    intermediate : Size=3
        Key : Lower : Body : Upper
          2 :   0.0 :  0.0 :   0.0
          3 :   0.0 :  0.0 :   0.0
          4 :   0.0 :  0.0 :   0.0

(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>
```

testNLP.py

```
lab1 > testNLP.py > ...
1  # -*- coding: utf-8 -*-
2
3  from pyomo.environ import *
4  from pyomo.opt import SolverFactory
5
6  Model = ConcreteModel()
7
8  A = [1,2,3,4]
9
10 xx = {1:2 , 2:6, 3:2, 4:6}
11 yy = {1:1, 2:1, 3:5, 4:5}
12 demanda = {1:100, 2:200, 3:300, 4:400}
13
14 #Model.x = Var(domain=PositiveReals, initialize = 2)
15 #Model.y = Var(domain=PositiveReals, initialize = 1)
16
17 Model.x = Var(domain=PositiveReals)
18 Model.y = Var(domain=PositiveReals)
19
20
21 Model.g = Objective(expr= sum((demanda[i]*((xx[i]-Model.x)**2+(yy[i]-M
22
23 SolverFactory('ipopt').solve(Model)
24
25 Model.display()
26
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  Python

Microsoft Windows [Versión 10.0.22621.1105]
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C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestre\MOS\l
abs>C:/ProgramData/Anaconda3/Scripts/activate

(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>conda activate base

(base) C:\Users\elpin\OneDrive - Universidad de los Andes\7mo_semestr
e\MOS\labs>C:/ProgramData/Anaconda3/python.exe "c:/Users/elpin/OneDri
ve - Universidad de los Andes/7mo_semestre/MOS/labs/lab1/testNLP.py"
Model unknown

  Variables:
    x : Size=1, Index=None
        Key  : Lower : Value              : Upper : Fixed : Stale : Do
main
        None :     0 : 5.332625897989843 :  None : False : False : Po
sitiveReals
    y : Size=1, Index=None
        Key  : Lower : Value              : Upper : Fixed : Stale : D
omain
        None :     0 : 4.5369430173199055 :  None : False : False : P
ositiveReals

  Objectives:
    g : Size=1, Index=None, Active=True
        Key  : Active : Value
        None :   True : 2540.1450233862192

  Constraints:
    None
```