In [1]:
```python
import sys, os
import docplex.mp
from docplex.mp.model import Model

path = 'D:\SISTEMAS\SEMESTRE-2020-2\Pesquisa Operacional\Lista1'
os.chdir(path)
```

In [2]:
```python
modelo = Model(name='Lista_1_Questao_4')
```

In [3]:
```python
X1 = modelo.continuous_var(name='X1')
X2 = modelo.continuous_var(name='X2')
```

In [4]:
```python
# Função Objetiva
modelo.maximize(0.5*X1 + 2*X2)
```

In [6]:
```python
# Restrições
modelo.add_constraint(X1 >= 0)
modelo.add_constraint(X2 >= 0)
modelo.add_constraint(X1 <= 20)
modelo.add_constraint(X2 <= 45)
modelo.add_constraint(2*X1 + X2 <= 50)
```

Out[6]: docplex.mp.LinearConstraint[](2X1+X2,LE,50)

In [7]:
```python
modelo.print_information()
```

```
Model: Lista_1_Questao_4
 - number of variables: 2
   - binary=0, integer=0, continuous=2
 - number of constraints: 5
   - linear=5
 - parameters: defaults
 - objective: maximize
 - problem type is: LP
```

In [8]:
```python
otimizacao = modelo.solve()
modelo.print_solution()
```

```
objective: 91.250
  X1=2.500
  X2=45.000
```

In [14]:
```python
modelo.parameters.lpmethod = 4
modelo.solve(url=None, key=None, log_output=True)
```

```
Version identifier: 20.1.0.0 | 2020-11-11 | 9bedb6d68
CPXPARAM_Read_DataCheck                          1
CPXPARAM_LPMethod                                4
Tried aggregator 1 time.
LP Presolve eliminated 4 rows and 0 columns.
Reduced LP has 1 rows, 2 columns, and 2 nonzeros.
Presolve time = 0.00 sec. (0.00 ticks)
Parallel mode: using up to 4 threads for barrier.
Number of nonzeros in lower triangle of A*A' = 0
Using Approximate Minimum Degree ordering
Total time for automatic ordering = 0.00 sec. (0.00 ticks)
```

```
        Summary statistics for Cholesky factor:
          Threads                  = 4
          Rows in Factor           = 1
          Integer space required   = 1
          Total non-zeros in factor = 1
          Total FP ops to factor   = 1
         Itn      Primal Obj          Dual Obj    Prim Inf Upper Inf  Dual Inf Inf Ratio
           0    1.2750000e+02    2.9500000e+02    1.54e+02  1.39e+02  3.00e+00  1.00e+00
           1    9.3939167e+01    9.4801275e+01    1.40e+01  1.26e+01  2.73e-01  6.89e-02
           2    9.2060072e+01    9.2396839e+01    1.23e+00  1.11e+00  8.15e-03  1.51e+03
           3    9.1202725e+01    9.1252913e+01    2.69e-03  2.43e-03  3.59e-04  1.65e+03
           4    9.1249997e+01    9.1250003e+01    3.63e-07  3.28e-07  3.58e-08  1.13e+06
           5    9.1250000e+01    9.1250000e+01    3.70e-11  3.34e-11  3.58e-12  8.49e+09
           6    9.1250000e+01    9.1250000e+01    0.00e+00  7.25e-15  4.23e-16  8.42e+13
        Barrier time = 0.05 sec. (0.01 ticks)
        Parallel mode: deterministic, using up to 4 threads for concurrent optimization:
         * Starting dual Simplex on 1 thread...
         * Starting primal Simplex on 1 thread...

        Dual crossover.
          Dual:  Fixed no variables.
          Primal:  Fixed no variables.

        Dual simplex solved model.

        Total crossover time = 0.02 sec. (0.00 ticks)

        Total time on 4 threads = 0.06 sec. (0.01 ticks)
```

Out[14]: docplex.mp.solution.SolveSolution(obj=91.25,values={X1:2.5,X2:45})

In [11]:
```
%notebook "D:\SISTEMAS\SEMESTRE-2020-2\Pesquisa Operacional\Lista1\Questao_4.ipynb"
```