!pip install -q amplpy

from amplpy import AMPL, tools

ampl = tools.ampl\_notebook(

modules=["cplex"],

license\_uuid="906b5cb9-52ea-4345-9735-e9d2687b1b40")

%%writefile telephone.mod

param m;

set I={1..m};

set J = {1..m};

param capacity{I,J};

var x{I,J} >=0;

maximize Z: x[m,1];

s.t. Tranship {j in J}: sum{i in I} x[i,j] - sum{i in I} x[j,i] =0;

s.t. Capacity{i in I, j in J}: x[i,j] <= capacity[i,j];

%%writefile telephone.dat

param capacity: 1 2 3 4 5 6 :=

1 0 500 400 0 0 0

2 0 0 0 300 250 0

3 0 0 0 200 150 0

4 0 0 0 0 0 400

5 0 0 0 0 0 350

6 999 0 0 0 0 0;

param m:=6;

%%ampl\_eval

reset;

# Model File

model telephone.mod;

data telephone.dat;

# Calling Optimization Engine and Optimizing

option solver cplex;

solve;

# Display Results

display Z,x;

%%writefile rental.mod

set S = {"B1", "B2", "B3"};

set D = {"CityA", "CityB", "CityC", "CityD"};

param C{S,D};

param Supply{S};

param Demand{D};

param PC{S};

var x{S,D} >=0;

minimize Z: sum{i in S, j in D} C[i,j]\*x[i,j] + sum{i in S, j in D} PC[i]\*x[i,j];

s.t. supply{i in S}: sum{j in D} x[i,j] = Supply[i];

s.t. demands{j in D}: sum{i in S} x[i,j] <= Demand[j];

%%writefile rental.dat

param C: CityA CityB CityC CityD:=

B1 7 11 3 2

B2 1 6 0 1

B3 9 15 8 5;

param Supply:=

B1 6

B2 1

B3 10;

param Demand :=

CityA 2

CityB 3

CityC 5

CityD 8;

param PC :=

B1 00

B2 00

B3 00;

%%ampl\_eval

reset;

# Model File

model rental.mod;

data rental.dat;

# Calling Optimization Engine and Optimizing

option solver cplex;

solve;

# Display Results

display Z,x;

%%writefile colonel.mod

set Positions;

set Personnel;

param YearsOfExperience{Personnel, Positions} >= 0;

var x{Personnel, Positions} binary;

maximize Z: sum {i in Personnel, j in Positions} YearsOfExperience[i, j] \* x[i, j];

subject to OneAssignmentPerPerson {i in Personnel}:

sum {j in Positions} x[i, j] = 1;

subject to OneAssignmentPerPosition {j in Positions}:

sum {i in Personnel} x[i, j] = 1;

%%writefile colonel.dat

set Positions := Adjutant Intelligence Operations Supply Training;

set Personnel := MajorMuddle MajorWhiteside CaptainKid CaptainKlutch LtWhiz;

param YearsOfExperience:

Adjutant Intelligence Operations Supply Training :=

MajorMuddle 3 5 6 2 2

MajorWhiteside 2 3 5 3 2

CaptainKid 3 0 4 2 2

CaptainKlutch 3 0 3 2 2

LtWhiz 0 3 0 1 0;

%%ampl\_eval

reset;

# Model File

model colonel.mod;

data colonel.dat;

# Calling Optimization Engine and Optimizing

option solver cplex;

solve;

# Display Results

display Z,x;