In [1]:

```
import numpy as np
from gurobipy import *
```

In [2]:

```
d = [220,155,105,90,170,210,290]
T, K, h = 7, 1000, 1.2
M = 10e5
```

In [3]:

```
WW = Model()

q = WW.addVars(T, lb=np.zeros(7), vtype=GRB.CONTINUOUS, name="order_quantity")
x = WW.addVars(T, lb=np.zeros(7), vtype=GRB.CONTINUOUS, name="inventory_level")
y = WW.addVars(T, vtype=GRB.BINARY, name="if_order")

WW.setObjective(quicksum(K*y[t]+h*x[t] for t in range(T)), GRB.MINIMIZE)

c1 = WW.addConstrs(q[t] <= M*y[t] for t in range(T))
c2 = WW.addConstrs(x[t] == x[t-1]+ q[t] - d[t] for t in range(1,T))
c3 = WW.addConstr(x[0] == q[0] - d[0])
```

```
Restricted license - for non-production use only - expires 2022-01-13
```

In [4]:

```
WW.optimize()
WW.printAttr('X')
```

```
Gurobi Optimizer version 9.1.2 build v9.1.2rc0 (win64)
Thread count: 4 physical cores, 8 logical processors, using up to 8 threads
Optimize a model with 14 rows, 21 columns and 34 nonzeros
Model fingerprint: 0x75f00a53
Variable types: 14 continuous, 7 integer (7 binary)
Coefficient statistics:
  Matrix range     [1e+00, 1e+06]
  Objective range  [1e+00, 1e+03]
  Bounds range     [1e+00, 1e+00]
  RHS range        [9e+01, 3e+02]
Presolve removed 3 rows and 4 columns
Presolve time: 0.01s
Presolved: 11 rows, 17 columns, 27 nonzeros
Variable types: 11 continuous, 6 integer (6 binary)

Root relaxation: objective 1.949020e+03, 7 iterations, 0.00 seconds

    Nodes    |    Current Node    |     Objective Bounds      |     Work
 Expl Unexpl |  Obj  Depth IntInf | Incumbent    BestBd   Gap | It/Node Time

     0     0 1949.02000    0    4          - 1949.02000      -     -    0s
H    0     0                       5948.0000000 1949.02000  67.2%     -    0s
H    0     0                       3926.0000000 1949.02000  50.4%     -    0s
     0     0 3204.90092    0    3 3926.00000 3204.90092  18.4%     -    0s
H    0     0                       3710.0000000 3204.90092  13.6%     -    0s

Cutting planes:
  Implied bound: 7
  MIR: 2
  Flow cover: 4

Explored 1 nodes (15 simplex iterations) in 0.06 seconds
Thread count was 8 (of 8 available processors)

Solution count 3: 3710 3926 5948

Optimal solution found (tolerance 1.00e-04)
Best objective 3.709999999983e+03, best bound 3.709999999983e+03, gap 0.0000%

    Variable            X
-------------------------
order_quantity[0]          570
order_quantity[4]          670
inventory_level[0]          350
inventory_level[1]          195
inventory_level[2]           90
inventory_level[4]          500
inventory_level[5]          290
 if_order[0]            1
 if_order[4]            1
```