

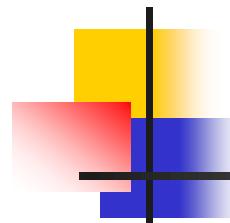
Mathematical Programming: Modelling and Applications

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AMPL model – Carelland

```
set PRODUCTS;

param p {PRODUCTS} >= 0;
param HMan >=0;
param Max {PRODUCTS} >=0;
param m {PRODUCTS} >= 0;
param h {PRODUCTS} >= 0;
param a {PRODUCTS, PRODUCTS} >=0;

var x { PRODUCTS } >= 0;
var y { PRODUCTS } >= 0;

maximize profit: sum {i in PRODUCTS} (p[i]*y[i] - m[i]*x[i]);

subject to limit{i in PRODUCTS}: x[i] <= Max[i];

subject to work: sum {i in PRODUCTS} h[i]*x[i]<= HMan;

subject to balance{i in PRODUCTS} :
y[i] + sum{j in PRODUCTS}(a[j,i]*x[j]) = x[i];
```

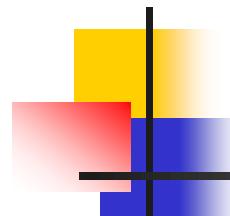
AMPL dat – Carelland

```
set PRODUCTS := steel plastics electronics engines;

param HMan:= 830000;

param :          p          m          h          Max      :=
  steel        500        250        0.5    2000000
  plastics     1200       300         2        60000
  electronics   300        50        0.5    650000
  engines      1500       300         1    2000000 ;
;

param a:      steel    plastics    electronics    engines  :=
steel        0        0.01        0        0.02
plastics    0.2        0        0.05        0.03
electronics  0.01      0.05        0        0.01
engines      0.8       0.11       0.15        0
;
```



Solution – Carelland

```
ILOG AMPL 10.100, licensed to "ecolepolytechnique-palaiseau".  
AMPL Version 20060626 (Linux 2.6.9-5.ELsmp)  
ILOG CPLEX 10.100, licensed to "ecolepolytechnique-palaiseau",  
options: e m b q use=8  
CPLEX 10.1.0: optimal solution; objective 435431250  
9 dual simplex iterations (6 in phase I)
```

```
x [*] :=  
electronics    74375  
    engines     475833  
plastics      60000  
    steel       393958
```

;

```
y [*] :=  
electronics      0  
    engines      465410  
plastics        0  
    steel       547.917
```

;