Exercise Solution

Adding a Budget Constraint to the Furniture-Making Problem

Add a budget constraint to the previous demonstration program. Specify that the total cost of all the resources that are used in the furniture-making problem is at most $10,000. Expand only this new constraint. Does the optimal objective value change?

```
proc optmodel;
   /* declare variables */
   var Desks >= 0, Chairs >= 0, Bookcases >= 0, Bedframes >= 0;

   impvar Hrs = 2*Desks + Chairs + 3*Bookcases + 2*Bedframes;
   impvar Lbs = Desks + Chairs + Bookcases + Bedframes;
   impvar Ft3 = 3*Desks + 3*Chairs + 4*Bookcases + 4*Bedframes;

   /* declare constraints */
```

```
   con Labor: Hrs <= 225, Metal: Lbs <= 117, Wood: Ft3 <= 420,
      Budget:  14*Hrs + 20*Lbs + 11*Ft3 <= 10000 ;

   /* declare objective */
   max NetProfit =
      94*Desks + 79*Chairs + 125*Bookcases + 109*Bedframes
      - 14*Hrs - 20*Lbs - 11*Ft3;

   expand Budget;

   solve;

   print Desks Chairs Bookcases Bedframes;

   print Hrs Lbs Ft3;

quit;
```