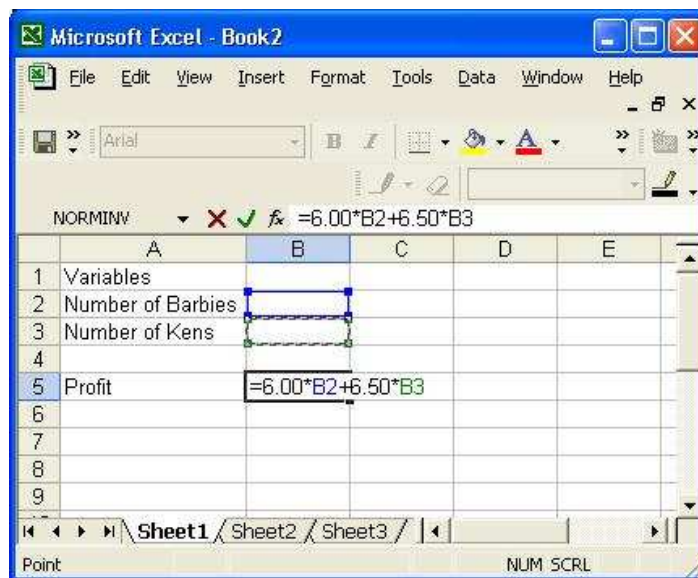


Ken and Barbie Do Linear Programming – with Excel

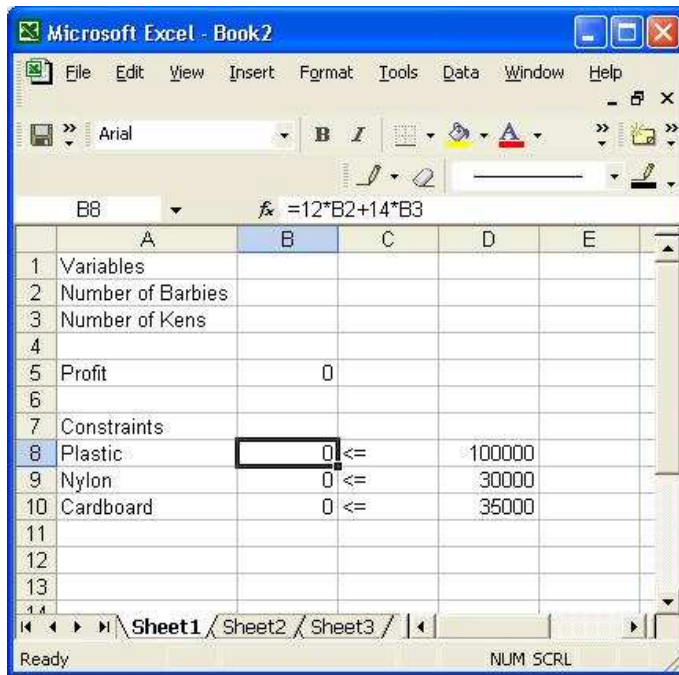
Please note that this material has been BLATANTLY copied from Dr. Holly Hirst of Appalachian State University (<http://www.mathsci.appstate.edu/~hph/5950/lp.pdf>).

The problem at hand: A doll factory wants to plan how many Barbie and Ken dolls to manufacture in a week to maximize company profit. A Barbie doll earns \$6.00 in profit and is made of 12 ounces of plastic for her body and 5 ounces of nylon for her hair. A Ken doll earns \$6.50 and is made of 14 ounces of plastic. Each doll goes in a box made of 4 ounces of cardboard. The company can only get one weekly shipment of raw materials, including 100,000 ounces of plastic, 30,000 ounces of nylon and 34,000 ounces of cardboard.

1. For most entries in Excel, it is good practice to put an identifying label next to it.
2. In one column enter the names of your variables (one name per row).
3. Below that enter a label of “Profit” and in the cell to the right of that enter the formula for the profit, using the cells directly to the right of the variable labels in place of the variable name. Also remember that all formulas are to start with =. For example, if your variables are in columns A (for names) and B (for values), rows 2 (Barbie) and 3 (Ken), you would enter in cell B5= $6.00*B2 + 6.50*B3$



4. Continue below your variables and objective function (profit) with your constraints. I like to have a label for each constraint in column A, the expression for the left hand side of the constraint in the next column B, the inequality or equality sign in column C and the right hand side of the constraint in column D.



5. Now you're almost ready! Go to the Tools menu and see if you have the Solver listed. If so, select this, otherwise select Add-Ins and select Solver.



- In the Set Target cell, put the location of the objective function (here profit, in B5), and hit enter.
- Select the radial button for the correct option (Max or Min) for your problem.
- For the By Changing cell, click in this space then go back to your spreadsheet and select the cells where your variables will be stored (to the right of their names).
- Lastly you want to Add constraints. For the cell reference enter the location of the left hand side of a constraint. Select the appropriate equality or inequality, then in the Constraint box put the location of the right hand side of the constraint (the constant). Continue to do this by hitting Add until all constraints have been defined.
- When you're ready, hit Solve. You will be given the option to keep solution values or return to original values, as well as to generate reports. These reports could be helpful, and they'll be put in separate worksheets.