Homework 9
Due 4/12

You own a manufacturing plant that sells furniture products to different stores. The sale price to all the stores as well as the cost of making an item is listed in the table below.

	Wood	Assembly	Finishing	Sale Price
Desk	10	5	4	35
Chair	3	3	2	20
Table	6	3	2	25

You have on hand 50 wood to start with, and are able to purchase up to 100 more at a cost of $3 per board. There are 60 available assembly hours at a cost of $1 per hour, and 40 available finishing hours at a cost of $2 per hour. You can also have your workers work overtime at double the cost. The total number of overtime hours worked at the plant cannot exceed 40.

Currently only 2 stores have any demand for your products that can be found in the table below.

	Desk	Chair	Table
Buckhead	4	5	3
Sandy Springs	3	4	6

It costs $3 to ship each unit to Buckhead and $2 to ship to Sandy Springs.

Using GAMS or Excel or some other solver, find the optimal linear solution to this problem. What constraint is most affecting your solution? If you were using the Branch and Bound method to solve, what would your branches be? Add the integer constraints to your model that you put into the solver and find the optimal integer solution.

Additional Constraints you may find in problems (do not need to do these, just so you know what types of things you may find):

1. Price you sell at depends on the store.
2. Quantity discount. If you order more than 50 lumber, each one only costs $2 instead of $3.

3. To send furniture to a store you need to rent a truck at a cost of $15. This truck can only serve one store, so if you send to both you would need 2 trucks.

4. One truck can serve two stores if you rent it for a longer period of time that costs $20. There is also an extra shipping cost of $2 for items going to the second store visited by the truck.

5. Each truck can only hold up to 10 items.

6. More stores have demand. Shipping costs added for trucks going between stores.

7. Shipping cost varies by product type.

8. Multiple sizes of truck available to rent. The more it can hold the more fixed cost to rent.