

Name:

## Model-based Decision Support

Exam 5 (homework)

April 25, 2013

**Production Planning:** The Butterfield Company makes a variety of hunting knives. Each knife is processed on four machines. Available machine capacities (in hours) are 1,500 for machine 1, 1,400 for machine 2, 1,600 for machine 3, and 1,500 for machine 4. Following are the processing times required:

Knife	Processing time (hours)			
	Machine 1	Machine 2	Machine 3	Machine 4
HuntersBlade	0.05	0.15	0.10	0.05
HuntsmanShiv	0.15	0.05	0.10	0.05
BuffaloSkinning	0.20	0.10	0.05	0.20
HollowGroundKnife	0.15	0.10	0.10	0.10
CarvedKnife	0.05	0.10	0.10	0.05

Each product contains a different amount of two basic raw materials. Raw material 1 costs 50 Cent per ounce, and raw material 2 costs 150 Cent per ounce. There are 95,000 ounces of raw materials 1 and 100,000 ounces of raw material 2 available.

Knife	Requirements (oz/unit)		Selling Prize (\$/unit)
	Raw Material 1	Raw Material 2	
HuntersBlade	2	4	20.00
HuntsmanShiv	8	6	24.50
BuffaloSkinning	3	1	14.00
HollowGroundKnife	5	2	18.50
CarvedKnife	10	7	32.00

About a century ago the Butterfield Company has started their business producing knife BuffaloSkinning (the traditional buffalo skinning knife). To continue company's tradition at least one out of 60 produced knives should be a buffalo skinning knife.

If the objective is to maximize profit, specify the objective function and constraints for the problem (assume that labor costs are negligible). Use GAMS to model and solve this decision problem. Take care to use suitable index sets and use summation and indexing modelling style.

Would you be so kind to copy your GAMS Code of the model and a verbal description of the optimal production plan to a sheet of paper and submit it to me at class on April 25.