

Name:

Model-based Decision Support

Exam 3 (home assignment)

till April 14, 2016

The purpose of this home assignment is to get familiar with MS Excel solver. There are many web sites explaining MS Excel solver, one e.g. is

<http://www.meiss.com/download/Spreadsheet-Optimization-Solver.pdf>

Use the last three digits of your student enrolment number. The last but two digits defines X, the last but one digit defines Y and the final digit defines Z. If a digit is zero then use 10 instead. (Example: enrolment number 1699502 results in X=5, Y=10, and Z = 2).

Optimal Production Mix: 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	$X/100$	$(11-X)/100$	$Y/100$	$Z/100$
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 Price (\$/unit)
	Raw Material 1	Raw Material 2	
HuntersBlade	2	4	30.00
HuntsmanShiv	8	6	24.50
BuffaloSkinning	3	1	14.00
HollowGroundKnife	5	2	18.50
CarvedKnife	10	7	32.00

If the objective is to maximize profit, specify the objective function and constraints for the problem (assume that labor costs are negligible). Use MS Excel to model and solve the resulting mathematical program (MIP) by MS Excel Solver.

Additionally, would you be so kind to **describe verbally** the optimal production mix somewhere on your MS Excel working sheet - the sheet where you have provided the input for optimisation (above parameter tables, cells for decision variables, constraints, etc). Print this working sheet and submit it to me at class on April 14. (I expect two pages at most – please do not submit any reports like Answer Report or Sensitivity Report).