

Instructions

- Complete solutions will include well labeled graphs, good explanation of the process used to implement any algorithms, and complete sentences for any discussion of the answer. Where appropriate, you can draw circuits or number edges directly on the graphs provided.
- You may talk about the assignment with other students in the class, but the work you submit must be your own independent creation. If you have questions talk with me before or after class or during office hours.

Questions

- (20 marks) The table below shows different species of fish which, if placed in the same tank, will attack one another—an X means *ATTACK!*

	A	B	C	D	E	F	G	H	I	J
A		X		X		X	X		X	X
B	X		X		X	X		X		
C		X		X			X		X	X
D	X		X		X		X	X		
E		X		X		X	X	X		
F	X	X			X		X			X
G	X		X	X	X	X				X
H		X		X	X				X	X
I	X		X					X		
J	X		X			X	X	X		

- Draw a graph which represents the conflict information in this table.
- What is the minimum number of tanks in which fish can be displayed so no fish in a particular tank will attack each other? Which fish go in which tank? Can you put at least two different species of fish in each tank?

You should answer Questions 2 and 3 by

- creating a mixture chart,
 - using the mixture chart to write the profit formula and constraint inequalities,
 - determining the feasible region by drawing a sketch, and
 - determining the numbers of desk lamps and floor lamps that should be made to maximize profits.
- (20 marks) Wild Things raises pheasants and partridges to restock the woodlands and has room to raise 100 birds during the season. The cost of raising one bird is \$10 per pheasant and \$15 per partridge. The Wildlife Foundation pays Wild Things for the birds; the latter clears a profit of \$7 per pheasant and \$8 per partridge. Wild Things has \$1200 available to cover costs. How many of each type of bird should they raise to maximize profit? How, if at all, do the maximum profit and optimal number of birds change if Wild Things is required to raise at least 20 pheasants and 10 partridges?
To see Pheasants Forever's take on restocking visit: <http://www.pheasantsforever.org/page/1/stocking.jsp> and you can read about restocking pheasants in Maine here: http://www.maine.gov/ifw/hunting_trapping/hunting/pheasant2012.htm.
 - (20 marks) Lights Afire makes desk lamps and floor lamps, on which the profits are \$2.65 and \$2.57, respectively. The company has 1200 hours of labour and \$4200 for materials each week. A desk lamp takes 0.8 hours of labour and \$4.00 for materials; a floor lamp takes 1.0 hours of labour and \$3.00 for materials. What production policy maximizes profit?