BUS 735: Business Decision Making and Research
Instructor: Dr. James Murray
Fall 2011: Take Home Exam 2
Due on Friday, December 16, 2011

1. The dataset `salesrev.xls` contains the monthly sales revenue (in thousands of dollars) for 200 sales people for a large national corporation. The sales people focus on one of two categories of products, which are labeled as Product 1 and Product 2 in the dataset. Also included in the dataset is the years of experience each sales person has. The company introduces a new sales person training program. The training program involves three full day training sessions, one training session is offered each month for three months. The 200 sales people participate in the training program, and the company gathers data on the monthly sales before the training (`Sales0`), after the first training session (`Sales1`), after the second training session (`Sales2`), and after the third and final training session (`Sales3`). For the following questions, test the appropriate hypothesis and report your conclusion.

   (a) Taking into account the effect the product type and years experience has on sales revenue, is there evidence that the training program positive influences sales?

   (b) Do all of the training sessions lead to an increase in sales revenue? If not, which training sessions do you find evidence that are effective, and which training sessions do you fail to find evidence that they are effective?

   (c) Is there a difference in sales revenue between sales people who sell Product 1 versus Product 2?

   (d) Are the training sessions more effective for sales of either product 1 or product 2?

2. Sue sells six selections of sea shells on the sea shore. Her selections include large-cone shells, medium-cone shells, small-cone shells, large-flat shells, medium-flat shells, and small-flat shells. The time it takes to collect and inventory each type of shell and the profits for each type are as follows:

Shell-Type	Time (minutes)	Profit
Large-cone	1.5	\$1.50
Medium-cone	2	\$0.75
Small-cone	0.5	\$0.50
Large-flat	1	\$0.75
Medium-flat	0.5	\$0.50
Small-flat	0.5	\$0.25

   Sue hires shell collectors and has 4 labor hours available. Sue's sea shells sales slump with a small selection of shells so she must have an equal number of cone shaped shells

and flat shaped shells, and each type of shell must number at least 10% of the total selection. Also, broken sea shells don't get sold, so you cannot sell a fraction of a shell.

(a) What is the objective function?

(b) List all constraints.

(c) How many of each type of shell should she keep in inventory to maximize profits? What is her total profit?

(d) How much would sue be willing to pay for one additional *hour* of labor?

(e) Are any of the constraints non-binding? Which ones?

3. You have just been hired as head football coach at State Tech. Your football coaching staff focuses its new player recruiting efforts on high schools in six states: Florida, Georgia, Virginia, Pennsylvania, New York, and New Jersey. You have seven assistant coaches who handle the recruiting, so you may assign two coaches to one of the states and one coach to every other state. Every assistant coach has recruited in every state at sometime in the past. The coaches success rate (percentage of target high-school recruits that ended up deciding on Tech State) are given in the table below. Who should you assign to each state to maximize the expected success rate?

	State					
Coach	Georgia	Florida	Virginia	Pennsylvania	New York	New Jersey
Allen	62	56	65	71	55	63
Bush	65	70	63	81	75	72
Crumb	43	53	62	55	64	50
Doyle	58	66	70	67	71	49
Evans	77	73	69	80	80	74
Fouch	68	73	72	80	78	57
Goins	72	60	74	72	62	61