KEY - Quiz 2 [10 pts]. September 16, 2008 **Math 111 Sec FC01**

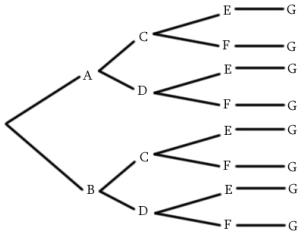
For questions 1 and 2: At a certain restaurant, the limited prix fixe menu allows the customer to choose from the options for each of the four courses. The menu is below:

Soup:	Asparagus puree
	Bisque of lobster
Salad:	Cæsar
	Date and nut
Entree:	Escargot on petit filet mignon
	Fried chicken
Dessert:	German chocolate cake

1. How many different possible meals could the customer select for his meal? [3 points]

   Two choices for each of the first three courses and one choice for the last, so $2 \cdot 2 \cdot 2 \cdot 1 = 8$.

2. Draw a tree diagram to represent each of the possible meals. [3 points]



3. A standard New York state license plate is designated by three letters and four numerical digits. How many license plates are possible using this method? [2 points]

   26 possible letters for each of the first three spots, 10 digits for each of the next four. By the generalized multiplication principle, there are $26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 26^3 \cdot 10^4$ possibilities.

4. Suppose that the letter O is not allowed to be used in the license plates. How many are possible? [2 points]

   Same as before, only now we are just allowed 25 letters, so $25^3 \cdot 10^4$.

Bonus. Suppose the letter O is allowed, but no license plate is permitted to have the same number repeated four times in a row. How many license plates are possible now? (Hint: First, figure out how many license plates there are with the same digit repeating four times.) [2 points]

The number of license plates with the same digit repeated four times is $26 \cdot 26 \cdot 26 \cdot 10 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 26^3 \cdot 10$. So the number of license plates *without* the same digit repeating is $26^3 \cdot 10^4 - 26^3 \cdot 10$.