Study Exam Problems for "Sistemas de Negocios" 2015/2016

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<u>Problem 1:</u> Python programming. (Class 2 and Lab 1)

In Lab 1 (prob 1 and prob 2) you explored python, data structures, random number and classes. Answer the following questions and carry out operations:

Part 1:

a. Count the number of items in a list with the result in a dictionary. List example:
   l = ['a', 'b', 'f', 'f', 'b', 'b'],   Should give something like: c = {'a': 1, 'b': 3, 'f': 2}

b. Write a short python script to read the contents of a file, consisting of two columns of numbers. Store each line of numbers as pairs of integers in a list. Finally convert this list to a multi-dimensional numpy array.

<u>Problem 2:</u> Python programming. (Class 2 and Lab 1 related to python)

a. Within a python script (that can be run at the command line) create an class object *Employee*, which has three attributes in its constructor (*first_name, last_name, staff_number*), and one member function "*GetEmployee*" member function that returns a string concatenating *first_name, last_name,* and "*staff_number*".

b. Using your two objects,   Create a list, E, consisting of 2 Employees where the *staff_number* is generated randomly.

<u>Problem 3:</u> (class 2, 3 and 4; Lab 2, 3 and 4 related to Django install/programming)

You want to create a Django application "Product_Catalog" within a Django project ECommerce.

a. Write the commands needed to create a Django "project" within a virtualenv.

b. Write the command to create a Django "application".

c. Write the data model "Products" within the Django application "Product_Catalog" (specify which file you must modify, and include the following attributes: *product_name, product_description, purchase_price, sales_price*)

<u>Problem 4:</u> (from Class 6, Lab 4&5 related to Postgresql commands)

Answer the following questions with respect to Postgresql:

a. What command would you use at the command line to create a new database? Given the file, "ins-data.sql", consisting of a table and 1000 lines of SQL insert lines for this table,   how would you insert these lines into postgresql using the command line?

b. Imagine that you connect to the data model "Products" from problem 3c. Write a python script that contains a function using psycopg2 to "insert" a new element and another function to "select" a product based upon the a string that represents the product_description.

Problem 5: (from Class 4,5, Lab 4 related to Postgres programming)
Answer the following related to Programming with SQL:

Imagine that you have the two tables:

```
CREATE TABLE users (id int PRIMARY KEY, name varchar(256));
CREATE TABLE address (id_user int, address text);
INSERT INTO users VALUES (1, David');
```

and the address data of this user is given by two inserts:

```
INSERT INTO address VALUES (1, 'Works during winter in Ourense');
INSERT INTO address VALUES (1, 'Works during summers in Boston');
```

Write a trigger (and appropriate function) that will delete all associated addresses of a user if this user is deleted.

Problem 6.   (From class 13, Lab12 NoSQL and MongoDB)
In lab, we studied an e-Commerce product catalog for an album product.   Imagine that you have a mongoDB consisting of entries similar to the following:

```
{
    type: "Audio Album",
    title: "A Love Supreme",
    description: "by John Coltrane",
    details: {
        artist: "John Coltrane",
        genre: [ "Jazz" ]
    },
}
```

a. Write a python interface with pyMongDB that will find the CDs by artist and genre.

Problem 7: Python programming for BI (Class 9-11 and Lab 9, 10 related to BI)

a. Write a short python script using sklearn to compare the prediction of a Random Forest classifier to an SVM classifier in the context of supervised learning. Imagine that the feature vector (consisting of two float values) and its class label (consisting of one number {0,1}) (For example: =[[0,0], [2,2], [3,1], [4,5]], Y=[0,0,1,1].

b. How could you implement a 10-fold Cross validation.

Problem 8: Python programming for BI (Class 11 and Lab 11 related to BI)
Imagine you have a huge data set consisting of feature vectors with a large number of attributes. You have used supervised learning to classify new data but you want to confirm "visually" whether your predictions make sense.

a.   In this context, explain how the t-SNE manifold method could be a useful tool (hint: first explain what t-SNE is and what it can do, then explain how it could be used here).

Problem 9.   (From class 7, Lab7 Odoo)
Basic empty Module in Odoo.
Explain how you would install an empty odoo module. (hint: You should use the "scaffold" command from odoo to create an empty project).
Where should you deposit the directory for your custom project?
Explain what you would need to do to deploy this custom module so that it installed.

Problem 10.   (From class 8, Lab8 Odoo)
Imagine that you have want to modify the default "Manufacturing Order" workflow in Odoo in order to adapt to the requirements of your company. In particular, you want the final approval of the manufacture order to depend upon the Supervisor if the cost value of raw materials passes a certain amount (5000Euros).
a. Explain "qualitatively" how this could be accomplished using the Odoo custom workflow editor.   An example of the workflow is given below.