

Study Guide for “Sistemas de Negocios” 2016

Clase 1: Intro

- What is an ERP from the point of view of systems software? (Lec 1. page 6, 7)
- What are the major components of an ERP?

Lab 01: Python Programming.

- Should understand how to write basic python programs of problems 1 thru 8.

Know basics of the python language: (Review of *Lab01_SN_Python_Slides.pdf*)

- operations (p.11)
- how to write a basic script and make it executable on the command line:
 - with `#!/usr/bin/env python` and then using `chmod +x script.py`
- assignments, multiple assignments (p.13)
- reserved words (p15)
- types of expressions (p.16)
- if statements (p.17)
- for and while loops (p.19, 20, 21)
- lists (p.22, 23, 24)

Know how to use functions in python:

- definition (p 25,26,27)

Using modules:

- importing (p.28)
- common modules and regular expressions (p29)

Using Numpy:

- some topics (p 35)
- arrays (p.36,37,38)
- operations, products(p.39, 40)
- slices of arrays horizontal/vertical stacks(p41, 42, 43)

Using the basics of Matplotlib:

- plotting data/functions (p. 58)

Classes in Python:

- definitions (p.60, 62)
- full class example pp. 63- 76)

Class 2 : Introduction to Django:

Setting up a project in Django (clase 2A)

- use the virtualenv to isolate code (p 6-8., Clase02A)
- create a project (p 11 Clase02A)
- what is the settings.py file used for (p12 Clase02A)
- syncdb (in present versions “makemigrations” and “migrate”) (p.13 Clase02A)
- what is the “url.py” file used for (p14, Clase02A)
- how to start the server (p.15, Clase02A)
- making an application (p.21-22, Clase02A)
- the models.py file (p24-25, Clase02A)
- registering an app in the settings file (p.26, Clase02A)
- Adding a model to the admin (p.28, Clase02A)
- how to display an html web page. (p34-35, Clase02A)
- Adding a form (p. 36-42, Clase02A)

Clase2B:

- understand how to deal with static files (p.8, Clase02B)
- Using Bootstrap to create a base template (p 10-13 Clase02B)
- very basic operations with templates (p.13-15, Clase02B)
- Message middleware (p27-33, Clase 2B)
- Redirecting; interplay of views and urls (p.34, Clase02B)

Lab 2. Django project.

Problem 1 and 2: You should be able to build the simple model within an App. from the first class notes. How can you see your model in the admin?

Class 3: Django part 2

- Get a simple view (p5 and p9 Clase03)
- Parameters of the settings file (p.6 clase03)
- Context variables and sending to template (p10-11 clase03)
- Using forms (p12-17 Clase3A)
- Using the shell (p18-21 Clase3A)
- Concept of Queryset (p22 Clase3A)
- Template inheritance (p2, 5-9 Clase3B)

Lab 3: Programming a Django projects:

- Problem 2; understand the details of developing an application.

Class 4: Django part 3

More Django:

- More details about Template inheritance, context and views. (p2-22 Clase4A)
- User models and authentication (p.35-46 Clase 4A)

Postgresql and Cron

- basic commands: create/delete user (p. 10, 11, Clase04B)
- backups with pg_dump (p.12, Clase04B); restore (p.20, Clase04B)
- Cron service (p.14-19, Clase04B)
- SQL review (p. 25-32, Clase04B)
- Server Programming: (p.33-49 Clase04B)
- Review of triggers (p24-26, Clase05A)

Lab 4:

- Problem 1: very simple product catalog with the django model.
- Problem 2: You should be able to write a simple DB with SQL and use command line tools of postgresql.

Class 5: Psycopg2 and ERP concepts

Postgres:

- Know how connect to database session and perform queries with psycopg2 (p.4-12 Clase05A); also scripting concepts with psycopg2 and examples (p.7-23, Clase05A)
- Integrate Postgres into Django as a DB (p. 27-29 Clase05A)

ERP

- What is an ERP (p.7-11, Clase05C)

Lab5:

- problem 1 : you should be able to create a database in postgresql
- problem 2: you should be able to create a database for a particular problem; here a bank example. How do populate the tables? How do you create relations? How do you perform queries?
- Problem 3: you should be able to write a python script for queries to postgres database
- Problem 4: You should be able to write a trigger function. This problem treated the issue of creating triggers for sales/stock in a car database.

Class 6: odoo and ERP

What is odoo ?:

- general ideas from wikipedia (p.5, Clase06A)
- From the example shown in class notes of Clase06A, what is a “workflow” in odoo?

Lab 6

- Problem 2: How do you do “reverse engineering” to determine the tables involved in a particular process (such as a sale).
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Class 7: Odoo (part 2)

What is custom module in odoo and how would you construct one?:

- Class notes from Clase07B cover this topic.

Lab 7

- problem 1. You should understand workflow of purchasing raw materials. You should be able to describe the steps in a purchase order of raw material and adding this raw material to stock
- Problem 2 You should be able to understand the bill of materials, and workflow steps necessary to manufacture a product.
- Problem 3: How would you sell a product and use the CRM?
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Class 8: Admin Processes and Workflows with Odoo.

- Know how to backup Odoo installations (p6-7. Clase08A)
- Administer users/groups in Odoo (p.8-14, Clase08A)
- What is a workflow and how to modify workflows in Odoo (rest of Clase08A).

Lab 8:

- problem 1: workflow of HR Module
- Problem 3: Web workflow and e-commerce.
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- problem 4: How would you create an empty module (that you would eventually use for programming a new module)
- Problem 5: What are the steps involved in making changes to a form in Odoo so that you can create customized modules?
- Problem 6 and Problem 7: Workflow diagrams. How could you use this tool to radically change the workflows within Odoo?

Class 9: Business Intelligence 1: the data:

Basics:

- What is machine learning?
- What are the Key tasks of ML ?
- What is Supervised learning ?
- What is Unsupervised learning ?
- Regularization
- What is a K-nearest Neighbor classifier? How does it work? How would you implement this in sklearn?
- What is an SVM classifier? What is the basic concept behind it (not necessarily the detailed math)? How would you implement this in sklearn?
- What is “churn rate”?
- Describe some examples of real business problems that are using machine learning (“loan predictors”, “fraud detection”, “asset pricing”, etc).
- In supervised learning, describe training and predicting in the context of cross validation methods.
- What is a decision tree? What is the “concept” of a random forest classifier?
- How do you use a random forest in sklearn for making predictions with a supervised learning procedure?
- How do you use a neural network in sklearn?
- What is data preprocessing? How would you use it? What methods are available in sklearn?
- What is K-means clustering?
- What is PCA? How could you implement this in sklearn?
- What is t-SNE? How could you use this in sklearn to visualize classification of high-dimensional data

Lab 9:

- Problem 1: Concept of Supervised learning using the Titanic data set. You should know all the steps involved in solving a problem like this. What are the basic tools needed to pre-process the data? What are the sklearn methods for implementing classifiers and then testing with cross-validation.

Class 10: Business Intelligence 2: unsupervised learning

- More on unsupervised learning
- More on data normalization
- More on use of PCA and dimensionality reduction.

Lab 10:

- Problem 1-3: Supervised learning: you should be able to apply the techniques you learned to various types of problems.

Lab 11:

Unsupervised learning: you should be able to apply the techniques you learned to various types of problems; K-means and t-SNE methods.

Class 11: NoSQL methods

- What is NoSQL? What isn't NoSQL?

Using a specific NoSQL:

- What is mongoDB?
- What are the steps required to get mongoDB installed and a database created?
- In mongoDB, what is a Document and what is a Collection?
- How do you populate a Collection?
- How do you install the python driver for mongoDB?
- Basic operations with pymongo: create a connection, access the database objects, insert data/documents, perform queries, aggregation queries.
- What is "sharding"?
- How would you perform "sharding" in mongodb for big data configurations across several nodes? What are the fundamental parameters to worry about?

Lab 12:

- Problems 1-3: You should be able to use mongoddb and pymongo to perform the basic database operations and queries.

Clase 12: Virtualization

- What is virtualization? What types of virtualization exist?
- What is the difference between a Type 1 and Type 2 hypervisor?
- What is KVM?
- What are Containers? How are containers different or similar to virtualization? When would you use containers such as Docker?