

## **Workshop in Applied data science and software development for business**

This is the first of two part workshop. The first part is a standalone workshop for students that want to focus mostly on developing general applications that require database. In the second part we utilize the framework for advanced applications including research projects.

**Background:** Everyone these days want to be a data scientist. In another word, everyone want to be able to swim across the ocean. Needless to say, you must be trained to be able to do so. You can easily spend most of your life and will not be able to do it. Therefore, you need experts that actually did it several times. Dr. Baranes is a PhD from the University of Chicago, economics departments, and a CPA (USA) who worked for top companies in the USA, PwC and Lexecon Inc. before he opened his first hi-tech company in 1994. Since then, he conducted many projects across the Globes. Currently, he manages two start-ups. The first start-up, is building a Business Simulation used in MBA programs. The other one, is development a software of automated algo-trading in options. Dr. Baranes, is active researcher in option trading and deep learning. He teaches Corporate Valuations and Business Intelligence in IDC and Business Simulation in the University of Haifa. Dr. Baranes constructed these two parts workshop, based on thirty years of experience and wants to share his experience you with in skill developments in modern hi-tech era.

I developed the skills on how to learn in the modern age we live in. This course and the next to come are condense and focused on developing individual and team skills. It does not cut corners, but cut unnecessary knowledge. Both parts of the workshop, are based on my last two start-ups which uses the most advanced technologies. Moreover, we do not skip theory and emphasis it when needed.

**Objective:** train students in short period of 12 sessions (6 weeks) how to use the most modern framework to develop online applications. We provide you with the framework and how to work in a team in incredibly fast manner. These skills are so essential for students which enable them to study and mange businesses.

**Outcome:** By the end of the workshop, students will be able to write online application within days/hours. For example, you should be able to develop in 8 hours an online calculator for the Black & Shultz model including the Greeks and upload it to the cloud. You should be able to do the same project in a team of three students in less than two hours.

**Sessions:** there are six sessions. Each weekly session includes two meetings of 4.5 hours each (two breaks of 15 minutes)

### **First Session - Infrastructure:**

In the first session, we start by seeing the whole picture and dive into the details in the following sessions. In another words, you will install and understand the technical structure from the first session. Most important, you will practice with the working application and understand all the components necessary for modern online application.

- Setup: We start with installation of all the components that will be used in the workshop. We download a working project for Github and make sure it works on your computer.
- Modern structure of online application: We learn how to create services and how to deploy them to the cloud.
- How to work in a team: as we describe the framework, we ask each member of your team to perform changes, you will collaborate and share this changes with your team members in the most efficient way.
- What we will learn in the course: As we progress in this session, we will highlights the details of the topics of the next five sessions.

### **Second Session – introduction to Python/Django framework:**

There are many excellent programming languages and excellent frameworks. Yet, you have to pick one that is the most popular and has growing community. Moreover, it should have a framework to develop general applications and suitable for research projects. I found that Python and Django framework (written in Python) are good choice for these objectives.

- Python language: from basic to advanced topics. Understanding advanced topics in Object Oriented Programming. In session three, you will master the use of python objects in creating databases. The more you practice, the better you become; there are no short cuts.  
You must develop good programming habits based on best practice. Most important, you must get to a level that you can download code from the internet and learn how to integrate it into your application. There are many smart people out there and they are very generous to share their work with you; so, you must be able to use their code.
- The Django Framework: how an online application is structured in Django and how the VCM model is implemented in Django.
- Client side programming: from HTML to advanced Bootstrap.

### **Third Session – introduction to database:**

Databases are the place you keep the most important assets of your application, your information. There are several kinds of databases and each type design for a different objective. We will review the different databases and how they are being used in real life. Yet, in this workshop, we focus on relational database which is the common database used in operational systems.

- How to build a relational database.
  - Tables
  - Views
  - Relationships between tables
  - Backup and replications
  - Other important topics
- The SQL language

You are not going to be an expert, but for a business person, you will learn all you need. Most important, you learn how to acquire additional knowledge by yourself.

#### **Fourth Session – The Django framework - details:**

- The implementation of the VCM model in Django. Understanding the importance of dividing the application to at least three major layers: Models, Business and presentation layers.
- Models: This is the data layer. We will learn how to use Python objects in Django framework to create tables (models in Django)
  - Basic database model
  - Relationships (one to one, one to many, many to many)
  - Advanced topics in database modeling including mixins etc.
- Views: This is the business logic layer which is the core of your application. This is the place you should spend most of your time. As you progress and learn more advanced libraries in python, even for research (such as Tensor Flow), this is the place to integrate them (more on that in the second part)
- Templates: This is the presentation layer. You will learn the structure on how to organize you output of your application. It is important to learn at least the basic of HTML, CSS, Jinga.. etc.

#### **Fifth Session – Design an application:**

Do not run and start building your application. It is a must to design the structure of your application based on the objectives and goals you try to achieve. Design patterns, is a very important topic which unfortunately, many ignores. In this session, we spend the time on several ways that good design improve performance and increase user experience.

- State the objective of the application
- Design the database
- Design the business logic
- Design presentation layer
- Make sure, there will be a page that present your team members with a short bio.

Notice, that we provide you with a framework that include many redundant elements required in every application. Here, you integrate the elements of your application with the given framework.

**Sixth Session – implement the application with your team:**

In this section, you implement all the skills and knowledge you acquired in this workshop. Equipped with the design, assign tasks to each member and mile stones to get to the final applications which you deploy to the cloud.

- Assign tasks to your team members including time table
- Define milestones for the project
- Perform testing
- Write instructions to use your app (.md file)
- Deploy your application
  
- Ceremony: present your project to your classmates.
- Get your Diploma

**Good Luck**