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# Subjects

## Supervisor : dr. Ralph El Khoury

**Supervisor**: Ralph El Khoury

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### Subject 1: Medical Center Software

This subject regroups 4 projects related.

The software should include accounting part for the payment for the medical consultation and for the pharmacy.

**Project1.** **Create a Website for a medical center** (not a hospital, but a primary health care center - dispensaire)

* external part: visible for everyone
* internal part: visible inside the center.
* Different type of users: admin, doctors, nurses, secretary, etc.
* Medical information not accessible to everyone. Nurses have to fill their preliminary examination... that doctors can see.. Admin has the possibility to manage the employers, adding doctors, nurses etc., and can generate statistics.
* Create Medical e-files (EHR - electronic health record) for the patients: replace all the paper medical files by e-files, where the doctors and nurses can create and modify.
* Doctors should fill a medical file while examining patients, with a given form. An e-file should contain history of the patient containing past diagnostics, history of medications, history of labs...
* The doctor should add prescriptions connected to the pharmacy of the center.
* Make possible statistics on patients, e.g. we want to know the number of patients that has diabetes, etc. Further information can be given later.

**Project2. Appointment system** (more info will be given later):

* there are a given number of physicians that come to the center each day, and uses given rooms. e.g. family medicine, pediatric, gyneco, and other specialities.
* there are rooms for infection disease.
* there are constraints for taking appointments based rooms, infection disease and physician available.
* Appointments mainly is took by the secretary of the center. It should be easy to precise the available slots.
* Consider also the possibility of patients to take themselves online the appointments.

**Project3**. **Pharmacy stock management**. Should include Suppliers, Category of medications, remaining quantity, receive the prescription of doctors. Invoices, payments.

### Subject 2: Doctor Software

This subject regroups 2 related projects.

- Create an EMR/EHR (electronic medical record) software for a family medicine specialty, for a **clinic** use. It should replace the paper documents by electronic files and help in the procedure of patient questionary and examination.

- You should overview the existing software and their features.

**Project1: Create Medical e-files** (EHR - electronic health record) for the patients: replace all the paper medical files by e-files, where the doctors can create and modify.

* *Patient general information*: Doctors should fill a medical file while examining patients, with a given form. An e-file should contain history of the patient containing past diagnostics, history of medications, history of labs.
* *Appointments scheduling*

**Project2: Doctor diagnosis and prescription**

* EMR/EHR, including questionary (list of questions), list of diagnostics (e.g. ICD-10), procedure (steps to follow for a given patient in ), doctor should see the history of the patient and its medications, reminding of vaccination, or some test to do for a category of patients, saving some documents, generating reports, etc.
* E-prescribing, medications

## Supervisor : dr. Charbel Julien

### Subject 1: pet store

Online pets store and veterinary support service.

Provide pet food and supply store.

### Subject 2: on-line charity application

Online charity application where individuals and companies can donate to through the website.

* Potential donors can browse and select from a wide offering of projects that are organized by geography or by themes such as health care, the environment and education.
* A donor can contribute any amount using a credit/debit card, check, PayPal, Apple Pay, stock transfer, DAF, or M-Pesa.
* Donors can purchase gift cards which recipients can redeem in support of a project of their choosing.
* Also people in need can make their request on the website

## Supervisor : dr. Joseph Costantin

### Subject : Deep Learning  model in the Detection and Diagnosis of COVID-19.

Les étudiants doivent connaitre Deep Learning, Python et Tensorflow.

## Supervisor : dr. Ibtissam Costantin

### Subject: Facial Emotion Recognition using deep convolution neural networks

Ce projet est en premier destiné aux  étudiants ayant suivi une formation en deep learning

## Supervisor : dr. Jhonny Mattar

### Subject 1: LRC – Patient Care Reports management

#### Topic briefing:

A Lebanese Red Cross (LRC) Emergency Medical Services (EMS) station wishes to manage its Patient Care Reports (PRC) by using a web application on its local intranet. The data of each PCR are entered for each mission in order to enable the generation of reports, based on this data, upon demand.

#### Detailed description:

For every ambulatory mission, provided by the Lebanese Red Cross (LRC), a Patient Care Report (PCR) is to be filled. This report contains the following data:

1. Every report has a unique identifier, containing the relevant day’s date followed by a sequential number that resets at the beginning of each day (12am). I.e., the ID of the first PCR after 12am on the 23rd of March 2021 is 23032021/1, the second is 23032021/2, and so on. This format allows a real-time identification of the number of fulfilled missions in the current day.
2. The date and time of the PCR are automatically filled by the current date/time of the system, but the user is allowed to edit these fields in the case of an a priori scheduling of a PCR.
3. The plate number of the ambulance used in the mission is recorded in the PCR. This number is to be chosen from a predefined list of ambulances that are in service. The list of ambulances can be edited by the administrator and contains each ambulance number, a brief description of it, and its status. The status of an ambulance can be i- in service, ii- under maintenance, iii- out of order, iv- total loss.
4. The mileage (kilometrage) of the ambulance is recorded in the PCR, prior and after each mission. Any relevant conditions should be fulfilled upon this entry. Allowing or denying the omission of this entry is set by the administrator.
5. The type of the mission should be registered in each PCR. This type is selected from a predefined list that can be edited from the administrator. E.g The type can be i- URG (“Urgence” - Emergency), ii- AVP (“Accident a Voie Public” - Accident on public roads), iii- TM (“Transport Malade” - non-urgent patient transport), iv- SAC (“Soin Au Centre” - care given at station), v-POSTE (events where an ambulance is required due to presence of large masses or activities where injury risks are high).
6. A binary Identifier will be filled to determine whether the mission was completed by the night shift or the day shift: EDN (Equipe De Nuit) or EDJ (Equipe De Jour).
7. Each PCR usually involves one patient, but in some exceptional cases it can involve more. For instance, in a standard mission, a single patient is transported in the ambulance, but exceptionally, if it is a car accident rescue mission for example, and two or more related persons are injured, then they might be transported in the same ambulance. For each transported patient, the following information are recorded in the PCR:
   1. Full name
   2. Nationality
   3. Age
   4. Accompanying person (Only one healthy relative can accompany a patient in the ambulance)
8. Moreover, for each transported patient, the medical case is recorded in the PCR. The

medical case can be chosen from a list of predefined cases (that can be edited by the administrator) such as heart attack, broken arm, etc… Moreover, and since new types of cases can unexpectedly arise, a user defined case (other) can be entered.

1. Supplies-wise, the following data is recorded in the PCR for each mission:
   1. The pressure remaining in the E-tank of O2.
   2. The pressure remaining in the D-tank of O2.
   3. The pressure remaining in the M-tank of O2 (when applicable).
   4. The number (identifier) of the taken CM Kit (chosen from a list filled by the administrator)
   5. The number (identifier) of the taken UHF radio kit (chosen from a list filled by the administrator)
2. Itinerary-wise, the “from” and “to” destinations of each mission are recorded in the PCR. These destinations can either be selected from a list of predefined hospitals’ addresses (filled by the administrator), or user defined (manually entered address of a patient’s home or accident location etc…)
3. Finally, each ambulatory mission should be operated by, at least, a driver and a mission leader. They can also be accompanied by up to three additional rescuers. This list of operating personnel is filled in each PCR from a predefined list. The function of the personnel is to be respected, e.g. a non-driver cannot be selected as a driver.

The predefined list of personnel is filled by the administrator and contains the following:

* 1. Nick name
  2. Full name
  3. Date of birth
  4. Gender
  5. Phone number
  6. Functions (Driver, Mission Leader, EMT (Emergency Medical Technician))

Following the entry of the PCR data, the following type of reports shall be available:

1. Monthly report per ambulance showing a list of the missions(PCR ID with Mission Type and From and To fields should be shown) it was used in and how many kms was covered in each and how many kms covered in total.
2. Monthly and annual reports per rescuer and per station and per shift type (EDN/EDJ) showing how many missions of each mission type were completed.

#### Development technologies:

PHP – MySQL – LARAVEL (optional)

### Subject2: Galaxy page design and highlighted tree visualization

Galaxy is an open source, web-based platform for data intensive biomedical research. Its sub-pages are designed by using a special set of tags and instructions. Therefore, this project is twofold; in its first part, you are required to design a Galaxy page for integrating a clustering tool for biological sequences, while in its second part you are required to implement a tool for graphically visualizing phylogenetic trees.

Regarding the first part, the requested Galaxy page is supposed to collect the user input of the required parameters, and run the clustering tool called SpCLUST by assembling its command adequately. SpCLUST takes as input the following arguments:

1. -in: file name of the input dataset (should be previously uploaded to the Galaxy platform)
2. -out: file name of the output text file for the clustering result
3. -cTech: the clustering technique that can either be GMM, DBSCAN, HDBSCAN, or CHAINS
4. -alignMode: the alignment mode that can either be none, done, fast, moderate, or maxPrecision
5. -mdist: the choice of the distance matrix that can be none, EDNAFULL, PAM250, or BLOSUM62
6. -ccCriterion: the choice of the clustering choice criterion that can be bestBIC, bestAIC, bestICL, mostFreq, or fast
7. -nbcCriterion: the criterion used to determine the number of clusters and that can be BIC, AIC, or ICL
8. -nbRuns: the number of iterations. This parameter is **not required** if the ccCriterion choice is “fast”
9. -neStop: the number of consecutive iterations to stop at, if no result improvement is detected. This parameter is **not required** if the ccCriterion choice is “fast” or “mostFreq”
10. -matType: the affinity matrix type that can be UL, RWNL, MOD, BH, MOT4, MOT13, FMOT4, or FMOT13
11. -tt: the thresholding technique that is **only required** when the chosen matType is MOT4, MOT13, FMOT4, or FMOT13. The available choices are pClosest, AVG, PropAVG, or deltas
12. -th: a positive float <1 consisting of the user-defined threshold that will be used for the thresholding technique. This parameter is **only required** when the tt choice is either FMOT4 or FMOT13
13. -tp: a technique parameter **only required** to indicate either the epsilon for DBSCAN, or the minimum cluster size for HDBSCAN, or the ending loop size for CHAINS

A basic page is already designed for this purpose but requires some enhancements especially for **setting the visualization conditions for the last 5 parameters**.

Regarding the second part, the implementation of a tool is required for visualizing a phylogenetic tree that shall be generated following a “Newick” file format. This tool should also read the resulting clustering from SpCLUST and highlight the elements of a same cluster (on this tree) with a same color. This tool can be implemented as a web application by using PHP, or a windows application by using MS Visual C#. The user should have the option of exporting the generated and highlighted tree to a certain image format (jpg, png, eps, etc…).

## Supervisor : dr. Ziad Balaa

### Subject 1: Caller ID Mobile App based on Microsoft Dynamics

**Project Title:**

Caller ID Mobile App based on Microsoft Dynamics

Microsoft Power Platform Portal vs Adoxio Benchmark

**Company name:**

Javista Services SAL

**Description:**

* Caller ID Mobile App: Build a caller ID mobile app that will fetch the identity of the caller from the client’s Microsoft Dynamics
* Portal Benchmark: Microsoft offers a Portal product in 2 versions: SaaS or Self-Hosted Open-Source

**Objectives:**

* Design the mobile app via UML and deliver the app
* Portal Benchmark:
  + Install and set-up both platforms
  + Perform a comparative benchmark: performance, cost, security
  + Extend the portal functionality via .NET/JavaScript/C#

**Prerequisites:**

Basic knowledge of mobile app development, web programming (JS, CSS) and knowledge of C# or Java

**Duration:**

4 months; At least 3 full days per week. The duration includes pre-project training. Project scope can be adapted to fit a longer/shorter period

**Remuneration (if any):**

20 USD cash per work day (8 hours)

**Location:**

Javista office, Berytech Mathaf. Work from home is also possible

**Advisor(s):**

Tanios Kahi, Technical Director, Javista, 03455768, [tanios.kahi@javista.com](mailto:tanios.kahi@javista.com)

### Subject2: web site Pastorale Saint Maroun

- Formulaire social Pastorale Saint Maroun

- Gestion de Comptes Pastorale Saint Maroun

### Subject3: web site Pastorale Saint Maroun

- Gestion des Médicaments Pastorale Saint Maroun

- Gestion de la distribution des aides Pastorale Saint Maroun

### Subject4: QR code for rooms

For IT department in UL, a QR code allows to know the content of each room: Computers, Chairs, Tables, etc…As the status of each item.

It must display also the last maintenance applied on the items.

It must display also the room Code, utility as the teacher assigned ti this rrom.