Epoka University

Faculty of Economics and Administrative Sciences

Business Informatics

CEN302 -- Software Engineering

E-DENT

Requirements Specification

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1. Executive Summary

1.1 Project Overview

Describe this project or product and its intended audience, or provide a link or reference to the project charter.

Automatization and the decrement of the human intervention is basically the main course all businesses are following, to succeed in an environment where the customer satisfaction is crucial. This model, businesses are following, provides fast service, transparency, easy access by the customers and as a result more successful business and more loyal clients who are satisfied with the service.

A system for a dental clinic is what we are going to establish. Having a system to organize all the services and customers, helps the clinic to easier manage the operations, schedules, keep track of the patients cards etc. In other words be more efficient. Everyone who wants to receive a service from this dental clinic can book his appointment and the type of service needed, based on the available schedules. Another user of the system is the service providers, dentists. They can have their profile where will be stored all the patients' cards under their care. And the third user is the admin who will add or delete dentists', patients', and deal with inventory. Also there will be a user for receptionist who will deal with accounts keep track of the schedules and notify the patients in case of any change to the schedule or other operations.

1.2 Purpose and Scope of this Specification

Our purpose as the developers of this software is to improve customer experience and facilitate operations inside and outside of the dental clinic through E-DENT (Web Application). This software will provide very practical and simple solutions to the issues that the owner, patients, doctors and receptionists have addressed. Not only will E-DENT make it easier for potential patients to approach the clinic, but also for the clinic to be closer to the patients in case of any complication. Shortening the distance by creating a well-balanced frequent interaction between each of our users, we aim to facilitate each process from the attraction of the patient to the conversion in a promoter. The software is developed to be used by one dental clinic since we will customize it according to our client's requests and budget.

2. Product/Service Description

2.1 Product Context

E-Dent is a software which is designed to manage and facilitate the activities of a dental clinic. This product is a flexible and effective solution of managing jobs by converting medical and inventory data on paper into electronic files.
The software will be used by every employee of the clinic, but also by loyal and potential patients. Main goal of this platform is to enhance communication between staff and clients and help the staff coordinate their job and schedules in order to provide a satisfying user experience. Our software will be accessed by four users: patients, receptionist, dentists and admin/manager. The software aims to facilitate every step of clinic job from booking from

clients, to booking approvals, tracking dentists' timetables, generating patients' records, ordering from dental depots.
The software will also serve as a website for potential customers who can navigate and see services and prices offered, experiences and results of other patients' from esthetic and surgical intervention, and contact for any information.

2.2 User Characteristics

The users of the system are :

Patients: anyone who wants to receive a service by this clinic can:

- register to the system to book appointments specifying the service based on the list (also prices) provided in the system ,
- have personal dental record section with previous appointments
- view different experiences that other clients had with this dental clinic and the dentists to whom they will trust their oral health

Dentists: Every dentist in the clinic will:

- be registered in the system
- keep track of the patients he has under care
- communicate and advise them when they have a concern
- view his schedules and appointments assigned to him
- declare the materials used which will be subtracted from the main inventory.

Receptionist: as a person who deals with the schedules and appointments he will:

- have a general calendar with appointments organized in the system and directly updated by the patients actions
- assign dentists for each appointment taking into consideration their workload
- view each dentists' schedules
- communicate it with the patient using the contact information in the patient records, in case of any changes in schedules
- keep track of the payment completion of the services provided, indicated by the Paid/Not Paid status for each patient.
- Register the patients in the system if they directly request service in the clinic

Admin: as the main actor of the system will:

- diss/approve the registration of the dentists
- be able to change the list of the services according to the decisions made for expanding/shrinking the services or changing the prices
- Be able to generate financial reports

Economist: the person responsible for the internal and external financial transactions

- keep track of salaries payments
- keep track of payments for each service provided by the clinic
- keep track the inventories of the clinic and make sure the needed materials are ordered
- keep track of the payments made for each new order
- keep track of any other expense
- preparing monthly reports of the cash flow

2.3 Assumptions

The list of assumptions :

- It is assumed that each user has limited working proficiency in English.
- It is assumed that each patient in cases when is registered by the receptionist gives the correct personal information and the approval for the account registration.
- It is assumed that the admin account is created by the system developers and given to the clinic's owner/ IT manager.
- It is assumed that the clinic and the patient own smart devices and have internet connection to be able to access the system.
- It is assumed that the system is built in accordance with the Albanian Law No.9887 "ON PROTECTION OF PERSONAL DATA"
- It is assumed that every patient should be limited to watching only his booking and not interfere with other patients.

2.4 Constraints

List of constraints:

- The internet connection when absent or not powerful enough can be a constraint for the fully functioning system.
- It is required that every device should be equipped with browser to run the application
- Budget of the client.
- MySQL will be used for fetching data from database which may not be very efficient for large database.
- For very large databases the management efficiency by the SQL my fade.
- The system will only use the data contained in the existing corporate database.
- The system shall be available 99.99% of the time for any 24-hour period.

2.5 Dependencies

The list of dependencies that affect the requirements:

- The willingness of patients to use the system and not to request information manually from the receptionist
- the patients and clinic's staff access to the internet
- Depends on successful communication with related dental depots. This is achieved by maintaining an accurate inventory, by generating weekly reports on the quantity of used and available products.
- The execution of the sql queries performed by the users through the software's interface are dependent on the capacity of the database , the way the entities are organized and the number of users concurrently using the system.

3. Requirements

3.1 Functional Requirements

Req#	*Requirement*	*Comments*	*Prio rity*	*Dat e Rv wd*	*SME Reviewe d / Approve d*
BR_01	The system is implemented as a web application used by four functional user modules: admin, patients, dentists, receptionist.	This will be the main platform of operation for all users	1		
BR_02	The administrator account must have the majority of the privileges of the system, and be able to manage the main operations provided by the data available on the system.	The system is under the management of the admin who can edit and manage the users and operation related to the system.	2		
BR_03	The system should associate a supervisor indicator with each user.	The admin can have under supervision al the users accounts and have full access on them	3		
BR_04	The system must provide the admin account with the competence to control the creation of the users account except the patients' one.	The admin can use a button to approve or disapprove the creation of a new employee account(dentist,receptionist).	2		
BR_07	The admin can log in into his account using the credentials received by the development team.	The admin receives a username and password by the system developers and use to log in.	1		
BR_08	The system must give the opportunity to the admin to change the credentials.	Using the change credentials button admin can change the username and password.	2		
BR_09	The system must provide graphical data about the inventory to allow Economist be able to manage and meet the demand	This will be important to have a clear idea about the stock material to help the decision making related to inventory.	3		
BR_10	The system must provide the option to add the dental materials specifying the name, the quantity and the price.	The Economist will frequently update the inventory database to have the accurate quantity of materials.	2		

BR_11	The system must provide the option to remove from inventory the used up material according to the name and specifying the quantity.	The Economist can use remove command to exclude the used materials from the inventory to have updated quantity.	1		
BR_12	When a specified min quantity is reached the system must notify the Economist for refurnishment.	The clinic will always have the necessary material on time as the Economist can order them as soon as notification appears.	3		
BR_13	The system must allow the admin to edit the list of the services offered by the clinic.	The admin can add/delete service types meeting the patients demand and clinics decisions about the progress.	2		
BR_14	The software must allow the admin to Edit the prices specifically for every service type in the list.	The admin can change the prices according to any discount or other decisions made by the owner.	2		
BR_15	The software must allow the admin to delete an employee account.	In case a dentist or receptionist leave or is fired the admin must remove his account from the system	2		
BR_16	Each user should be identified by unique username and valid password.	No two users have the same username and password is hashed before stored in the database.	1		
BR_17	Admin should have restricted access to users' sensitive information.	Admin should be able to change only his password, not the others.	1		
BR_18	Dentists should be able to cancel their appointments	If for any personal reason, the dentist can not reach the appointment, he has the right to cancel it.	2		
BR_19	Patients should be notified by email in case that appointment is canceled.	An email is automatically sent to the patient to notify that his/her appointment is canceled.	3		
BR_20	Patients can cancel their appointment and book another one.	If the patient can not attend the appointment to the clinic for any reason, can cancel it.	3		

BR_21	Receptionist and dentists are notified for the cancellation of an appointment by a patient.	A notification is automatically sent to the receptionist and dentists if there is any change in bookings.	3		
BR_22	Software should be able to generate XML/PDF files which store all records of a specific patient. Everyone can look at the clinic	Each patient has its own medical records which are stored and updated in the system.	3		
BR_23	Everyone can look at the clinic webpage and get information	Everyone who has a browser can access the webpage and find information regarding services, dentists, address.	1		

BR_24	The system shall provide the user "Patient" with the option of booking appointments.	This option will make it possible for the user to check availability and make a decision on the booking date and time	1		
BR_25	The main system page, the home page shall give general information about dentists, reviews,contact details, location,services.	.In order to have a clear idea about the clinic and its type of services offered a home page providing all of these is created	2		
BR_26	The system shall allow the user "Patient" to chat with his or her own doctor.	This option will make it possible for the user to consult with the doctor in case of any complication or situation that might occur.	3		
BR_27	The system shall provide the user "Patient" with full access to own dental records in the clinic.	Will make it possible for the user to check each service that has been provided to him and the advancements that he/she has had since the treatment.	2		
BR_28	The system shall include detailed information about the user "Patient" and a dental record on all the services received at the clinic.	It will be stored in the database and the users will have limited access on it except the admin.	1		
BR_29	The system shall provide the user "Patient" with the list of services offered in the clinic and the respective prices.	Will make it possible for the user to know what actually is offered in the clinic and be aware of the amount the clinic will charge them.	2		
BR_30	The system shall allow the user "Patient" to edit all the attributes in his/her account, except the ones defined by the admin.	Each user shall be able to edit the specified features in the personal account.	2		

BR_31	The system shall provide the user "Patient" with his/her personal account.	Each user shall have an account with his/her own personal data.	1		
BR_32	The system shall allow the user "Dentist" to chat with his or her own patients.	This option will make it possible for the user to check up with the patients in case of any complication or situation that might occur.	3		
BR_33	The system shall provide the user "Dentist" with dental records on all patients that received services at the clinic.	Will make it possible for the user to check each service that has been provided to the patients in the clinic.	1		
BR_34	The system shall provide the user "Dentist" with the complete list of scheduled appointments assigned him/her.	Will make it possible for the user to check on his availability and also know what is on his agenda.	2		
BR_35	The system shall provide the user "Dentist" with his/her personal account.	Each user shall have an account with his/her own personal data.	1		
BR_36	The system shall allow the user "Dentist" to edit all the attributes in his/her account, except the ones defined by the admin.	Each user shall be able to edit the specified features in the personal account.	2		
BR_37	The system shall provide the user "Dentist" with limited access to the information about the users.	The user can not have access to every data on the database.	3		
BR_38	The system shall provide the user "Dentist" with full access to his/her own profile.	The user can have access only to the specified data data on the database.	2		
BR_39	The system shall provide the user "Dentist" with full access to patients' dental records.	The user can have access only to the specified data data on the database.	2		
BR_40	The system shall provide the user "Receptionist" with his/her personal account.	Each user shall have an account with his/her own personal data.	1		
BR_41	The system shall allow the user "Receptionist" to edit all the attributes in his/her account, except the ones defined by the admin.	Each user shall be able to edit the specified features in the personal account.	2		
BR_42	The system shall provide the user "Receptionist" with limited access to the information about the users.	The user can not have access to every data on the database.	2		
BR_43	The system shall provide the user "Receptionist" with full access to his/her own profile.	The user can have access only to the specified data data on the database.	1		
BR_44	The system shall provide the user "Receptionist" with full access to patients' dental records.	The user can have access only to the specified data on the database.	2		

BR_45	The system shall provide the user “Receptionist” with full access to patients’ dental records.	The user can have access only to the specified data data on the database.	2		
BR_46	The system shall provide the user “Receptionist” with full access to patients’ personal account.	The user can have access only to the specified data on the database.	2		
BR_47	The system shall allow the user “Receptionist” to edit patients’ personal data.	Each user shall be able to edit any of the user “Patient” attributes in the respective profiles.	3		
BR_48	The system shall allow the user “Receptionist” to delete patients’ personal data or account.	Each user shall be able to delete any of the user “Patient” accounts.	2		
BR_49	The system shall allow the user “Receptionist” to add a new patients’ personal account.	Each user shall be able to add a new user “Patient” account.	2		
BR_50	The system shall allow the user “Receptionist” to add a new appointment.	Each user shall be able to add a new appointment for any patient.	1		
BR_51	The system shall allow the user “Receptionist” to edit an appointment.	Each user shall be able to edit an appointment for any patient.	2		
BR_52	The system shall allow the user “Receptionist” to delete an appointment.	Each user shall be able to delete an appointment for any patient.	1		
BR_53	The system shall provide user “Receptionist” with access to the user “Dentist” schedule.	Each user shall be able to see the agenda of each user “Dentist” in order to assign appointments properly.	2		
BR_54	The system shall allow user “Receptionist” to edit the user “Dentist” schedule.	Each user shall be able to modify the agenda of each user “Dentist” in order to assign appointments properly.	2		
BR_55	The system shall provide user “Receptionist” with access to the user “Patient” schedule.	Each user shall be able to see the appointment of each user “Patient” in order to assign dentists correctly.	2		
BR_56	The system shall allow user “Receptionist” to edit the user “Patient” schedule.	Each user shall be able to modify the appointment specifics of each user “Patient” in case of any change.	2		
BR_57	The system shall allow user “Receptionist” to assign appointments to the user “Dentist” schedule.	Each user shall be able to assign an appointment by a specific patient to the available dentist.	1		
BR_58	The system shall allow user “Receptionist” to assign dentists to the user “Patient”	Each user shall be able to modify the appointment specifics of each user “Patient” in case of any	2		

	appointments.	change.			
BR_59	The system shall provide user “Receptionist” with the list of all appointments and their specifics.	All the users shall see all the appointments so there are no inconveniences nor confusions between patients and the dentists.	1		
BR_60	The system shall provide the user “Economist” with his/her personal account.	Each user shall have an account with his/her own personal data.	1		
BR_61	The system shall allow the user “Economist” to edit all the attributes in his/her account, except the ones defined by the admin.	Each user shall be able to edit the specified features in the personal account.	2		
BR_62	The system shall provide the user “Economist” with limited access to the information about the users.	The user can not have access to every data on the database.	2		
BR_63	The system shall provide the user “Economist” with full access to his/her own profile.	The user can have access only to the specified data on the database.	2		
BR_64	The system shall provide the user “Economist” with full access to patients’ payments list.	The user can have access only to the specified data on the database.	1		
BR_65	The system shall provide the user “Economist” with limited access to dentists’ profile.	The user can have access only to the specified data data on the database.	2		
BR_66	The system shall allow the user “Economist” to edit dentists’ payment records.	The user shall be able to edit that attribute of the user “Dentist” in the respective profiles.	1		
BR_67	The system shall allow the user “Economist” to edit patients’ payment records.	The user shall be able to edit that attribute of the user “Patient” in the respective profiles.	1		
BR_68	The system shall allow the user “Economist” to edit receptionist’ payment records.	The user shall be able to edit that attribute of the user “Receptionist” in the respective profiles.	1		
BR_69	The system shall allow the user “Economist” to edit admin’ payment records.	The user shall be able to edit that attribute of the user “Admin” in the profile.	1		
BR_70	The system shall provide the user “Economist” with full access to the inventories database.	The user can have access only to the specified data on the database.	1		
BR_71	The system shall allow the user “Economist” to edit the inventories payment records.	The user shall be able to edit that attribute in the database.	1		

3.2 Non-Functional Requirements

3.2.1 Product requirements

3.2.1.1 User Interface Requirements

- E_DENT is going to be a web-based application, which can be accessed at any browser including Google, Mozilla, Safari, Internet Explorer.
- The user interface of the system will be user-friendly,easy to use, supported by the overall organized structure of the modules and not a complex frustrating one. No manual or training will be necessary to be able to use this system,however a descriptive document with the system functionalities will be provided.
- The main interface all the user will be presented to will be the home page divided into different sections redirecting to specific pages. Into the home page there will be the option for the log in, register,Dental services,Smile Gallery, Meet our Dentists, About us. A side bar for easier navigation will be on the right side of the interface.
- The register module will have a form where the required information will be filled to later be sent to the database. Some of the required data may have some constraints such as password format. For any non compatibility with the format, specified also close to every input field, an alert will be view on the screen warning the user for the errors to make it easier and more transparent experience.
- The log in module uses the credentials input for each user to connect to the database, authenticate and provide access to each specific account. When a non-existent user or a wrong password is typed a small alert will be shown to notify the user for this error.
- The admin user will initially use the credentials received by the developing team to log in into his account. There will be the Inventory,Edit Services and the HR section. Each of them located on top of the page will be accessed through the on click command.
- The Inventory section will provide graphical data generated by the data of the current items of the inventory. This view will give the admin the general insights and an easier way to manage inventory. The table with the items will be shown and the button for removing or adding new item materials.
- The HR module available only for the admin will include the list of all employees and the functionalities to add/remove employees and the wages records. A notification will be provided by the interface for any latency in wage delivery.
- The Edit Services module will be plain and simple including the current list of the services and prices and the edit button adjacent to each of them.
- The interface of the module accessed by the receptionist will contain a calendar of all the appointments booked by the patients specifying the ones with assigned dentists or not. Also the receptionist will be able to view the Agenda of the specific dentists and interact with the page by assigning dentists to the appointments according to free hours or days shown.
- The receptionist module will also provide a table with the payments of the services offered with the feature of the Paid/Not Paid status for each service provided. In the cases when the patients records are needed at the moment the receptionist can view them from the Patients' Records section.
- The dentist after he logs in he will be directed to his account where a calendar of his agenda will be shown. The interface will shown the notification with a red dot on top right corner for the new

appointments assigned by the receptionist. Also the dentist will be able to view and edit the Patients Records(cards).

- The patient after they get a brief information on the home page and decide to open an account after they log in they will see the list of the upcoming scheduled appointments(if any). Also one of the section on patients module is the Patients personal Record. The interface will also provide with a notification signaling new messages from the Consult with Your Dentist section.
- The patient can view all the services and prices and also on the Book an Appointment part a calendar with free spots will be shown to make it easier for the patient to plan the next appointment.
- The overall user interface will provide an understandable design and structure with a lot of functionalities that make the system highly interactive and organized.

3.2.1.2 Usability

Software is user-friendly which means that is very easy to work with and each user will find it easy and comfortable to access it. Users will learn how to use the software application within a couple of minutes as every step is easily identifiable through design in order to provide a satisfying user experience. Instruction and alert messages are shown during the execution of the task. For example if a user tries to log in with a wrong username or password, it shall display "Wrong username or password, please try again". Icons and menus facilitate the user to perform specific tasks.

Accessibility

- Since it is a Web application it will be accessible on any device, at any time only if the user has access to the internet. Software is accessed by four users: admin, dentists, receptionist, patient. These users can access the software through their accounts. The Website is also available to everyone who is interested in the clinic services and can be accessed through a web browser such as Google Chrome or Mozilla.

Responsiveness

- The software should be highly responsive in design, data transactions and social network that will be implemented as part of the web to provide satisfying user interactions.

Flexibility

- The software should be constructed in such way that it is easy to be modified and updated in order to accommodate new requirements.
- The software application should be designed in such manner that is able to isolate and manage errors efficiently. In case that user enters wrong data input, the system shall generate alerts or ask for confirmation to proceed.

Effectiveness

- The software application will be easy to use and learn by all users. A manual in English and Albanian language will be provided to facilitate the users to efficiently access the system.
- The software will provide both staff members and patients with practical tools of managing their data and with a convenient way of performing their tasks across the platform.

Efficiency

- The software system is designed to be fast, efficient and reliable.
- The software will provide users and administrators with a fast and reliable way of accomplishing their jobs such as creating and scheduling appointments or updating dental information in little time at their own convenience.
- The design will ease the use of interface as the icons, buttons, headings will make it easy for any user to perform any operation.
- In case that a user enters data input incorrectly, the system will check and warn the user.

3.2.1.3 Performance

- It will be a web-based software, so it is required to be run from a web server.
- The performance of this app is strongly determined by the user's internet connection strength, server hardware performance, the algorithm's efficiency on fetching the necessary data from the database, the number of active users that are accessing the web at the same time and on the operating system that is installed in the server.
- Powerful server machines with high band internet access are needed to provide a better performance and handle multiple users.
- A high storage space is needed to support more users and bigger workspace per user.
- The web application should be developed as a lightweight web app so that it can work on almost any platform even with slower internet connections.
- The software shall support all the users who must have access in the system at any time.
- The software will take initial load time depending on internet connection strength which also depends on the media from which the product is run.
- The performance will depend upon hardware components of each user. Registration of data for each entity shall be processed in a few milliseconds.
- The software shall support 2000 users a day at maximum traffic.
- Software Response Times for failure should meet 95% of all pages in less than 8 seconds.
- DB system should easily handle 10,000 read queries per hour but only 3,000 update operations per hour.
- The system should be able to process 50 queries per second.

Capacity

- Average page load (from a user perspective) must be less than 500 milliseconds.
- Slowest page load cannot take more than 4 seconds.

Availability

- The app must be available more than 99.5% of the time, on average.
- The app must be available more than 99.999% of the time during the hours of 8am-8pm GMT+2.
- The app must be available and accessible by any user worldwide.

Latency

Latency is a time interval between the stimulation and response. Average speed for the completion of a full interaction is estimated to be faster than 50 ms.

3.2.1.4 System Interface/Integration

The database of our system will be provided to the dentists, receptionist and economist, as information. Not all of them will be able to make changes. Only the administrator can make changes to the structure of the database.

Network and Hardware Interfaces

The system will be a web application stored in web server, this means that a TCP connection will occur between the server and the browser. Every browser will be able to support the connection, this way our system will function properly and the administrator, the receptionist, the dentists and every patient will be able to access the system when in the right conditions provided.

3.2.1.5 Security

- In this system will be stored these types of data: Personal data of each user, Clinical Records of patients, Credentials of each person. Under the privacy policy, the dataset will be encrypted, safe from unauthorized usage and stored for unlimited periods of time.
- The methods that will be used to insert and store data in the database, will assure stability, check data integrity and prevent injections from inside or outside of the system.
- We will use methods as sanitizing, hashing and encryption in order to protect our system from external hazards.

Authorization and Authentication

- New users will be registered with a username and password. At that time an email with a randomly generated password that is automatically encrypted with b-encryption standard shall be sent to the .
- The database is centralized to a single admin user and accessible only to the administrator account who performs all the CRUD functionalities on the data

3.2.1.6 Data Management

The database will hold various types of data necessary for a fully functional system. The connection between php functions with the database make it possible for the users to interact with the data through the interface. The access to this data will depend on the priviledges and scope of functions of each user. The data is organized in entities which are connected with each other by relationships. These relationships create the data flow model among the users. These users will implement these relationships due to different features and functions that provide the interactivity with the data of the system. The overall structure of the entity relationships of the database will be build to be efficient in responding to users commands.

- Almost all of the data will be generated by the users as they continue to use the system, except for some specific data that has to be initialized like the credentials of the admin(editable).
- The system's database will have data regarding the employees including their personal information, the patients they have under care and the wages amount and delivery time. This information is accessed and manipulated only by admin and the employees but only for their account,

not for the other employees

- The database will hold the data regarding the inventory items and quantity, name and price for each.This data is accessed and manipulated only by admin.
  - Because the data validations are performed during input in forms of registration and log in and so on the accuracy of the data is relatively high. A special attentions must be paid to the quantities and prices as the information they contain is important for the clinic.
  - The system will contain data for the service list and the prices for each. This data can be viewed by everyone but can be edited only by admin. This type of data may be most frequently used by the patients to book appointments.
  - The database will hold data type photo(file) which are part of the Smile Gallery section. This data is uploaded by the admin into the database and can be accessed and viewed by everyone.
  - The system's database will also contain all the patients' records which are input of dentists. This data can be one of the most frequently used data as the patients supervision is one of the core functions of the clinic.
  - One of the main and most frequently used data is the one describing the appointments of type Date which is connected with dentists and service types.

3.2.2 Organizational Requirements

3.2.2.1 Operational Requirements

The E-DENT online software has the main purpose of facilitating the interaction between the dental clinic and its clients, while:

Allowing clients to have a personalized profile where they are provided a set of operations:

- Have editing permission of their profile personal information (Create, Read, Update, Delete)
- Set an appointment to the clinic
- Have an accessible personalized history of their dental records
- Give feedback of the service via rating and/or comments
- Have access on previous feedbacks of different clients

Giving the receptionist the responsibilities of

- Maintaining the timetable by CRUD functionalities over appointments(appointing dentists and time) as well as approving them
- Having CRUD functionalities over clients profiles when having clients verbal consent
- Having the responsibility of checking and editing clients payment status

Dentists operations consist of:

- CRUD access of their profile
- Read-only access to his/her assigned clients dental record
- Declaration of used material on each appointment by ticking boxes
- Access on his/her personal timetable

Admin operations consist on:

- CRUD functionalities of dentist and receptionist profiles
- CRUD functionalities on the menu of services and prices
- CRUD functionalities on the list of inventory materials
- Access the workers payroll, and expenses
- Generate reports regarding expenses, income, payroll.

3.2.2.2 Development requirements

Front-end - Client-side programming

- HTML (Hypertext Markup Language) and CSS (Cascading StyleSheet), used through Microsoft Expression Web 4 framework
- JavaScript with JQuery libraries to make the page interactive

Back-end - Server-side programming

- PHP programming language through the best free framework (Laravel)
- MySQL database for data storage
- VPS (Virtual Private Server) Hosting for handling clients requests

3.2.2.3 Environmental requirements

- Physical space of workstations places in every examination room as well as in the receptionist desk and main office
- Power supply through normal infrastructure which is connected to power generator in case of energy blackout.

3.2.2.4 Portability

- Since the software is a web based application, it can operate in any device and be accessed by anyone who has internet connection and a web browser.
- Only staff members and patients who have an account and password to log in can collaborate with other members and execute operations in the system.
- Real time updates when bookings and inventory orderings are made.
- The used portable scripting language will be php.

3.2.3External Requirements

3.2.3.1 Regulatory Requirements

The system will operate under a specific address that we will create and provide further in the project. Privacy policies will be in compliance with the Law No. 9887, dated 10.03.2008, “ON PROTECTION OF PERSONAL DATA” and related sub-legal acts. Privacy Policy describes and includes the types of collected information and also the way of usage of this information. As most entities on the Internet, visitors’ IP addresses to the web-based application are used to help diagnose problems with the server. IP addresses are not linked to anything personally identifiable, so the user sessions will be tracked, but they will remain anonymous.
Also, according to the law No. 9887, dated 10.03.2008, as amended with law No.48/2012, “On Protection of Personal Data”, the personal information of each user should be private and accessible only by the specific people.
This web-based application will also enforce the latest update on the General Data Protection Regulation (GDPR) as it became enforceable on May 25, 2018 in EU (European Union) and EEA (European Economic Areas) countries.

3.2.3.2 Ethical Requirements

The personally-identifiable information voluntarily provided by the users, such as name, surname, date of birth, phone number, email address will not be traded to other parties or shared. Controllers, processors and persons who come to know the content of the processed data while exercising their duty, shall remain under obligation of confidentiality and credibility even after termination of their functions.
At the same time, personally-identifiable information will be provided to third-parties if one or more of the following conditions apply:

- The administrator has received the consent of users to share the information.
- The administrator is requested or authorized to share the information by the legislation in force, court order or an act of a public or regulatory authority.
- The administrator shares the information in order to protect specific rights or staff members.

3.2.3.3 Accounting Requirements

Accounting requirements will be in compliance with the Law No. 25/2018 on Accounting and Financial Statements that was approved on 10 May 2018 by the Albanian Parliament abrogating Law No. 9228 dated 29 April 2004 on Accounting and Financial Statements.
Public interest entities that exceed the criteria of medium enterprises and the regulators of public interest entities (i.e. the Bank of Albania and Financial Supervising Authority) will apply the International Financial Reporting Standards (IFRS).

All other enterprises will apply the National Accounting Standards (NAS).

Entities may also select voluntary application of the IFRS.

3.3 Domain Requirements

Domain requirements reflect the environment in which the system operates, in our case a system for a dental clinic. The main purpose of this platform is to extend up the communication between clients and staff and allowing clients to have a personalized profile where they are provided a set of operations. Our software will be only accessible by five users which are patients, receptionist, dentists, manager(admin) and economist. The application is developed to be used by one dental clinic in order to customize the client's budget and their requests.

4. Software Design / Diagrams

4.1 User Scenarios

Admin Scenarios

Admin fails to log in:
1. The log in form to input the credentials is shown
2. Admin types the username and password incorrectly
3. The alert is shown for the incorrect credentials pop-up
4. The message for log in failure shows
5. The re-input of the credentials is requested

Admin successfully logs in:
1. The log in form to input the credentials is shown
2. Admin types the username and password correctly
3. After the database check is done the admin is directed to his homepage
4. The admin views his homepage

Admin changes credentials and profile info:
1. On admin's homepage clicks on the top right profile button
2. The "My Profile " page is viewed with the main information and the username and password
3. Clicks on edit button and admin all textfields become editable
4. Make the desired changes according to the validation rules and click save
5. Message "Changes successfully saved" pops-up

Admin fails to change credentials:
1. On admin's homepage clicks on the top right profile button
2. The "My Profile " page is viewed with the main information and the username and password
3. Clicks on edit button and admin all textfields become editable
4. Make the desired changes violating the validation rules and clicks save
5. Alerts on each text field for the error show and a message "Failed to save changes" pops-up

Admin edits the employee's list:
1. On the homepage clicks the Employees button
2. A table on all employees divided by category is showed

- Adds new employees:
    1. At the bottom of the list clicks on the Add button
    2. A form with required information is showed
    3. Admin fills it and clicks Save
        - If info is filled according to the validation rules the message "Changes successfully saved"
        - shows If info is filled violating the validation rules alerts on each text field for the error show and a message "Failed to save changes" pops-up

- Admin removes employee from the list:
    1. On the action section of the employee's list click the remove button on the employee he wants to remove
    2. A reconfirmation message appears "Do you want to remove this employee?"

    Click yes, the message "Successfully removed appears"

- Admin view employee's profile:
    1. On the action section of the employee's list click the "Full profile" button on the specific employee's row
    2. The profile with specific details is viewed
- If no changes are needed Click on the "Cancel" button
- To go back to the homepage click"Back"

Admin Edits the Service List:

1. On the homepage clicks the "Dental Services" button
2. A list of all Services and their prices shows

    - Admin changes the price/name
        1. Adjacent to each service there is a "edit" button, clicks on it and the name and the price fields become editable
        2. Make the changes and click "Save"
        3. The list is automatically updated
    - Admin removes the service form the list:
        1. Adjacent to each service there is a "Remove" button, clicks on it
        2. A reconfirmation message appears "Do you want to remove this service?"

    Click yes, the message "Successfully removed appears"
    - Admin adds a new service in the list:
        1. At the end of the list clicks on the "Add" button
        2. A Row on the list with required details to be filled is added
        3. Fill and click save , the new service is automatically part of the list

3. If no changes are needed Click on the "Cancel" button
4. To go back to the homepage click"Back"

Admin checks the job applications:
1. On the homepage there is a section with job application list
2. Clicks on "View all" to look at the full application list
3. For each application clicks "Open" to view the information and to Approve/Reject the application

Admin requests Reports from Economist:
1. Clicks on the "Reports" on the homepage
2. Buttons regarding the types of report to be requested shows
    - Admin requests financial reports:
        1. Clicks on the "Financial Reports " and a drop down box appears
        2. ""Balance Sheet" , "Wages Schedule","Income Statement", "Cash Flow" Is listed with a *request* command adjacent to each one of them
        3. Clicks *request* on the specific report and the request is sent automatically to Economist
    - Admin requests Invetory Records:
        4. Clicks on the "Inventory Records "
        5. A *request* command shows
        6. Clicks *request* and the request is sent automatically to Economist
    - Admin communicates with Economist:
        1. If specific information is needed Admin Clicks on "Message" and types the text and hits send

2. The message is sent to the Economist

Admin views the received reports:

1. Clicks on the “Reports” on the homepage
3. A Received Reports list is showed after the Buttons regarding the types of report to be requested
   - Admin views financial reports:
     7. Clicks on the “Financial Reports ” and a drop down box appears
     8. “”Balance Sheet” , “Wages Schedule”,”Income Statement”, “Cash Flow” Is listed with a *open* command adjacent to each one of them
     9. Clicks *open* on the specific report and the report file is viewed
   - Admin views Inventory Records:
     10. Clicks on the “Inventory Records ”
     11. A *open* command shows
     12. Clicks *open* and the report file is viewed

Admin checks the messages received:

1. On the homepage clicks on the “messages” button
2. A list of all messages appears

Admin logs out:

1. On the top right corner clicks on “Log out” button
2. The admin is sent back to the log in form page.

Receptionist Scenarios

Successful Log in

- Receptionist enters the username on the specific required field.
- Receptionist enters his/her password.
- If the credentials are correct, match those saved in the system database then the Receptionist is Logged in.

The Receptionist is directed to the his Page, that provide all the
-His profile
-Dentist’ schedule
- List of appointments scheduled
-List of patients of the clinic and access to their profile.
-List of payment/non-payment done by each patient

Unsuccessful Log in

- Receptionist enters the username on the required field.
- Receptionist enters his/her password.
- If the credentials do not match those saved in the system database, then an error message is displayed.
- Receptionist remains in the Log In page.
- Receptionist must re-enter his/her credentials.

Receptionist- Update Profile

- Receptionist is logged in the system
- Receptionist clicks on the Profile button at the side of his page.
- The user clicks on Personal Details to change his information.
- A form will be displayed with his registered information.
- Receptionist clicks on the edit button to change his information/picture.

Receptionist- Add a patient account

- Receptionist is logged in the system
- Receptionist goes to the Patient Page.
- Receptionist clicks on the Add Patient button.
- Receptionist is displayed a form with needed information to be provided.
- Receptionist fills the information regarding name, surname, username, phone number, age, password, category.
- Receptionist confirms the procedure by clicking on the Submit button.
- If data input entered conforms with the system restrictions, then the user is successfully added.
- User is created as an entry in the Patient table of the clinic system database.

Receptionist- Delete a patient account

- Receptionist is logged in the system
- Receptionist goes to the Patient Page.
- Receptionist is shown a list of all patients of the clinic.
- Receptionist clicks on the Delete Patient button.
- Receptionist confirms the procedure by clicking on the Submit button.
- User is deleted from the Patient's table entries of the clinic system database.

Receptionist- Searches a patient in the list

- Receptionist is logged in the system
- Receptionist goes to the Patient Page.
- Receptionist is shown a list of all patients of the clinic.
- Receptionist clicks on the search field and type the name of the patient he needs.
- List of patients is updated every time the Receptionist enters a key, to display the results.
- Receptionist clicks on the name of the patient and is directed to his page.

Receptionist- View dentist schedule

- Receptionist is logged in the system
- Receptionist goes to the Dentist Page.
- The Receptionist is displayed a page with a list of dentists' profiles.
- Receptionist clicks on a specific dentist profile to be directed to his page.
- Receptionist clicks on the calendar button to see the appointments assigned.

Receptionist- Add Appointment & Schedules

- Receptionist is logged in the system.
- Receptionist is directed to his/page.
- Receptionist goes to Appointment & Schedules.
- The Receptionist is displayed a table with a list of appointments scheduled.
- Receptionist clicks on the Add Appointment button.
- Receptionist is displayed a form with needed information to be provided: date, time, patient information, dentist, service to be provided.
- Receptionist confirms the procedure by clicking on the Submit button.
- A new entry is created in the Appointments table of the clinic system database.

Receptionist- Cancel appointments

- Receptionist is logged in the system
- Receptionist is directed to his/page.
- Receptionist goes to Appointment & Schedules.
- The Receptionist is displayed a table with a list of appointments scheduled.
- Receptionist clicks on the Edit button below the table.
- Receptionist clicks on the Cancel Appointment button beside the specific patient appointment.
- A table pops in to confirm the cancellation of the appointment.

- If Confirm, the page is refreshed to show the updated list.
- Entry is deleted from the Appointments table of the clinic system database.
- An email is automatically sent to the respective dentist and patient to notify that his/her appointment is cancelled.

Receptionist- Checks a Patient Dental Record

- Receptionist is logged in the system
- Receptionist goes to the Patient Page.
- Receptionist is shown a list of all patients of the clinic.
- Receptionist clicks on the search field and type the name of the patient he needs.
- Receptionist clicks on the name of the patient and is directed to his page.
- Receptionist clicks on the Dental Records button.
- The receptionist it is showed a list of dental records in the PDF version.

Receptionist- Checks a patient payment

- Receptionist is logged in the system
- Receptionist goes to the Patient Page.
- Receptionist is shown a list of all patients of the clinic.
- Receptionist clicks on the search field and type the name of the patient he needs.
- Receptionist clicks on the name of the patient and is directed to his page.
- Receptionist clicks on the Payment button.
- The receptionist shows the payment status: Paid/ Not Paid.

Receptionist- Checks a patient appointment request

- Receptionist is logged in the system
- Receptionist is directed to his/page.
- Receptionist clicks on the Notification button.
- Receptionist clicks on a patient request in the notification window.
- Receptionist submit the appointment according to the dentist's schedule and patient requirement.

Receptionist- View Appointment & Schedules

- Receptionist is logged in the system
- Receptionist is directed to his/page.
- Receptionist clicks on Appointment & Schedules.
- The Receptionist is displayed a table with a list of appointments scheduled.
- Each entry in the table provides information such as date, time, patient name, surname, dentist, service, payment.
- Below the table are displayed images of the dentists of the clinic, that when clicked direct to their profile.

Dentist Scenarios

Successful Log in:

- Dentist enters the username on the specific required field.

- Dentist enters the password on the specific required field.

- If the required entered information is correct, matches that saved in the system database, then the Dentist is successfully logged in.

- The Dentist is logged into his/her page, where the following options are provided on the right side of the page:

- His/her profile - Patients’ Dental Records - Appointments and Schedule - Messages - Log out

Unsuccessful Log in:

• Dentist enters the username on the specific required field.

• Dentist enters the password on the specific required field.

• If the required entered information is not correct and does not match that saved in the system database, then an error message is displayed.

• Dentist remains in the Log in page.

• Dentist should enter the required information again in order to log in.

Dentist – Profile Update

• Dentist is logged in the system.

• Dentist clicks on the Profile button at the side of his/her page.

In the Profile page, the following information is provided:

- Name - Surname - Birthday - Degree - Phone - Email - Gender - Password - Profile Photo - CV - Status

• Dentist may make changes to this information, by clicking on the button Edit.

• Dentist may save the changes by clicking the Submit button.

Dentist - Upcoming Appointment

• Dentist is logged in the system.

• To see the upcoming appointment, the dentist can simply click on the Button Check the upcoming appointment and the appointment with the specific information will be provided.

Dentist - See Schedule

• Dentist is logged in the system.

• To see the schedule directly, the dentist should click on the Check your schedule button and the schedule will be shown.

Dentist – See Appointments and Schedule

• Dentist is logged in the system.

• Dentist goes to Appointments page.

• Dentist is provided with the following options:

- Appointment Number- Date- Time- Service- Comment- Name- Surname- Special Health Conditions- Done/Not Done

• Dentist clicks on the specific fields to make the desired and corresponding annotations.

• Dentist is provided with the Daily Schedule in this page.

Dentist – See Patient Dental Records

• Dentist is logged in the system.

• Dentist clicks Patient Dental Records and is directed to that page.

• Dentist is provided with the following information about the patient:

- Name - Surname - Age - Gender - Treatment and services provided to the patient

Dentist – Message the Patients and received messages

• Dentist is logged in the system.

• Dentist is provided with the messages from the patients in the first page.

• Dentist can write a message by clicking on the Write a message button at the end of the page.

Dentist – Log out

• Dentist is logged in the system.

• To log out, dentist should click on the Log out button on the right of the page.

• Dentist is logged out and is directed to the Log in page.

Economist Scenarios

Economist fails to log in:

1. The log in form to be filled with the credentials input is shown
2. Economist types either username or password incorrectly
3. The alert is shown for the incorrect credentials pop-up
4. The alert for failing to log in is shown
5. Request to refill the credentials with the right input is requested

Economist logs in successfully:

1. The log in form to input the credentials is shown
2. Economist types the username and password correctly
3. After the database check is done the economist is directed to his homepage
4. The economist views his personal homepage

Economist fails to change his credentials and profile info:

1. In the upper-right of economists homepage clicks the Profile button
2. The personal info “My Profile” page is shown showing all the credentials
3. Clicks on the EDIT button on the bottom and all the fields can be editted
4. Make the desired changes and click the SAVE button
5. Changes not made according to validation rules and “Failed to save changes” pops-up

Economist changes his credentials and profile info:

1. In the upper-right of economists homepage clicks the Profile button
2. The personal info “My Profile” page is shown showing all the credentials
3. Clicks on the EDIT button on the bottom and all the fields can be editted
4. Make the desired changes and click the SAVE button
5. Changes made according to validation rules and “Changes successfully saved” pops-up

Economist checks the revenue (inflows):

1. On his homepage there is a small table with the header Incomes
2. The very last transactions are shown there
3. To open the full table clicks Go Button next to the table
4. The table shows all the transactions:
    a. number
    b. name
    c. surname
    d. date
    e. time
    f. description
    g. amount.

Economist Sorts the inflow transactions (all steps above):

5. The economist can sort them by all of them by clicking on the table headers

Economist Choses the extent of the transactions list (all steps above):

6. The economist can expand the list by clicking on the “Show” dropdown button and choose:
    a. Today
    b. This Week
    c. This Month
    d. This Year

Economist Prints a list of transactions (all steps above):

7. By clicking Print button, after having done the sorting and expansion
8. The print Tab Pops-up

Economist Checks the Expenses:

On his homepage there is a small table with the header Incomes

1. The very last transactions are shown there
2. To open the full table clicks Go Button next to the table

Economist Adds an expense transaction (all steps above):

3. Clicks on the “ADD” Button on the bottom right
4. A new editable row is shown in the beginning of the list
5. After finishing filling the fields on the row click button “Save”
6. The table shows all the transactions with the headers:
    a. number
    b. name
    c. surname
    d. date

e. time
f. description
g. amount.

Economist Sorts the inflow transactions (all steps above):

7. The economist can sort them by all of them by clicking on the table headers

Economist Chooses the extent of the transactions list (all steps above):

8. The economist can expand the list by clicking on the "Show" dropdown button and choose:
   a. Today
   b. This Week
   c. This Month
   d. This Year

Economist Prints a list of expense transactions (all steps above):

9. By clicking Print button, after having done the sorting and expansion
10. The print Tab Pops-up

Economist controls the inventory depot:

1. From his homepage on the upper-right clicks Inventories
2. The Inventory page opens, a list of materials is shown each entry having:
   a. Material
   b. Amount
   c. Duration
   d. Description
   e. Last Order Date
   f. Last order amount
   g. Price per Unit

Economist Adds a new material (steps 1&2):

3. Click button ADD
4. An editable row of blank entries shows in the beginning of the list
5. After filling the row, click the button Save
a. If entries filled according to the validation rules the row is created on the list
b. If entries are filled in violation of the validation rules, a warning will show asking to refill (redo step 5)

Economist Deletes an existing material (steps 1&2):

3. Select the existing material by clicking its row
4. Click the DELETE button, an alert pops-up "Do you really want to delete this material"
5. Click Yes, the entry is removed from the list

Economist Edits an existing material (steps 1&2):

3. Select the existing material by clicking its row
4. Then click the EDIT button
5. The Selected row becomes editable, click and edit the entries
6. To finish click SAVE
a. If entries filled according to the validation rules the row is updated
b. If entries are filled in violation of the validation rules, a warning will show asking to refill (return to 5)

Economist Orders new materials(Steps 1&2):

3. When a material low on stock to reorder click “Go” button next to “Place new order:”
4. A list with the names of suppliers as well as their emails will show
5. By clicking their emails, automatically an email window will open where the economist can make the order

Economist takes report request from admin:

1. On the homepage “Document request” notification is shown
2. By clicking on the notification the request specifications are shown
3. After the economist has prepared the report clicks the Upload button on the notification
4. Selects the report file
5. Press Send Button

Patient Scenarios

Successful Log in:

1) Patient enters the username on the specific required field correctly.

2) Patient enters the password on the specific required field correctly.

3) If this information is correct and the database check is done then the patient is successfully logged in.

4) The patient is directed to his/her personal page where are provided the following options:

- Patient’s profile
- Check dental clinic’s services
- Book an appointment
- Check appointment status
- My Appointments
- Dental Records
- Chat with the dentist
- Log out

Unsuccessful Log in:

1) Patient enters the username on the specific required field.

2) Patient enters the password on the specific required field.

3) If this information is incorrect and does not match that saved in the database, then an error message is displayed.

4) Patient remains in the Log in page.

5) Patient must re-enter the required information in order to log in.

Patient - Update profile

1) Patient is logged in the system.

2) Patient clicks on the Profile button at the side of his/her page.

At the Profile page this information is provided:

-Name-Surname-Age-Birthday-Email-Phone-Gender-Special Health Condition-Password-Picture

3) Patient may make changes to this information, by the Edit button.

4) Patient may save the changes by the Submit button.

Patient - View the services provided by the dental clinic

1) To check dental clinic's services the patient should click on the button Check our services.

2) By clicking on that button the list of the services provided will be shown to the patient.

Patient - Book an appointment

1) Patient is logged in the system.

2) If the patient decides to have a treatment/consult in the clinic, he/she should book an appointment by entering the time, date and service that he/she would like and then click on the Book now button.

Patient - Check appointment status

1)Patient is logged in the system.

2) To check appointment status, the patient simply has to click on the You can check here your appointment status button and the status of the appointment will be provided.
Status options will be as following:
- Active: Patient makes a request
- Confirmed: Receptionist has confirmed it
- Cancelled: Receptionist/Patient has cancelled it
- Finished: Service has been provided.
- Completed: Patient has paid.

3) Patient may also check the appointment status by clicking My Appointments and he/she will be directed to Appointments page.

Patient - Appointments

1) Patient is logged in the system.

2) Patient is provided with the following information:

-Appointment number-Date-Time-Service-Status-Doctor-Paid/Not Paid

3) Patient can make changes on the appointment by clicking on the button Edit.

4) Patient can save the changes by clicking on the button Submit.

5) In this page the patient will be provided the following information related to the status of the appointment:

- Active: Patient makes a request
- Confirmed: Receptionist has confirmed it
- Cancelled: Receptionist/Patient has cancelled it
- Finished: Service has been provided.
- Completed: Patient has paid.

Patient - View Dental Records

1) Patient is logged in the system.

2) Patient clicks Records and it shows his/her dental records and also the beginning and the end date of the dental treatment.

Patient - Chat with the dentist

1) Patient is logged in the system.

2) If the patient wants to chat with the doctor, just click the button “chat with the doctor“, then communicate with the dentist.

Patient - Log out

1) Patient is logged in the system.

2) To log out, the patient should just click on the top right corner on “Log out” button.

3) Patient is logged out and is sent back to the log in form page.