

### **4.1.1 ER Diagram:**

This diagram shows the 8 tables and the different entities each of these entities is related and these relationships with the other entity. These tables are Manager, Staff, Booking, Customer, Services, Product, Order and Order\_Details. This diagram shows types of relationships such as: one-to-many and many-to-one.

### **4.1.2 Data Dictionary**

Data dictionary is one part of the database which includes the information about the database. It is structured in views and tables. The current system has several tables. In the data dictionary, tables are described by their attributes, data types and constraints of the attributes.

### **4.1.3 Normalization:**

Normalization is one technique of organizing the data in a database. Its process is to remove redundant data from tables in order to improve storage efficiency. The main goals of normalization are to minimize the data, make it easier to maintain, and provide better design. Normalization is a multi-step process, so they have three main steps following as:

1. First step (1NF) is removing repeating groups from the original table so each set of columns must have a unique value. Then separate repeating groups and non-repeating groups into one table with a PK that distinguishes it as unique.
2. Second step (2NF) removes partial functional dependency (PK-NK) so in the first table every non-primary key column is dependent upon the entire primary key.
3. Third step (3NF) removes transitive dependency (NK-NK) so you must remove any non-key that is dependent on the primary key.

#### **4.1.4: Use Case Diagram**

Use case diagram is describing graphic of the interaction between the elements of system is one methodology used in system to clarify, identify, organize and analysis the system requirement. The purpose for using use case to understand the business process and to ensure the delivery software work properly. The figure blow shows three actors Customer, Manger/Admin and Staff.

#### **4.1.5 Class Diagram**

Class diagram is static graphic so is represented static view of an application it base for component and deployment diagrams they describe the attributes and operation. Also it used to describe the responsibility of a system. There are 8 classes for online Let's Relax Spa management system (Manger, Staff, Customer, Product, Services, Order, Ordder\_details and Booking) with different attribute and operation.

#### **4.1.6 Sequence diagram**

Sequence diagram is used to show the interaction between the objects. The essential feature is that time passes from up to down. Meaning of that is the beginning of interaction is from up and end of interaction is down.

#### **4.1.7.1 System Architecture**

Let's Relax Spa company is use three tier architecture. The three tier architecture includes three levels which are application server (middle tier), database server and client (presentation tier).

Application server includes business logic such as calculations, validations and insertion date. In Let's Relax Spa Company, application server is used to do total rate calculations in customer order add new product and services, Manger, customer and Staff. This level simplify and make faster communication between the client and database server. Application server helps in retrieving data from the database and display total rate.

Database server includes the database of Let's Relax Spa Company. The Staff and Manger can login to access the system but the Customer first should register and

registration details will be stored in the database and they can login to the system. The application web server will be a client in accessing database server.

- ✓ Three tier architecture, this architecture include three layers following as:
  - Client layer: used for presentation of the application it contain user interface this layer used for design purpose for example designing booking form which contains text box, label, button etc. where data is presented to the user or input is taken from the user like the Customer can use the internet browser to booking the appointment and the Manger can also access the online report provide by the system. Also the doctor can use the internet browser to access the system from anywhere.
  - Business layer: is intermediary layer that help the client communicate faster with data layer it acts as interface between the client layer and data layer. In this layer written all business logic like data insertion, calculations and validation of data etc. The application server is used to process Customer information, logic to booking the appointment and the Manger generates report etc. More than one Customer can be access to the application layer to fill your personal information (name, address, telephone number and email) at the same time in register form but if user inters incorrect user name and password the system cannot allow accessing the system and viewing the forms.
  - Data layer: contains different methods to connect with database so whole database of Customer information system reside the database server layer and the (admin) have ability to insert, delete and update the data also the Customer can search for any information. This layer managing all fixed data and protected from direct access by the client so the interference must done by the application layer .

✓ There are many advantages for using three-tier architecture such as:

- Provide high performance.
- More secure, because the client dose not connect direct to database.
- Technological flexibility, so it flexibility in configuration and deployment platform.
- Improve customer services it provide simplest interfaces so the client can used different web browser.

- Reduces the risk.
- Easy to modify the data without effecting in anther model.
- Scalability.

#### **4.1.7.2 Data block**

Data block is smallest logical component used by database so when user selects data from a table, the select operation will read or fetch data from the database files in units of data blocks. The data block consists of index, table or consolidated data.

Data block size is the minimum unit for conducting database systems business of updating, selecting, or inserting data so the size of data block will be affect in performance for that reasons there are many guiled lines or criteria for choosing the data block size such as:

- If rows size is small and access is mostly random and lot of index lookups it should be chose smaller block size.
- If rows is large or if the rows is small and access is mostly sequential it should be chose a large block size.
- The optimal block size for most systems is 8K.
- A larger block size is suitable for report application if doing scan for large table.
- A small block size is useful for (OLTP) online transaction processing and a larger block size is more suitable for decision support system.

In online Let's Relax Spa management system will be chose 8K as block size of the system causes it help to improve database performance when user reading or searching for large data from the disk and also is optimal block size for most systems .

#### **4.1.7.2 Index:**

Index is another way to improve database performance it determine the locate information quickly and it copy of the selected columns of data from the table that can research very efficiently. Ideally the table which has frequently updated it should be not used index because of the overhead involved. The table that contains primary key by default the index will be crated but the table contains forging key must me crate an index to improve performance. Consider when create an index the column it should be in order causes it will affect in query performance.

#### **4.1.7.3 Auditing:**

Database auditing is auditing or monitoring the database user actions. DBA use auditing for security purpose. It can apply on SQL statement type for example insert, delete and

update which is executed. In addition, auditing can be applied on data such as time, username to monitoring successful and failed login attempts. Such as monitoring if the users do any update in table and recording the data about updates in auditing table. The objectives of auditing are integrity, confidentiality and auditing report. The benefits of auditing are enhance the security of the system and ability to generate alert of email when any changes is happens.

#### **4.1.7.4 Privilege:**

As we know multiple users can access the system and access the database objects, so we need controlled authorization these objects by privilege. Privilege is performing different administrative functions inside the database so every object has an owner and privileges control if a user can modify an object owned by another user. A privilege is issued by use grant command and revoke command that means user can access to the data so the database is handled through these types of privileges:

- System privilege it perform particular action or to perform an action on an object of particular type that allows user database to perform administrative procedures that occur within the database for example cerate table ,session ,index, procedure and etc. just the instance administrator or user with admin privilege can grant or revoke system privilege.
- Object privilege it perform particular action or to perform an action on an object or to access anther object is another type of SQL server security so is granted the appropriate privileges to specific persons to do specific operations on database objects for example select, insert, update and etc. so the Manger just has privilege to connect the system and some kind of operation like insert, select and view information they cannot drop any table. On the other hand the customer has specific id that help them to book the appointment or buy the product so each customer can see only their information. Also each staff has some privilege access the system and to add some information related to the customer.

Backup and recovery is one technique that protects the database which lose it by network failure, system failure and hardware and software failure. Backup is copy of data from your database that used for reconstructing the data it dived into tow type physical backup which often referred to as an operating system backup it used for storing and recover database like data files control files and archived red log the anther type is logical backup which contain logical data such as table or stored procedures. Backup and recovery it can be simple and complex depending on the business requirement so the DBA will be able to create a backup and recovery strategy. Backup and recovery is an essential way for the database of online Let's Relax Spa management system so the backup strategy for this system is:

- Full backups is copy of all the files and folders selected for the backup it take a long time and lot more storage spaces but it easy and fast for restores it very useful for save the database from any failure accrue during system work. Full backups is complete backup .The advantages of full backups is provides a single backup for your system, restore different versions and easy to maintain.

## **Create Database**

Physical database is one process for transfer logical data model into description of the physical database or into step of SQL statement so use SQL server 2008 to create database for Web Based Spa Management System for Let's Relax Spa. The figure blow show the cerate database which named by Let's Relax Spa.

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## **5.2 Test/ Evaluation:**

It is the process used to test the system works, and the components and requirements. Results are evaluated through performance, design and the possibility of support. Why use the testing / evaluation to determine whether this system is working properly or not, and this proves when evaluated.

The test system if it has achieved the requirements. In addition the test is to determine the errors. In other words, test is a very important stage and necessary to evaluate the system from all sides to see the quality of the actual system. This is certainly by testing the knowledge of how the system works and whether works well. Do not just test at the end of the implementation, but be continuous during the implementation cycle. This test confirms whether this integrated system.

There are some keys test points:

1. Ensure that the system achieves the client's requirement for staff, manger/admin and customer.
2. All users should be able to access all of their duties and their accounts.
3. Check the security of the system, and ensure the presence of credence to allow access to the customer, staff and manger/admin.
4. Users can access the data.
5. The customer can see the details of the request.
6. The manger/admin can see how to update, store and save data.
7. The manger and staff can see the reports of the Spa.

### 5.2.1 Testing strategy:

Testing strategy is one approach to ensure that whole system working well it use it to inform the project manager, developer and tester about the some issues of the testing process so will use test strategy to deliver the highest possible quality in the end of project. Test strategy it consist of myriad of activates and methodologies such as:

**Black box testing:** is software testing techniques which I used in this project it just examine the functionality of an application it does not testing coding or internal also is known as functional test. This type of testing is very useful it helps to find error in early stage and try to handle it moreover it no needs to have knowledge about particular programming language. This testing is based on the user perspective because the users who will be accept the system in the end so the designers independent form the tester. In this project I will be making different type of test represented on:

- **Unit testing:** is another software testing methods it tested each form in the application for instance test login form which required from the user so if the user enter the proper username and password the web page will be open otherwise the webpage will not be open and show you the error message to enter correct username and password. But consider the user information must be saved in the database when register in the web site at first time to ensure the user not repeated. This type of testing is important causes it shows you the large percentage of defects is determined during its use.
- **Integration testing:** is software testing methods it tested as group it used to test unite of code or individual software component to verify the interaction between different component software and detect interface defects for example the admin enter the user name and password they have ability to manage or control the web site successfully so it can delete or insert or update any recorded in database moreover it can make different reports but if the admin entering incorrect user name and password they receive error message.
- **System testing:** finally testing for the system by the other tem it check the behavior of a complete and fully integrated software to ensure the all function of the system project and evaluate the end user requirement ,business and functional. This type of system will be carried out only after the system integration testing.

- **Acceptance testing:** this type of testing will be performed by the client with respect the requirement which was agreed upon I used this test to obtain the results required and user satisfaction. Also it known as beta testing of the product the purpose of these testing to validate the end to end business flow.

**5.2.2 Test plan:** Test plan is a documents which describe the project plan it contain the detail of who the workflow. The main purpose of test plan is to ensure the all function and design requirement has been implemented because the test plan it help to identify amongst others test items, manage time, identify the features to be tested, the testing tasks, who will do each task, the test environment, the test design techniques, degree of tester independence and entry and exit criteria to be used. Also it help us to manage the challenges so it manage any changes occurs during project development.

### **5.2.3 Test case:**

Test case is document it consist preconditions, expected results, a set of test data and post conditions which developed for a particular test of this project to verify compliance against a specific requirement. Also it consist description of test step, the result of the test and the number of test. So this table will be describing the case test.

## **5.3 Deployment**

Is a set of activities to create programs available for used. The applications and install software on the operating system. Also be installed on the computers in the Spa and customers will be able to reach it because a website. All applications and software are on the manager's computer.

### **5.3.1 Client machine specification**

The client machine consist all the requirement of the client which need it to installed the system it can be installed in any operating system it must be organized and configured. The specifications that client must have in their machine are:

- Computers (Windows 7 or 8).
- Microsoft Visual Studio (ASP.NET 2012 or 2017).
- Microsoft SQL Server Management Studio 2008.



### **5.3.2 User expertise levels**

User interface is simple and clear so the user can use it simply and all user can use it so no need to going to expert which have knowledge about the system required so they can use this website application easily.

### **5.3.3 User training planned**

Training is required for the administrative because all the responsibilities of system depend on them. Also it important for staff which that not have any knowledge about the how using to access the system and how use the computer so it must training this person how to use all function in application.

## **5.4 Critical Evaluation**

Each project need to evaluate the final work to ensure the project has been done successfully or not so to evaluate project we need follow two key one of them learning process from the project which improve the performance in the future. Second key is issue verdicts based on the evidence or arguments about values and the quality of the project.

This project will meet all the Spa requirements where that solves the problems suffered by the customer and staff such as a long queue standing in the reception and the customer doesn't have any other way to book appointment also it reduce the overloaded for the staff when dealing with many of customer who are visiting the Spa every day so by this project customers can easily enter their personal data without visit the Spa that means the system saves time for staff to serve other customer.

Web Based Spa Management System for Let's Relax Spa has several features such as:

- Achieves enhance the communication between the manger, staff and customer by offering quick links between them and between whole departments.
- The system contributed to get rid of waiting a long time inside the Spa to make appointment but now they can easily make it by the website.
- Complete transaction as fast as possible and providing quick search of the information which means save the time and effort for the users.

In the other hand system has several great functions that help much each user for instance when the customers visit the website of Spa they can see different features such as booking appointment, buy product, search for offers, list of price and view information about the products and services but if the customer visit in first time they should register and fill personal information to get the username and password that make enable easily to log in the system. As the same case with the staff they should first fill personal information by the manger to get the username and password to access the page which contain (check customer book and check customer order).

Web Based Spa Management System for Let's Relax Spa project it gives a great experience by using new software ASP.NET (It is a programming language from Microsoft company to design and develop website) also it provide enhance the knowledge and the experience of programming skills and analyzing of data that's help to improve technical programming skills when using ASP.NET.as mentioned before in this project using new software is ASP.NET so that is main challenges to deal with this software so to learn this software I refer many website and books also I attend work shop and I have see many videos in the YouTube to learn how to design website and friendly interface in addition to that ,I learned how to connect the database by using SQL server with ASP.NET There are many difficulty encountered during this project. Generally the project has been done successfully with all the requirements.

## **5.5 Social, Ethical and Legal Issues**

An implementing a project in such environment it will impact in the society in terms of social, ethical and legal, the project who's the developer implement it he has been take care of those terms to be in safe side.

In term of social, this project will don't affect any body in society that it doesn't takes the privacy of the peoples that is used this system, in addition' it will not lose any jobs of workers that it will not affect in them' but it will open more opportunities to install such those type of project that workers will learn a new technology that it can be installed in the houses, also it will helps the peoples whose installed it to keep their home safely and saving electricity bills.

in term of ethical issues, the developer has been used an open source software materials, and free books to avoid copyrights that is will be effect the quality of the project that is not stratify with the ethical constrain, in addition the project has been implemented to be safe and not hack the user privacy of them that the customer whose wants this project he will going to trust it.

In term of legal issues, the developer is fully has used open sources, free video tutorials to avoid legal issues with the government, and it's allowed to use such this technology in Sultanate of Oman.

### **5.5.1 Social issues**

These days increasing number of Spas, but a lot of them do not have the system or its own website. These shops do transactions on a normal system. But they faced a lot of difficulty in the loss of data because they using the papers. On the other hand the difficulty happen to have received orders and absorbed, to the piece a lot of customers come to the shop and order more than one product. The workers inside the shop cannot completion of their transactions in an integrated manner, so this system solves a lot of problems in the community so that it saves time and manages all operations. Social issues Positive and negative system have an impact on society. Have a positive impact, but the piece that the system is to facilitate the buying and booking process also makes all operations occur automatically. This system allows the customer demand through it without that comes directly to the shop and demand. Director can also see all the details of the inside the shop and see the daily reports on sales and booking. On the other hand the staff can see the request details of the customer and rapid response to their request. This system saves the data, the users should know how use the system and face the problems when they occur.

- Privacy: the Spa system should be preserved and stifles personal information for staff, customers and the manager and not violation of privacy. In such cases affect the Spa's reputation dramatically.
- Possible that this issue will affect and lead to the loss of the job of the people, for the piece of the system to serve people in the community to finish their transactions, such as demand through it. This system positively effects of being quick to use, and be kind to use electronically.
- Use the system and to meet the people's transactions, the piece leads to feeling relieved. The Spa can perform transactions fast and flexible.

### **5.5.2 Legal issues**

Legal issues are a group of disputes and legal problems. Of the piece is the conclusion of contracts between companies away from the falsification of personal data or your own Spa. The following presents some of the points that talk about some of the legal points that must be taken for the benefit of the Spa and its environment (system) and also for the benefit of the country.

There are a set of laws that protect the system from any access illegally, and these are unauthorized persons entering the system. Also keep the data from theft or loss, is not allowed unauthorized persons. In Web Based Spa Management System for Let's Relax Spa should avoid the problems.

- ✓ The Spa that should provide the training ring where explain to staff how to use the system and how to avoid the risks when they occur, and must make staff to become proficient in its use to be able to completion of their operations quickly. Given to each staff inside the shop own username, password and e-mail to be able to work on the system without any problem.
- ✓ The advantage of this system that all staff when they login they can access a page of their duties. In addition it is to each user have username, password and e-mail is different from the other. Also helps to reduce the incidence of manipulating the data of others and occurrence of legal problems, so manager of the Spa must work on the legal regulations for non-violation of the system.
- ✓ Also add that these laws are just as applicable to the system should apply to the country. Oman has laws governing aspects of life, for the violation of these laws is to take measures Crisis: for example, will not be receiving the project or work done.
- ✓ The system is characterized save personal information for the manager, staff and customer. Penetrate this information lead to legal sanctions.
- ✓ The project when providing its services around the Spa environment, the agreements must be on the provision of services and high level of good for customers and employees to control the quality of service.

### **5.5.3 Ethical issues**

A lot of companies and project managers face ethical issues about the management of the project, whether the company or a particular project. These issues revolve around the values and beliefs of the individual, where there are no sanctions on the issue. The project managers must step up in repelling the ethical issues they face. Each project if the developer or be designed to be taken on the application of the principles of standards ethical. In this project must have a good interaction between the manager, staff and

customer, In addition to that there are some ethical issues for the management of this project are:

1. Copyright Issues: Breakthrough Copyright. Some of them will change the data to the false statements or they put Name example (Copyright ©XXX.2017), for the piece to avoid such an issue should work closer to these rights to the owner of the original project, which is written (Copyright © 2017 AL yaqoobi). The piece is saved to the original version of all the programs and reports that are stored.
2. Must also use everything in the Spa in a legal way. The main objective of this project is to store data especially for Spa, manager, staff and the customer. Also facilitate the sale and purchase through the system. The good thing that every staff, manager and customer has own username, password and email which will be logged into the page to do they work.

Finally every employee should have to worry about its work without interference in business or personal matters to the other employees so no data loss. Get rid of these issues. First put the project requirements before you start it. In addition to that it must enter the correct information, which will be sourced from the Spa management so they are not lost.

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### **6.1 Provide Recommendation for Future Work:**

When the project began in the design of any system or to develop a system, you must conduct a study and search for the old system and know what the problems they face are. After knowing all this is an appropriate solution for him. The collection of information about the ancient knowledge of their system and knowledge of requirements that shop management wants, and this will be of benefit big to design a new system. For the piece requires a new system designed to correct and valuable information. When compiling the information must be requires analysis and ranking.

As I noted previously replaced Let's Relax Spa they do not have any system, only they have normal system; the normal system rolling around the buying and booking. There is no system saves the information and Spa management. Here comes the role of the developer that analyzes the information that may be obtained and the order, even help to create new ideas about the new system.

In addition to the collection staff requirements and the Spa management about the new system for the shop, and in accordance with those requirements make the system works smoothly, and speed up transactions and to facilitate the buying and booking process. Finally, be security in keeping the Spa information (Manger, Staff and Customers).

The recommendation on this system that every staff, manager and customer their own job, so the customer can order and book through the system, the staff receives the request and will respond to the customer's request, and finally manager is fully operational in the Spa, for example, store, edit, and delete information. And can add or edit the services and products, also the manger can add and delete staff by the system.

Also this system recommends providing a report of all sales and booking information during day. On the other hand recommend this project future improvements help to improve it later:

- Open the idea to creating a system to all spas to develop sales and booking, also save spas rights system.
- Providing training courses for management Spa and staff on how to use the system and learning to cope with difficulties and solve them.
- Create text message or (SMS) through the system.

Add some features in the system such as:

- Alert staff and customer for booking time by receiving a text message.
- The customer can write any feedback through the system also the staff can view the feedback of customer and check it by the system.
- Adding a new feature in the system which is adding the names of the staff and the services they are provide.

## **6.2 Highlight the Strengths of your project:**

After implementation of the project or system, confirm that there are some strengths of the project:

- 1) Seek satisfaction about the Spa management and staff in the spa.
- 2) Switch manual system to electronic legal document.
- 3) The implementation of this project using different applications and languages, such as Language (V.S) and (SQL Server) and store the data in the database.
- 4) This system on the website for management, flexibility and security in use.
- 5) Ease of use of this system on the Internet.
- 6) Ease of completion of the transaction and save time.

## **6.3 Discuss What Advances you have made and Make:**

When the system is designed to replace this capability helps in the design of many of the websites to avoid many of the problems facing the Spas these days. This system is has the ability to save the information. Before starting work on the project, we must know the difficulties or problems and after the piece is placed right solution and fixed by the system design.

Understanding and assembly of the difficulties it is analyzed and repair. There are some analysis tools including graphs that collects operations from the old system and improved. There are a number of programs designed to help draw a concept of operations and clearly, for example: UML Star, MS. Visio and MS. Project. Some of them also help to understand the operations of the project, including: DFD (Data Flow Diagram), ERD (Entity Relation Diagram), Use Case, Flow Chart and Context Diagram.

At the end of each project must be tested, the spectrum evaluate the operations of the system. The test and check if find any errors are repaired on the spot. The test is a useful to gather their opinions about the system and what are their suggestions to make it efficient in the Spa environment.

## **6.4 Include Details of the Additional Knowledge/Experience that was gained:**

When I finish designing this system my knowledge technology has increased by using the software for this project. Use of programs such as: MS, VS, SQL Server and Context Diagram.

The ability to use the database and save the data inside it; using the SQL Server and the ability to use a programming language VS for the design of the website. This system helps to how to transaction manage and save the documents and information.

I benefited through this project, how to collect and analyze information. In addition to knowledge how working of the security system, user interface, security testing and knowledge of input and output operations.

Finally, I have earned the ability to design the system, to improve the work and save time and also facilitate the completion of the transactions faster.

## **6.5 Conclusion:**

In the booking and sales information system for Let's Relax Spa that put a lot of facilities for managing the activities of the spa. The main reason about the design of this system is not stores all transactions and information, where they face difficulties in receiving applications and save their own data. This system serves as a websites facilitates the work and its use, and the ability to terminate the transaction through the system. For example, the customer can order and book without resorting to the spa directly. Also the staff can receive the customer's order or book and to respond to his order or book. In addition to that manager controls all entrances and exits of the system environment, and can see the reports also the staff can see the reports of the system.

Web Based Spa Management System for Let's Relax Spa will help Let's Relax Spa management on the completion of their transactions easily and faster. In my opinion Let's Relax Spa profits will increase because of the existence of the new system so everyone can access the system easily and anywhere.

I have got a lot of skills of using a program (V.S), which contains a lot of features. Also I get ability to deal with the database (SQL Server), which was able to store data through it.



