Design And Implementation Of an applied relational data base for Students Projects Suggestions

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Abstract

The electronic government associates with the real government as a source of information and services. Citizens, institutions, and organizations found in society are represented as users who want to access this information and government services, and that is an improvement to the services execution and the goal here is to simplify these services to all parties.

This system implements the building of a relational database so as to store the information about suggested projects by a number of supervisors to be chosen by the undergraduate or postgraduate students.

Supervisors may use this Database so as to declare their projects, while students are using this database to reserve the proposed project that is suitable to their opportunities.

Keywords: Relational Database, Suggested projects, Database management system, Data security.

تصميم وتنفيذ قاعدة بيانات تطبيقية علائقية للمشاريع المقترحة للطلبة

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الخلاصة

ترتبط فلسفة الحكومة الالكترونية بالحكومة الفعلية كمصدر للمعلومات والخدمات كما ان المواطنين ومنشآت الاعمال والمنظمات المختلفة المتواجدة في المجتمع تعامل كمستفيدين يرغبون الاستفادة من هذه المعلومات والخدمات الحكومية ويمثل ذلك تغييرا جوهريا في ثقافة تنفيذ الخدمات والمعاملات الحكومية ونظرة المواطنين والاعمال تجاهها والهدف الستراتيجي للحكومة الالكترونية يتمثل في دعم وتبسيط الخدمات الحكومية لكل الاطراف المعنية. تم في هذا النظام بناء قاعدة بيانات علائقية لخزن المعلومات المتعلقة بالمشاريع المقترحة من قبل مجموعة من المشرفين للدراسات الاولية والعليا ليتم بعد ذلك اختيارها من قبل الطلبة. ويمكن للأساتذة اعتماد هذا النظام للتعريف بالمشاريع المقترحة، كذلك يمكن للطلبة الدخول الى هذه القاعدة واختيار أحد هذه المشاريع.

الكلمات المفتاحية: قواعد البيانات العلائقية، المشاريع المقترحة، نظام ادارة قواعد البيانات، امنية البيانات.

Introduction

Projects Suggestions Database is an online simulation for projects reservation procedure, so students can explore the suggested projects using this designed system.This system provide full details for each project, and any changes applied on any project will be instantly updated, so student by a very simple look will get a full idea about each project and this will make decision easier to him. This system cannot stand alone, It is useless without records of information to deal with, and this is was achieved by using **Microsoft Access** to build tables contain all required information.

The main goal in the project is to provide flexibility in exploring suggested projects and displaying full details for each specific project to make reservation decision easier.

To be able to use the system you should register an account online, Users can be either students or professors, and also there exists a web administrator to manage the website and data administrator to manage the database.

Objectives:

The main goal of the project is to provide flexibility in exploring suggested projects and displaying full details for each specific project to make reservation decision easier.

Problem of the project:

The problem that the project tries to solve is the non documented information for the supervisors suggested projects, and therefore students could not find their appropriate projects.

First axis: (The theoretical side):
Database:
1. Database Definition:

A **database** is an organized collection of data, today typically in digital form. The data are typically organized to model relevant aspects of reality (for example, the availability of rooms in hotels), in a way that supports processes requiring this information(8).

The term *database* is correctly applied to the data and their supporting data structures, and not to the database management system (DBMS). The database data collection with DBMS is called a database system(9).

2. Database Concepts:

One way of classifying databases involves the type of contents, (bibliographic, text, numeric and image)(7).The database concept has evolved since the 1960s to ease increasing difficulties in designing, building, and maintaining complex information systems (typically with many concurrent end-users, and with a large amount which enable the effective handling of databases. Though the terms database and DBMS define different entities, they are inseparable: a database's properties are determined by its supporting DBMS and vice-versa(7). The Oxford English dictionary cites. a 1962 technical report as the first to use the term "data- base"(2). With the progress in technology in the areas of processors, computer memory, computer storage and computer networks, the sizes, capabilities, and performance of databases and their respective DBMSs have grown in orders of magnitudes(5). For decades it has been unlikely that a complex information system can be built effectively without a proper database supported by a DBMS. The utilization of databases is now spread to such a wide degree that virtually every technology and product relies on databases and DBMSs for its development and commercialization, or even may have such embedded in it. Also, organizations and companies, from small to large, heavily depend on databases for their operations(5).

3. Database Security:

The definition of data security varies and may overlap with other database security aspects. Broadly it deals with protecting specific chunks of data, both physically or the interpretation of them, or parts of them to meaningful information.

4. Database Design:

Database system = Database +Database management system+ Application Environment(3), Where database management system is a collection of software, which can support:
1- The information content description of databases.
2- The data manipulation.
3- Host language system.
4- Self- contained DML(1).

Database design is done before building it to meet needs of end-users within a given application/information-system that the database is intended to support. The database design defines the needed data and

data structures that such a database comprises. A relational database management system consists of(4):

1- Interactive drivers.
2- SQL engine.
3- Transaction engine.
4- Relational engine.

Relational objects such as tables, index, and refrential integrity constraints are implemented in this components(10).

A design is typically carried out according to the common three architectural levels of a database. First, the conceptual level is designed, which defines the over-all picture/view of the database, and reflects all the real-world elements (entities) the database intends to model, as well as the relationships among them. On top of it the external level, various views of the database, are designed according to (possibly completely different) needs of specific end-user types. The conceptual view also determines the internal level (which primarily deals with data layout in storage) to a great extent(6).

Second axis: (The practical side):
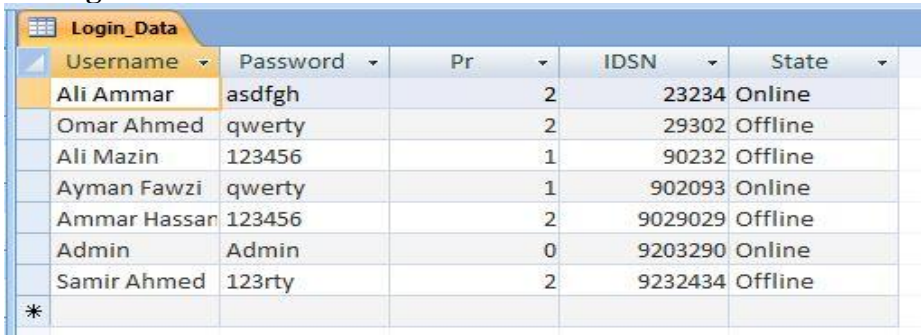**Projects Suggestions Database:**
1. Tables:

Tables are created Using Microsoft Access 2007, Because it provides full database options in simple way either in designing or dealing with the database. The essential database tables include 9 tables, each table contains related group of information, the unique one assigned as a Primary Key to protect from duplication of data.

These tables are grouped in one single file, which represent a database server, so all database operations done on it.

These table are:

A- Login Data:

Username	Password	Pr	IDSN	State
Ali Ammar	asdfgh	2	23234	Online
Omar Ahmed	qwerty	2	29302	Offline
Ali Mazin	123456	1	90232	Offline
Ayman Fawzi	qwerty	1	902093	Online
Ammar Hassan	123456	2	9029029	Offline
Admin	Admin	0	9203290	Online
Samir Ahmed	123rty	2	9232434	Offline

Figure (1): Login Table.

This table contains information of all registered accounts, It is used to identify and authenticate information of any person who is trying to login in to the website .

As shown in (figure, 1), the table consist of **5** columns:
1- Username: Contain**s Usernames** of registered accounts.
2- Password: Contain**s Passwords** of registered accounts.
3- Pr: Contain **Priorities** for each account, if account's priority equals 0, It means it is an administrator account, else if it equals 1, it means it is a professor account, and if it equals to 2 then it means it is a student account.
4- IDSN: Contains **ID Serial Number** for each user as a unique information to distinguish between accounts that have the same username.
5- State: Describes the account status, either online or offline.
B- Professor:

Professor			
Prof_Name ▾	Prof_SD ▾	IDSN ▾	Add New Field
⊞ Ehab Saad	Msc	9310	
⊞ Kasim Ali	Dr	79990	
*			

Figure (2) : Professors Table.

This table contains information about all professors in a specific department or college.
As Shown in (figure. 2) , It consist of **3** columns:
1- Prof_Name: Contain **Names** of all professors in the specific college or department.
2- Prof_SD: Contain **The Scientific Degree** for each professor.
3- IDSN: Contain **ID Serial Number** for each Professor as a unique information to distinguish between Professors who have the same name.

C- Student:

Stu_Name	Stu_Stage	Stu_Class	Grp	IDSN
Abbas	4	B	2	2345
Ali Ammar	4	A	3	23234
Ameer	4	B	2	82392
Mohammad Zuhair	4	B	0	987867

Figure (3) : Student Table.

This table contains information about all students.. As Shown in (figure, 3), it consist of 5 columns:
1- Stu_Name: It contains **Names** of all students in the specific college or department .
2- Stu_Stage: Contains **Stage** of each student.
3- Stu_Class: Contains **Class** for each student.
4- Grp: Contains the **Group** of the student, This group created after reserving a project to make dealing easier when more than one student share a single project.
5- IDSN: Contains **ID Serial Number** for each student as a unique information to distinguish between students who have the same name.

D- Msgs:

Src	Dest	Msg	Status
Mzr	Jumaa	Test Message	Unread
Ayman	Mzr	This is Ayman	Read
Mazin	Mzr	This Is Mazin	Read
Ayman	Mzr	This Ayman Again	Read
Maha	Mzr	This is Maha	Read
Omar	Mzr	This is Omar	Read
Maha	Mzr	Send Me Test Message Please	Read
System	Mzr	A New Request Sent From Mzr And Abbas On ...	Read
System	Mzr	The Request Was Sent By Mzr Has Been Delete...	Read

Figure (4) : Masseges Table.

This table contains information about all messages transferred between users .As shown in (figure, 4) it consist of 4 columns:
1- Src: Contains names of messages **senders**.
2- Dest: Contains names of messages **receivers**.
3- Msg: Contains the transferred **message**.

4- Status: Describes the **message status**, either read or unread.

E- Requests :

Figure (5) : Requests Table.

This table contains information about all requests sent to reserve a specific project. As shown in (figure, 5), it consist of 4 columns:
1- Request_Dest: Contains names of **requests receivers.**
2- Project_Name: Contains Names of **requested projects**.
3 Request_Src1: Contains Names of **requests senders.**
4- Request_Src2: Contains Names of **requests senders.**

F- Project :

Figure (6) : Projects Table.

This table contains information about all suggested projects. As shown in (figure, 6), it consists of 8 columns:
1- Proj_ Name: Contains the **Names** of the suggested projects.
2- Prof_N: Contains **a foreign key** for the professor number in the professor table, and this number represent the project supervisor.
3- Grp_ N: Contains a **foreign key** for the group number, and it represent the number of the group that reserve the project.
4- Proj_ Lang: Contains **the language** of each specific language.
5- Proj_ R: Describes **Project Status** either **Free, Reserved or Pending.**
6- Proj_ RD: Contains the **date of reservation** for each specific.
7- Proj_ NOS: Contains **number of students** in each project.

8- Proj_ No: Contains the project number.

G- Groups:

Figure (7) : Groups Table.

       This table is created to solve the problem of sharing single project by a group of students, so when 2 students reserve one single project, the numbers of the students will be saved together in this table as a group and this group will get a new number used for both of the students, so we can access the group by using the number of one of the students and access any student using the group number.

  As shown in (figure, 7) , this table consists of 3 columns:

1- Grp_No: Contains **numbers of groups**, each group consist if two students share one project.

2- Stu1_No: Contains **number of a member** in the group.

3- Stu2_No:Contains **number of a member** in the group.

H- Archive :

Figure (8) : Archive Table.

This table consists of previous years completed projects, where at the end of each year, all data will be erased from all table and all completed projects will be added to the archive with its final rate.

I- Languages:

Figure (9): Language Table.

This table contains only Allowed Languages to be used in projects implementation.

2- Relationships:

A relationship in the database means connecting two or more tables together using primary and foreign key…. Primary key means a unique information that have no duplicate, this one will be assigned as foreign key in another table, so we can reach information in the second table from the first table through the connection between the primary and foreign key.
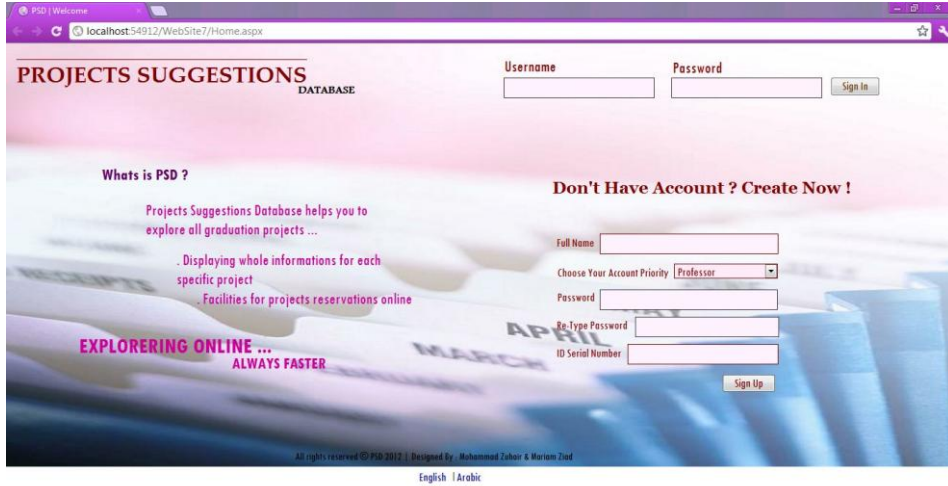
The third axis: (Design And Implementation):
1. Server and customers' computers:

The proposed database is implemented on one computer that may be accessed by the students and the professors so as to perform the insertion, updating, and deletion of the part of information that is permitted to that user. Many examples were taken to execute the

proposed database system, in that projects were inserted and students made decisions to reserve the projects by the students.
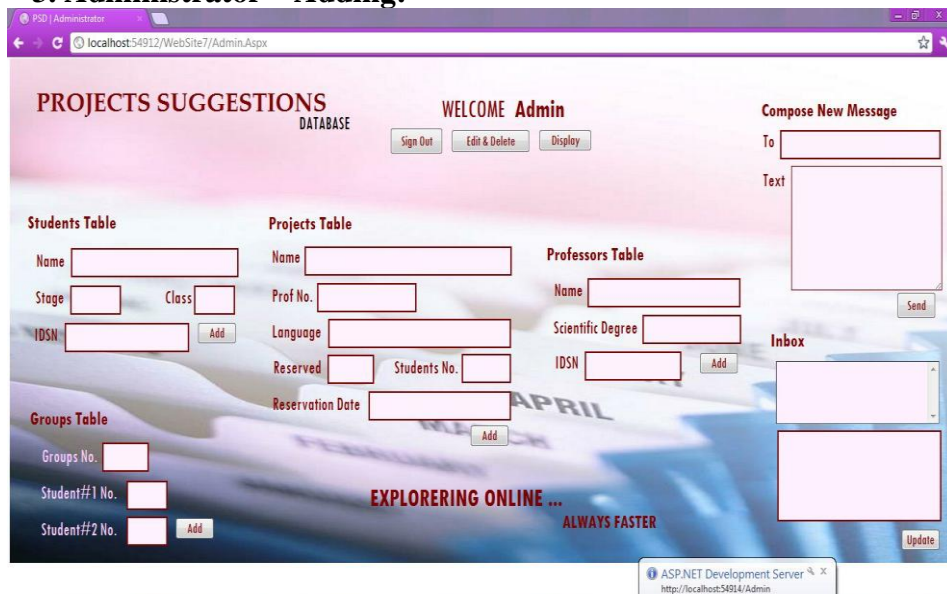
2. Start-Up Page:

This page used for login and accounts registering.

When the [Sign In] button clicked, A connection with the database server will be established, checking for match with the information the user provide, if a match found then a priority check will be done to decide for which page the user will be redirected.
Else a message will be displayed that these provided information is invalid.

When the [Sign Up] button clicked, a connection with database will be established and the checking for the new account information, if they are fully true .. the account will be created by saving the new information to the database and user redirected to his new page, else a message will be displayed to specify the error to the user.
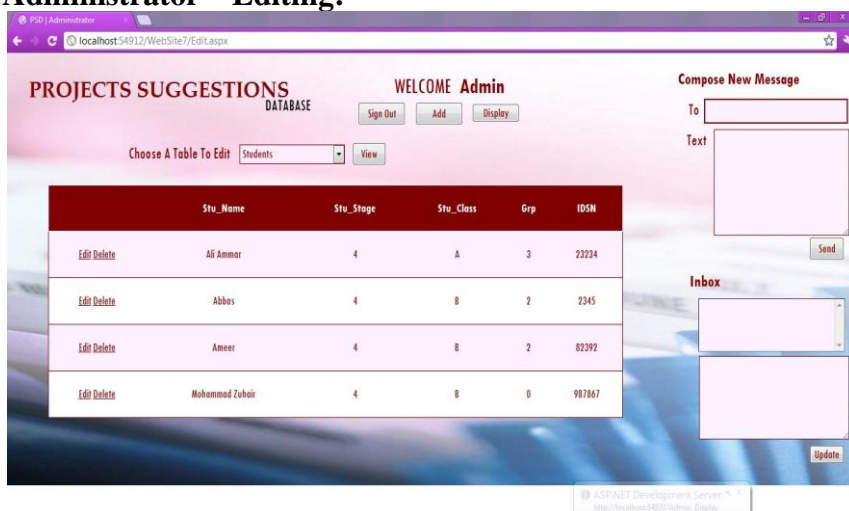
3. Administrator – Adding:

When an administrator logged in, he'll be redirected to this webpage.

Administrator can add new data for database tables, if any information missing or error, a message will be displayed to the administrator to correct the error.
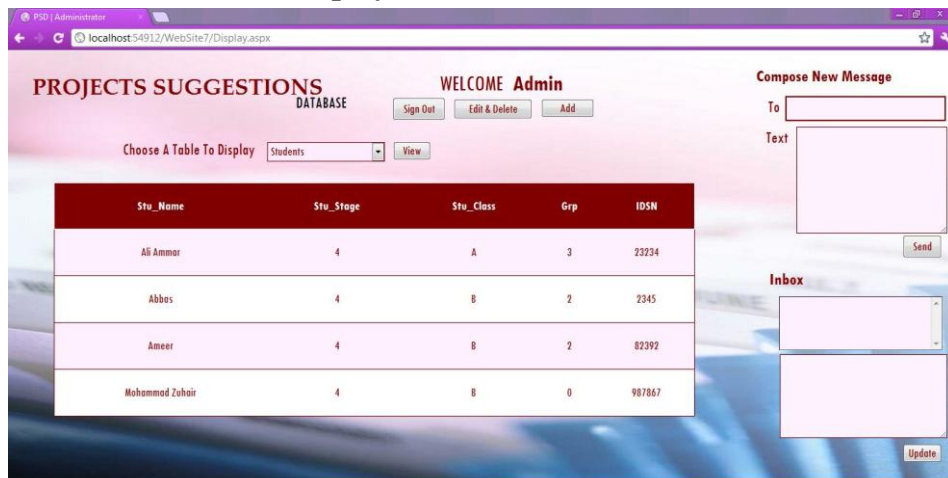
4. Administrator – Editing:

This page used by the administrator to editing, deleting data in a specific table (Project, Professor, Student, Groups), and any change will be instantly updated in the database server.
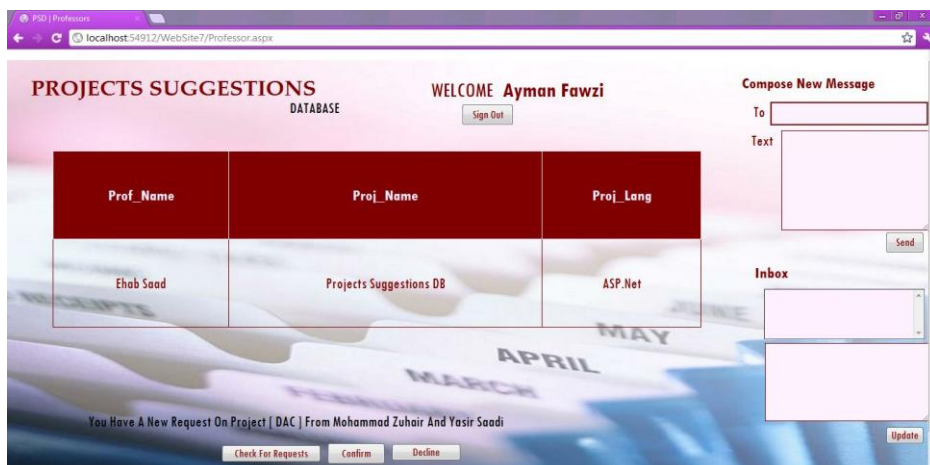
5. Administrator– Display:

This table used by administrator to display information from any table, specially to copy information needed in to add or edit on another tables.
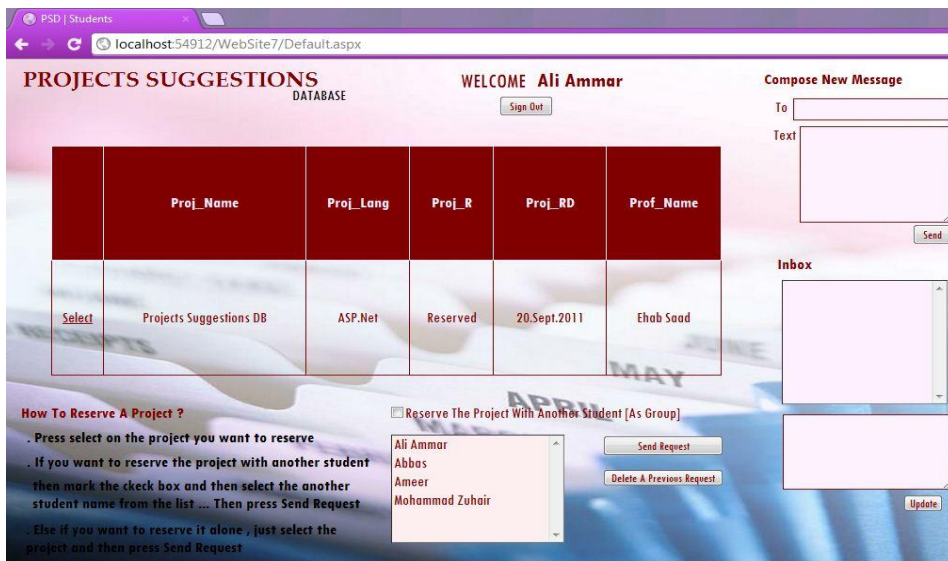
6. Professor:

When a professor logged in, he'll be redirected to this page.
The professor's job is to check for any requests on his projects, either to confirm or decline the requests.

7. Student:

This paged displayed for any student log in to the website, all suggested projects will be displayed to the student with its details.
The student will be able to reserve a project either for himself alone
Or for share it with another student as GROUP.

Suggestions and future work:

For future work, the implemented database system may be performed as:
- A Website that provide flexibility in exploring and reserving projects online.
- Mailbox center to transfer messages between users.
- Security issues may be taken so that data could not be edited only by permitted people.

Conclusion:

This work presents an electronic system that includes:
- A flexible interactive windows that help to reserve projects online
- A faster reservation procedure, because of saving time of searching for the professors to ask about project details and requirements
- Saving all completed projects in electronic archive, so it will be easy to retrieve them in the future.

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