
Design And Implementation of online Auction System

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Abstract

Online auction sites are a great way for people to buy and sell goods without the hassle of haggling prices or advertising items. It's also a good place for small businesses to advertise their products because they can attract more buyers with even small advertising budgets. Online auction system that enables people to buy and sell items to each other. It's similar to eBay but is more focused on buying and selling locally instead of internationally. Mosul University and some of its affiliated institutions, especially warehouses, lack the presence of an electronic auction that facilitates the operations of conducting auctions, as the current auction system is a traditional manual system with many difficulties and slow work, in addition to the complexity of the procedures for offer and sale operations. This research paper includes scheming and executing an online auction web application for Mosul University. This application will have a major role in supporting the electronic auctions conducted by the University of Mosul in terms of facilitating the display of items to be sold and speeding up and documenting sales processes and making the procedures more flexible and accurate. It is possible to make this application public to many public and private organizations. The manual system used for the auction at the University of Mosul was analyzed and on the basis of which the electronic system was designed, applied and tested. The application experiences showed flexibility in use and success in implementation. A web application for an electronic auction system was created using the web languages HTML, CSS and JS, as well as PHP, and SQL was used to save the data. The SMS service has also been activated to send a confirmation request before completing the login process to confirm the identity of the customer, which makes the system more secure.

Keywords: Auction, Online auction, Data management.

INTRODUCTION

The great reliance on the Internet in all aspects of life, besides the steady increase in its use on personal computers or smartphones, has made it one of the indispensable basics of life in modern life. This issue is translated into reality by dealing with many computer applications that simulate reality and replace manual use [1]. As a result, the use of website applications is increasing. Many users are eagerly waiting to use a new application as web applications are already replacing manual work in many cases [2] The rapid technological development in the twenty-first century has led to the presence of people looking for a more effective and convenient way to do business in terms of cost and time. So there has been an increasing demand for E-Commerce, E-Marketing, and E-Auction [3].

Information and Communication Technology (ICT) has made it possible to create tools for information arranging, transferring, storing, and working according to these tools digitally in modern way [4]. This approach has led to many innovations in the private and public sectors [5], one of its applications used in the world of commerce, such as electronic auctions which provides the sale of goods online in auctions electronically with ease and efficiency instead of selling them by traditional public auctions [6]. Online auctions are a web system designed to buy and sell items online by bidding on the item and increasing the bid over time [7]. The bidder with the highest bid for the item will win [8]. The electronic auction is considered the cornerstone of e-commerce [9]. The electronic

auction has become the popular and preferred method by users when dealing with the merchandise [10]. It reduces financial expenses and users of these auctions promote them because it makes it easier for them to buy and sell products and set the bidding process without going anywhere[3][11].

LITERATURE REVIEW

Several research papers published about the electronic auction system, these work can be summarized as follows : Manoj Kumar and Stuart I. Feldman [12], described an application for auctioning goods on the Internet, with a variety of auction mechanisms supported by the application, security requirements, pre-auction procedures, and post-auction interactions as well as the processes that comprise the auction application. They also add tools to make auctions attractive to real business users, including mechanisms for archiving closed auctions for record-keeping, and support for electronic bidding and quotation agents. In [13], Nara presented a study for designing an online auction system that is scalable, robust, and flexible to meet the growing demands for the security of applicable laws and transaction efficiency. The authors proposed some employment of a three-tiered architecture system for conducting online auctions to ensure reliability and flexibility. This online auction system was created to make a smooth and efficient transaction between buyers and sellers. In [14], Md. Imranul Sazzad and Mutasim Billah designed a system that consists of two parts: The customer interface and the administration interface. The customer panel allows the customer to upload a product to sell and bid, with a control panel through which the administrator can control the entire bidding system. The admin products can be approved by categories and registered customers . In [15], Michael Ostrovsky published check screen auctions in European countries, allowing consumers to choose their preferred search engine using the Android platform rather than Google's search engine. The author showed that seemingly small details in the design of auctions play a big role in the characteristics of auction winners that help them make bidding decisions.

Table (1) shows the most previous electronic auctions with details in addition to the programming languages used in designing them:

Table (1)

Year	University / Center	Research name	Author	programming language
1998	Watson Research Center	Internet Auctions	Manoj Kumar and Stuart I. Feldman	HTML
2005	University of Nebraska at Omaha	Web Auction System	Praveen K. Narra	HTML, JSP and Oracle
2016	East West University	Bid On: An Online Auction System	Md. Imranul Sazzad Mutasim Billah	HTML, CSS, PHP and SQL
2021	Stanford University and NBER	Choice Screen Auctions	Michael Ostrovsky	Android platform.

SYSTEM IMPLEMENTATION STAGES

As it is known that the project creation process includes several stages which can be summarized in figure 1:

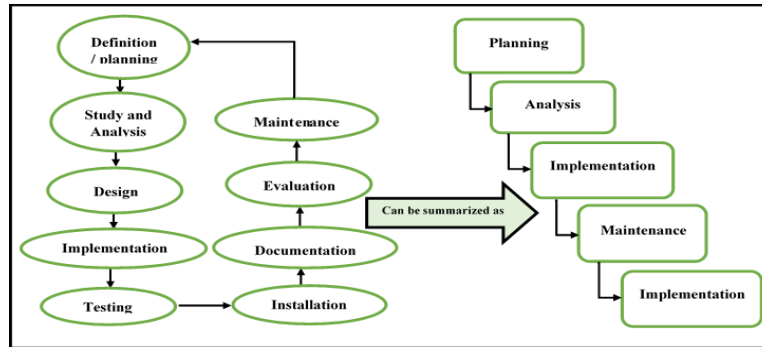


Figure 1: System Development Life Cycle

For the electronic auction system, in the following paragraphs, we will explain these steps (stages) in order, as shown in Figure 2:

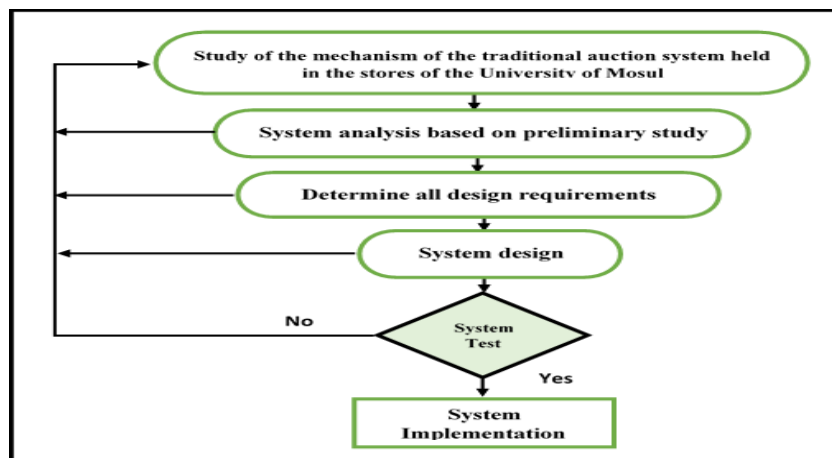


Figure 2: stages of implementing the system

A- System Analysis

This section analyses the requirements for an online auction system held in the stores of the University of Mosul, which consists of the following:

- **Software Subsystems :**

Software subsystems offer an intuitive way to understand, visualize and analyze basic functional requirements. Table No. (2) Shows the sub-systems of electronic auctions.

- **Use Cases** : A use case consists of many possible sequences of interactions between users and systems in a given environment to achieve a goal. The following are the electronic auctions use cases for the subsystems shown in Table 2 :

Table (2) Online Auction subsystems

subsystem	Users/ Actors	Description
User account management	Admin, Employees, Costumers	An admin, employees and customers can register themselves and they can also update or view the details. The admin can view/edit employees' and customers' details and delete
Auction management	Admin and employee	The admin or employees list the categories of products included in the auction and add and modify the products that will be sold. The process of deleting an item is the responsibility of the admin only.
Auction searching	Costumers	A Costumers searches products on auction
Bids	Costumers	Customers start bidding when the auction starts and the admin notifies the last bidder who wins the auction

- **User account management:** Figure 3 represents a diagram of the use case related to user authentication (admin/employees or customers), where a profile is created for each user it can also be the admin/employees or customers as well update or view its details. Auction admin can view the file details of any user and delete any user account.

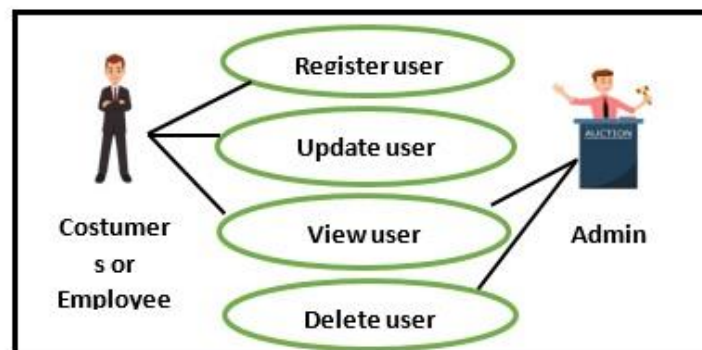


Figure 3: User account management use case

- **Auction management:** The admin or employee prepares the list of products for the auction. In this step, details such as product preparation, price, details, auction start, and end date, auction time...etc. are described. Only the admin approves the auction list and after obtaining approval, the admin will be able to process the auction and make amendments to it... Figure 4 represents a diagram of Auction management use case.

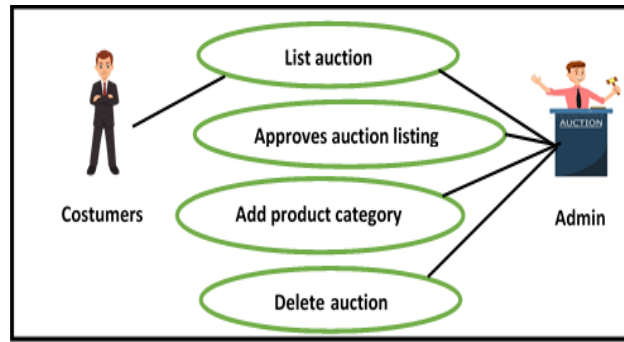


Figure 4: Auction management use case

-**Auction Searching:** All registered customers can start searching for products to be auctioned Figure 4 represents a diagram of Auction searching use case.

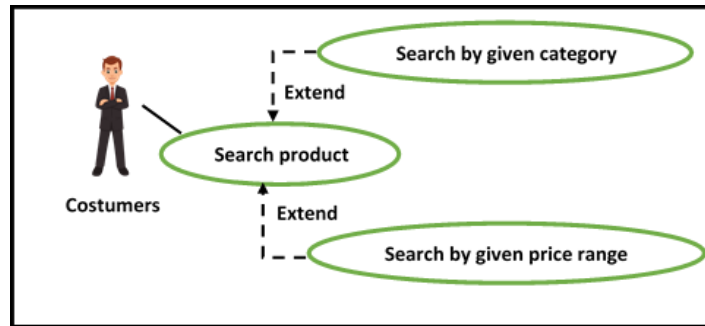


Figure 5: Auction searching use case

- **Bid:** Figure 6 presents a use case diagram of the bid procedure subsystem describing the auction list and collection of bids submitted by different customers (e.g., bid increment, minimum bid, Insurance deposit, etc....). The auctioneer finishes the auction and then selects the winning customer (last bidder) as per the auction rules.

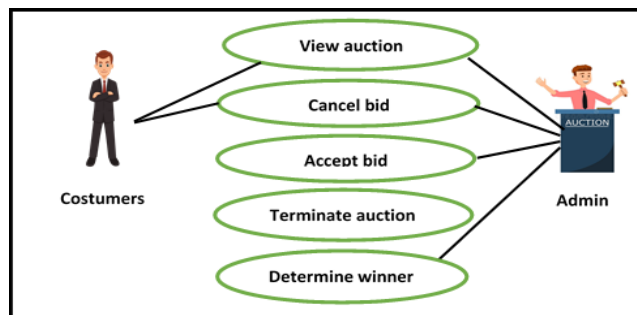


Figure 6: Bidding use case

After defining the sub-systems and use cases described above, the electronic auction system in Mosul University stores can consist of the following:

Step1 STORES: (Stor_Id, Stor_Name (Composite), Stor_Address, University_Name, and Notes). The Stor_Id is the primary key.

Step2 AUCTION: (Auct_Id, Auct_Name (Composite), Auct_Value, Insurance, Advertising, Begin_Date, End_Date, and Notes). The Auct_Id is the primary key.

Step3 ADMIN: (Adm_Id, Adm_Name (Composite), E-Mail, Password, Authorize, Phone, and Notes). The Adm_Id is the primary key.

Step4 EMPLOYEES: (Emp_Id, Emp_Name (Composite), E-Mail, Password, Phone, and Notes). The Emp_Id is the primary key.

Step5 CUSTOMERS: (Id_Number, Cust_Name (Composite), Address (Composite), E-Mail, Password, Phone, Insurance, and Notes). The Id_Number is the primary key.

Step6 ITEMS: (Item_Id, Item_Name (Composite), Image, Number, Details, Starting_Price, and Notes). The Item_Id is the primary key.

Step7 CATEGORIES: (Cate_Id, Cate_Name and Notes). The Cate_Id is the primary key.

Step8 BIDS: (Bid_Id, Time, Bid_Value, and Notes). The Bid_Id is the primary key.

Step9 LAST BIDDER: (Lb_Id, Bid_Date, Bid_Price, and Notes). The Lb_Id is the primary key.

Figure 7 shows the entity-relationship diagram (ERD) of the system. Figure 8 represents the data model for the proposed system.

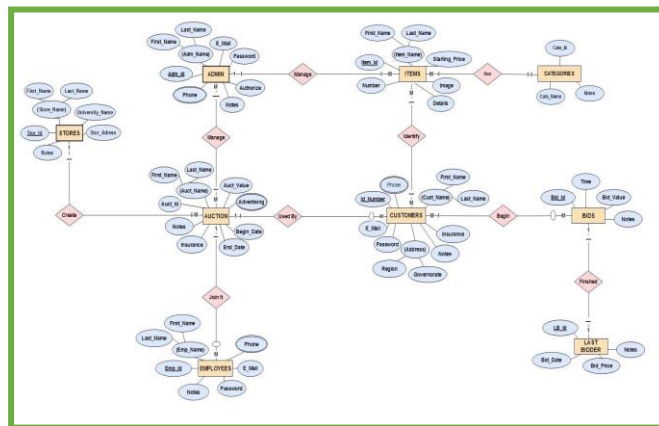


Figure 7: shows the entity-relationship diagram (ERD)

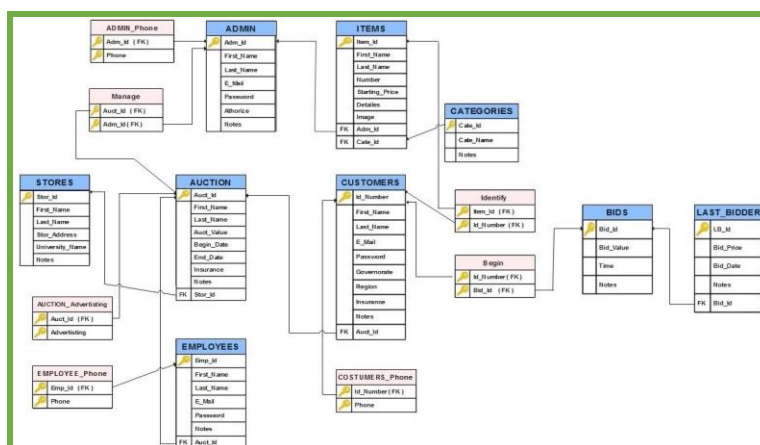


Figure 8: shows the data model for the proposed system

The entity-relationship diagram shows the types of entities in the system, the attributes of each entity, and the constraints that apply to the way entities are connected.

B- System design

After studying the system requirements obtained from the analysis phase, the system design is implemented by defining the hardware and software that will be used which includes in this project the use of laptops used to store data and the creation of the database using My SQL server 2014 as well as the use of C# 2019 To design system interfaces. Which helps in defining the overall structure of the system.

The system database My SQL server was used to implement the database. The tables below are examples of tables that have been created.

Table (3) Admin table

Adm_Id	First_Name	Last_Name	E-Mail	Password	Authorize	Notes
1	محمد	شهر	mohamedomer...	147258@@@	True	مدير المزاد
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table (4) Auction table

Auct_Id	First_Name	Last_Name	Auct_Value	Insurance	Begin_Date	End_Date	Notes	Stor_Id
2	المزاد	الاول	300.0000	50.0000	2022-02-12 09:00...	2022-02-22 09:00...	بيع المزاد المستعملة	10
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table (5) Costumers table

Id_Number	First_Name	Last_Name	E-Mail	Password	Insurance	Governorate	Region	Notes	Auct_Id
24005	يحيى	ابراهيم	yahyabrooo...	124578@*	1.0000	الربيع	القلعة		2
33025	احمد	كاهل	ahmedaaa20...	235689**	1.0000	الغوص	الحدباء		2
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

SQL is an interactive language that is used to communicate with a database to help retrieve data for complex queries in seconds. It enables users (administrator or employees) to display the structure of the database in different ways depending on the permissions that the user has.

C- System Implementation

This section discusses the stage of system implementation that came after the two stages of system analysis and design. The results of the system analysis and configuration of the proposed system are presented. Framework .NET Programming C# has been used based on its features which makes it suitable for this job. Figure 9 represents the login interface. The user must be logged in, whether as an administrator, employee, or customer. Non-

registered customers must fill out a registration form to use the system. Figure 10 register a new account. Figure 11 the auction management interface .

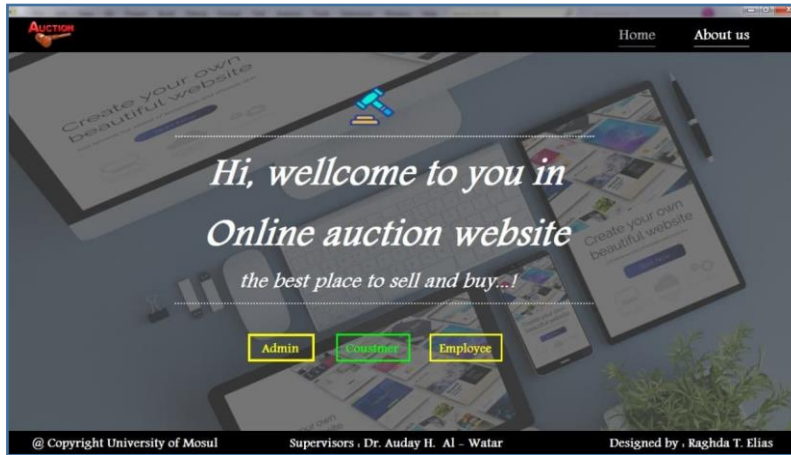


Figure 9: Login interface

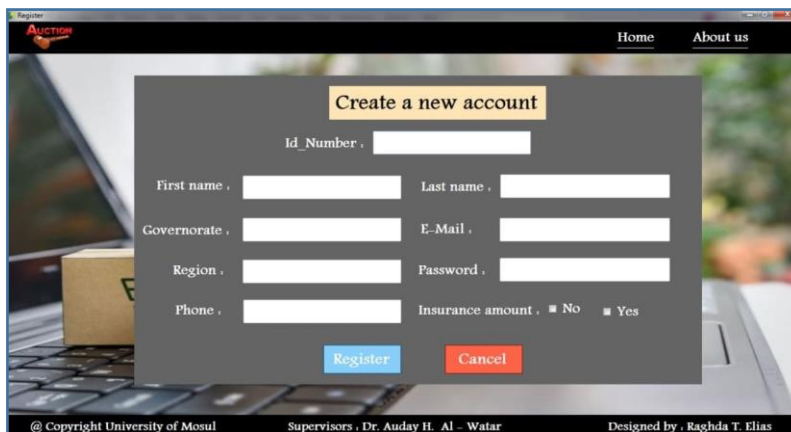


Figure 10: New account interface

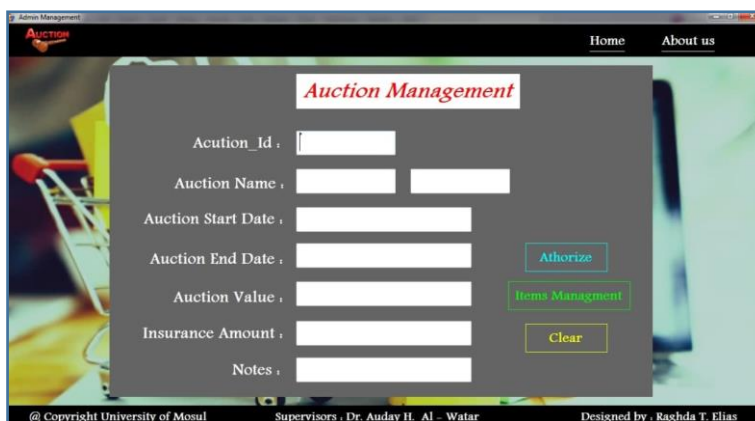


Figure 11: Auction management interface

BENEFITS OF USING ONLINE AUCTION SYSTEM

It was found that the application of this system results in benefits for both parties, the stores of the University of Mosul as a governmental institution, and those who deal with the stores as individuals, the most important of which are:

1. The use of web technologies helped build an integrated system through which products and auctions can be added easily and in a simplified manner.
2. The system helped facilitate the process of buying, selling, and auctioning electronically.
3. The system contributed to saving data in special data warehouses so that the data is preserved and the process of referring to it is easy when needed.
4. Using websites to make the buying and selling process, through the web, saves a lot of effort, money, and time.
5. Simplifying government work and making it more efficient, thus reducing the costs of government procedures.
6. Improving the performance of citizens in dealing with modern technologies.
7. Encouraging modern technology as the future of countries.

The above points are considered general for any online shopping system, and the proposed system has achieved many of them.

CONCLUSION

Auctions have witnessed great transitions and wide developments. After the transition from traditional auctions to electronic auctions. This work included the design and implementation of an electronic auction system. The system has been designed with all its functions successfully, the system was tested on real data for models of products (elements) in the Department of Stores Presidency of the University of Mosul. The process of selling these products has been transformed from the traditional form to the electronic form where the materials are organized and presented to the users visually and online. The system also provides an integrated tool for managing the auction and following up the workflow of the auction manager, as well as managing the accounts of users and employees and granting them access and participation in the auction, as well as providing flexibility in auction procedures such as adding or deleting products (items). It was also discovered that the use of this mechanism benefits all parties, including the University of Mosul as a public institution and the Auction customers. Through the implementation and examination of this system, it was found that it can be used and applied to any government institution in the city of Mosul or in Iraq that has auctions for the sale of various materials. The system can also be developed to include all tenders, bids and other transactions.

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