Reliable, Rapid, Accurate Banking Transactions using e-Bank

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ABSTRACT
E-bank aim to convert the handling of bank-to-client functions from manual system to a computerized system, to gain the benefits of the efficient computerized system and get rid of the disadvantages of manual system, also repair and solve common problems that exist in the daily work. This work will not be based on previous one in the subject of “e-banks”; it will be based on “Users requirements” of a local Iraqi bank branches using the concepts of software engineering. A design phase made according to requirements of users and staffs of local bank branches, the design follow the basic Waterfall model. The system consists of SQL database, windows GUI to the bank staff login to their accounts. Modern tools used to implement the system, MS SQL server the suitable for large-scale projects and the projects that connect and reached through the Internet, Microsoft Visual studio 2008 as editor to visual basic.net, ASP.net

Keywords
Banking systems, banking problems, relational DBMS

1. INTRODUCTION
A bank is a financial institution and a financial intermediary that invests money deposited by customers, pays it out at demand, makes advance with avails, exchanges money. bank qualifier differs from one country to another, depend on regulations of government , type of users and other factors; this research concern about Iraqi commercial banks. Iraqi banks act as payment agents by conducting checking for customers, the main functions that they do:
• conducting current accounts for their customers.
• paying instrument(check) drawn on them.
• collecting instrument for their customer

2. E-BANKING
Banking includes the systems that enable financial institution customers, individuals or businesses, to access funds, transact business, or obtain notion on financial services or products through the Internet. A bank customer can view account balances, recent transactions, paying bills make a checks or transformation quantity from account to another, i.e. any transactions could be made remotely.

3. SOFTWARE DEVELOPMENT
Software development is the development of a software product, it may be used to refer to the computer programming (writing code) [1]. Software engineering is the implementation of a regular, disciplined approach to the design, expansion, process, and maintenance of software, and the study of these approaches; i.e., the application of engineering to software [2].

In the waterfall model developers are follow these stages in order:
1. Requirements specification (Requirements analysis).
2. Software design.
3. Implementation and Integration.
4. Testing
5. Deployment.

4. DESIGN AND IMPLEMENTATION OF THE PROPOSED SYSTEM
In this section the user (bank staff and bank’s clients) requirements will set and proposed design illustrating the system will made, then the design will implemented. Figure(1) show the algorithm for the proposed system

4.1 Requirements: The requirements will be split into two parts:

4.1.1 User requirements specification
Requirements were collected from local banks staff and a usual banks clients, the requirements from bank staff were in form of problems that they exposed to it; the problems was miss-typing and miss-numbering in high value information that cause of massive problems; also the information records do not update at ones, its take a long waiting to affirmation of updates and since the bank do a lot of updates to many of records make the functionality of work slow. Also leak of integration in records. Bank client’s requirements were simple, like getting a quality bank service and get rid of witting routine.

4.1.2 System requirements:
Bank staff also provide me with the bank basic functions such as adding client, deposit, withdraw and issuing various bank statements and reports , how does it work, what data its need and what regulations should follow to make it done. All this requirements should basically build in way that improves its effectiveness and reliability, for that a proposal technique designed spatially to replace the old way and get rid of the disadvantage of it.

4.2 System Design
The system follows the waterfall model for software development; the design phase depends on user requirements; make all the users determinants became in form of software system. Requirements been gathered from various people how involved with bank transaction; also with commitment to the government financial controls laws and local bank standards.
The bank’s client information and transaction information stored in massive amounts so its need an efficient database to handle it, the application we need is a database management system with a suitable Graphical User Interface (GUI). This application should help the bank staff do all the everyday office work in banks, replaced the old manner of manual paper work. Also a client GUI for remote access, make it easy to client perform all possible transactions online, as showed in figure (2).
4.3 System Implementation
After setting the system design, the design will implemented by modern programming tools, converting the design’s plans into source code and GUIs.

4.3.1 Choosing the tools
The implementation done by modern programming tools that compatrible with modern development and satisfies the user. The banks accounts, transactions, and their information are the data that bank deals with every day, this data is exist in enormous number and its Increasing, changing, and requested via multi-users all its self-evident that the bank operating data is in form of database. Two types of GUI must be design; one for stationary bank staff system and the other to the clients; bank staff’s GUI is a windows environment allow the staff to does the traditional work on customer data; Clients GUI is a Web application that assist clients to gain access to their information remotely.

4.3.2 System developing steps
The three parts of the system (database, bank staff interface and clients web page), will explained.

4.3.2.1 Database
Five database tables have been built; the details of each one will be discussed in this section: 1. Main table: each record in this table represent a client’s account, it contains the unique account number which generated by the system called “go code”, password chosen by the client to login his account, and personal information such as name, address, e-mail, date of birth, gender, official ID number. Also contain the account information such as type of account, balance, and state of account. 2. Actions table: each record in it represent a transaction done by client or bank, it contains account numbers of the achiever of the transaction and the recipient, the amount of money that involved in the transaction, date of which it occur, date of validation in case of delayed checks, payee name and payee ID in case of the transaction to a person how has no account in e-bank.3. Notifications table: massages or statements to the client notify them to an action.4. Standards and rules table: it contains the least bank-note in circulation and the legal age of person to have bank accounts and the type of IDs and passports that bank accepted to make account for, and the type of bank accounts that could be made. It also contains the counters of accounts numbers and actions number.5. Login to system table: contains the name and password of the bank employee that allow to access the system, and is he/she a manager or employee to limitation the unauthorized access to the High Value Information HVI, employee will have limit access while manager has full access to data.

4.3.2.2 Management system:
It’s the system which bank staff uses to manage the data inside the database, in way that prevent inserting wrong or incomplete data. The first form is the security authentication, it allows both employee and managers to access to the main panel by checking there user name and password in the login table in the database as shown in figure (3) A&B.

![Figure (2): client interface](image-url)

**Figure (2): client interface**

**Figure (3) A: Login form**

![Login form](image-url)

When wrong name and password entered an error message shows up then name and password text boxes cleared.

**Figure (3) B: Login table which login form request data from**

![Login table](image-url)

When the employee or manager access the system the main panel shows up, it contains the three sections add client, client services, and alien services. These represent the main sections of the bank functionality.

**Figure (4): Error message of login form**

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**Figure (5): Main panel**

Adding Client Section: Click on adding client section, the adding form appears as shown in figure (6); it has two tabs adding personal account and adding account for institute. In
adding personal account there are three phases of information inserting; the first is personal information name, gender, address, date of birth and a list of allowed IDs to open bank account with and a field of that ID number.

Figure (6): creating personal account tab
As it shown in figure (7) only passports and Iraqi national ID are allowed, but this could be change from SQL database.

Figure (7): list of allowed IDs
The second phase is account information initial amount of money “balance”, date of creating the account “assigned automatically by the computer”, e-mail “if available” if not available checking the box shown will assign it as (Non available) automatically and make the field (Read only) because the empty fields are not allowed as shown in figure (8), unchecking the box will make it available for writing again, bank account password, and a list of available bank account passwords in figure (8) shows only three account types but managers cloud change that by add or delete types in SQL database.

Figure (8)

The third phase is for employees and employer, help them to transfer their salary from the companies they work for. If the person is not employee checking the box will assign it as (Non-employee) automatically and make the field (Read only) unchecking the box will make it available for writing again, except when the selected account is for employees only that make filling the fields of “employee and employer” mandatory as shown in figure (10) on the left the “employee and employer” fields while using a current account the box could be checked or unchecked and on the right “employee and employer” fields while using 401k which is account for employees only the box is disabled make the filling of the fields mandatory.

After filling the information clicking on validate button to make sure the information is correct or else create button will not be enabled, as shown in Figure (11).

Figure (11)

If there was wrong in the information massage shows up with explanation of occurred errors Figure (12).

Figure (12)

After create button became enabled Figure (14) the account number will be generated, the formula of account number is that the first letter is ether ‘P’ if the account been create is for person or ‘I’ if the account been create in institute tab. The second latter is the class that the account create in it domain from ‘A’ to ‘Z’ changers when the number reaches 999. The remaining numbers are the account sequence, see figure (13).
Then adding form close and a report form will appear, figure (15) detailing the information and give the account number, this report should be printed and handed to the client.

If the account type is current an additional form will appears, figure (16) the checkbook form that illustrate printing checkbook of 20 pages to the client. By that 20 record been added to Action table represent 20 unpaid checks in possession of client. Later when the client use the check to pay someone and the bank has to pay it for him (explained in details later in this work).

Adding an institute account is not too different from adding a personal account, as it shown in figure (17) it also has three phases accredited information are the personal information of the person how represent the institute, second phase Institute information and third phase Account information. Information also be validate before create button become enabled or else error massage will appear.

Client service section: The second section is Client service, it’s specified to serving the clients when they visit the bank. In this section login information required to gain access to client data that for client provide the account number and password to bank employee, after gain access to the account four service tabs will be enabled Statement, Withdraw, Deposit and Transactions, see figure (18).
In statement tab shown in figure (19) the client information reviewed and report of the present state of the account could be made by click Bank Statement button. If the account type is current the Checkbook button will enabled to print and hand the client with new checkbook in case he/she request one By that new 20 record been added to Action table represent new 20 unpaid checks in possession of client, otherwise the button remain disabled.

Figure (19): statement tab

Withdraw tab shown in figure (20) serve the withdrawing, it has three settings to self, to client, and to alien. “To self” represent draw money immediately to the client, “to client” represent transferring amount of money to another account, and “to alien” means drawing the amount by a check to person does not have account in this bank. Choosing any one of them will disable the others to prevent errors. Before enable the Proceed button a validation process made by click the Validate button in case of error a massage appear detailing the errors, errors might be empty fields or amount is not adhere to the less currency in circulation. Click Proceed the system generate unique transaction number and at database a record to action table added contain depositing details.

Figure (20): Withdraw tab

In case of “to client” transaction to another account, a notify massage will sent to the recipient by add a record to notification table as shown in figure (21).

Figure (21): adding notification to recipient

Deposit tab shown in figure (22) serve depositing amounts of money to client account, amount entered and user name and password of bank employee who receive the amount from the client to and the name of bank employee mentioned in depositing record as payee. Before enable the Proceed button a validation process made by click the Validate button in case of error a massage appear detailing the errors, errors might be empty fields or amount is not adhere to the less currency in circulation. Click Proceed the system generate unique transaction number and at database a record to action table added contain depositing details.

Figure (22): Deposit tab

Transaction tab shown in figure (23) review the history of client’s transactions, it split in to Incoming which means the transaction where the client acts as recipient, and outgoing which mean the transaction made by client. Search options for Incoming transaction are by transaction numbers and by account number “Payer account”, Search options for
Incoming transactions are by transaction numbers and by account number “Payee account” and by payee name in case of alien transactions “check”. Reports are available to all records and for particular records as client requests.

**Figure (23): Transaction tab**

Alien serves section: The third section is Alien serves, providing services to those who do not have bank account but they need to deal with bank. Alien section has three serves tabs currency exchange, Alien checks and checks settlement. Currency exchange shown in figure (24) tab has two phases, first phase selecting the currency “Euro, Pound, Dollar …etc.” from a list of currencies those banks accept exchange them, by selecting currency name it’s value for local currency viewed in read only text box. This list of currencies and there values could be set, changed, added and deleted in manager form. And selecting withers the bank will sale or purchases the currency. The second phase is specifying the amount of currency. In sale case the Amount represents the amount of the foreign currency; in purchase case the Amount represents the amount of the local currency, two boxes view Amount price of foreign to local currency, Bank fee thereat determined dully, client name and ID required guaranteeing the prerogative of refund.

**Figure (24): Currency exchange**

Exchange button enabled if Validate button give no error message. The system generates a unique number and adds a record to action table as registration to this transaction. And a report representing “Receipt” printed and handed to client. Alien checks tab shown in figure (25) is a service of give a check addressed to government institute or companies to people with rate of interest to the bank as fee. Two probabilities wither the institute have account in bank or not. If it does the amount deposit directly to its account, If not the name of that institute will be required instead of its account number, Bank fee thereat determined dully. Proceed button enabled if Validate button give no error message. The system generates a unique number and adds a record to action table as registration to this transaction. And a report representing “check” printed and handed to client.

**Figure (25): Alien checks tab**

Settlement tab shown in figure (26) is the serves of pay away checks made by client having current account to other people. After entering the check number in the box the system checks it wither it is exists or not, if it does exist its information will be loaded and fill the appropriate box of each field. If the check is already been paid the Settlement button will disabled preventing any activity, if it not paid yet bank employee set the amount as termed in the check.

**Figure (26): Settlement tab**
the check record in action table will modify and a note will sent to the check maker notify him/her that the check been paid for the person baring the check by adding notification to the notifications table as shown in figure (27).

Figure (27)

4.4 E-Bank web site
This part implemented using ASP .net which is an environment that enables programmers to combine HTML and reusable ActiveX components with scripts to create dynamic Web pages (designed for use on Microsoft Web servers). The main page shown in figure (28) is the login to account page, it use the account number as user name and the same account password which been appoint by client in adding section at the bank.

Figure (28): main page

The second page shown in figure (29) appears after gain access from the first page, this page represent the clients account, and it consisted of three parts the states information viewing basic information account state and balance amount, the transaction history view all transaction made by client and notifications which came from bank notify client about a statement.

Figure (29)

Logout link button end a session, transfer amount to account link button show up an additional components use to transfer money amounts online as shown in figure (30).

Figure (30)

Proceed button enabled after validate button shows no errors in information inserted in Account number and Amount. Cancel button will tear transaction down. Click will show affirmation message of successfully accomplish.

5. CONCLUSIONS
The banks are one of important factors in economy, and having a bank effective enough to raise the rate of money transaction, switching from manual system to electronic system always have advantage, such as saving time and deal with reliable data as well as preventing a lot of human errors. Web services will attract more clients to have bank account; also it is opening window of e-banking and online shopping as well as paying bills without any effort. Trace you savings and your financial state any time anywhere through the internet.

6. REFERENCES


