ANALYSIS AND DEVELOPMENT OF THE MESS MANAGEMENT SYSTEM FOR THE KDU CADET MESS

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Abstract- Today's Sri Lanka Military Mess Management and cost calculations are done manually and there is no proper system with electronic payment handling. Hence all the difficulties in manual system such as time consumption and human errors are inheriting to mess systems. Due to these problems, a requirement arises to create a system that will make the entire Mess Management an automated system. The present work automated the mess system which allow manipulate all the details about the payments and military personal and easy generation of reports using C# and SQL server. Further system also provides data on bar sales to be analysed with use of dashboards. Finally the present work allows mess management staff to engage in their work with maximum security and risk free from errors or loss of data. This new automated system will be interconnected with all end-users of the mess and all duties will be able to be proceeded easily with this Mess Management System.

Keywords- Stock, backup, restore, add, delete, Payments, Reports

I. INTRODUCTION

The aim of this project is to develop an accurate and efficient and computerized cadet mess management system for the KDU which can overcome the problems and loose ends of the existing way of managing and monitoring the information such as data entering issues, reduce delays in searching records, and handle all the related activities of the cadets to provide maximum service to users.

Having a variety of food within the menus for foreign and local cadets, the system will be able to felicitate the required menus payment calculations requested by the foreign and local cadets. The mess in KDU is compromised with cadet officers in three types of locations such as cadets in Rathmalana, cadets from Werahara and cadets from Sooriyawewa. Each section consists of either local or foreign cadets respectively.

The main feature of this project is to generate a hardcopy receipt of the total expenditure of the cadets at the end of each month. A special area will be allocated to get the necessary information about monthly expenditures. The payments can be paid by the end-users of the mess with the monthly invoices issued at the end of each month through the automated new mess management system.

More other features which are included in this computerized mess management system (MMS) is that a report will be produced at the end of each month consisting with the total monthly expenditures and other necessary information. The reports will be separately generated by the mess management system to the relevant sections consisted and letters will be generated in order to make the system completed with more efficiency directly through the software application than handwriting which is a waste of time and increases the expenses.

The main problem aroused was the inefficiency of the currently prevailing manual mess management system. It is time consuming and even the slightest mistake will effect errors in any money transaction details or monthly bill details. The misplace of data and information will always occur in such manual systems and data entry and

retrieving will take a considerable time due to the absence of an automated system. No authorized method for mess managers to keep in touch with the standard of security within the manual system is also a major problem. Less protection methods since it is hard to have more back-up copies which will again result in using more storage space and therefore increase expenses.

Through such a mess management system the aims such as organized in time management, security, stock level management, data storage, information gathering, report generating, searching for details, errors in calculation, backing-up and trustworthiness can be achieved.

Using a user friendly system which consists of user interactive interfaces with the use of suitable technology is another objective through this mess management system. Delivering the system with the maximum functions in order to make the system functional within the management of the mess is the main objective and also to enhance backing up the entire system to get rid of the loss of data.

II. LITERATURE REVIEW

When considering the work done in the previous mess management system the whole system is driven manually with manual calculations and data storage in previously named and arranged files within the specific section. Considering the KDU mess, the mess duties which should be computerized can be identified into two main sections such as the payment handling with cadet details and bar section.

The sections are managed and data is organized by the specific officer assigned in order as to do his or her duty in that section. Considering the cadet and officer mess detail entry, deletion and updating, the current system enters the details into spreadsheets and those are taken with printouts to store in a separate file so needs in preparing the mess bills separately to each user individually with the expenses within the month. The monthly generated bills are pasted in a large book which acts like a database but it is a time consuming and complex process than the easy to use featured user interface and data entry interfaces in the new system. There is no feature to search and check required cadet details through featured buttons or options and one by one should be analysed in order to get a cadets details. Each cadet consists of a serial or registration number which will be the main attribute in order to recognize that this is the particular person which an expense should be added to.

In the payment section the payment details are made as in for issuing the mess bill for the services and food provided by the mess to the end-users of the mess. The payments include all the necessary payment criteria's for a month and additional payments which are only included if a particular event is held in a specific month. The whole receipt is a printed bill, but all other calculations are done in a separate place not attached to the system directly.

In the bar section of the mess there are two main criteria's followed in the current system. They are to note down the stocks of sales and the purchases to balance the remaining amount of the stock. The current bar section in the mess is not interconnected with the payments directly and due to that two people are working separately. It is a disadvantage to maintain records if one administrator is unavailable in one section. Therefore, through the mess management system, both sections will be interconnected with one major system where information can be shared directly with the two administrators using the system.

A system was developed using the Model-View-Controller architecture which divides the programming structure into three tiers known as model, view and controller. Model governs the access to and updates of the system data. In real world, the model could be represented as the business domains. Since this system is developed using Java language, therefore, NetBeans IDE is chosen as it is designed for Java application development. NetBeans IDE is free and open-source, so, there is a lot of information about it available on the Internet and it is convenient to find support for it. The system is backed up using internet cloud applications and security measures are taken because the system is user's servers and web technologies in inter connecting the system. (Muniraja, Rajanikanth, In-Time Billing Process for Canteen Management System)

The functions and features of a previous mess management system are as follows. The mess manager will first login by entering the correct username and password. The user will need to enter the correct old password in order to set a new password. After successfully logging in the options page will be displayed with following options such as Cadet-info, Stores, Market rate, Diet-chart, help. (Ankita Chawla, Priyanka Joshi, Sanjana Panjwani, Surabhi Sontakke, Mess Management System)

In the navy department mess management system, it runs fully manually with the information and details recorded in files and books. It consists of payment handling books and Common Cash Card (CAC) automated system. In the Cash Meal Payment Book records on meals sold for cash are recorded. When meals are sold for cash from a general mess they give a receipt through transfer Control process. The supply officer will assign a control officer for the handling and security of the Forms. Assignment will be as a collateral duty and shall be listed in the command notice of collateral duties. The Transfer Control and Receipt will be used to complete books. Individuals authorized to receive cash meal payment books will sign the transfer control and receipt at the time of receipt. The coupon will be retained by the control officer transferring the book as a receipt. A transfer control and receipt will be used to return the completed books. The transfer control and receipt coupon will also be used when the Cash Meal Payment Book is turned over to station audit boards. (Michael S . Hansen CDR ,SC , USA- NAVSUP P-486)

III. METHODOLOGY

A. Description for proposed system

Considering the above mess management systems and other related systems which consist of stock and payroll management systems we propose a more efficient and functional mess management system called MMS for the KDU mess for the administrators to use it easily and to secure details of end-users.

The proposed system will be more user friendly and interfaces of it will be more specific enough to give all directions to the user to proceed with all functions easily. The proposed system to KDU will be run on the program application and all user requirements which will be needed for the payroll and stock management systems. The whole model will be more efficient for data backups, insertion, updating, deletion of information and generating user required reports. Visually providing all detailed paths, having support from a guide in order to use the system wisely and providing the opportunity for the administrator to have easy access from forms or girds are other features provided by the proposed mess management system.

The overall process of the Mess Management System has been implemented as a computerized solution to run within the mess office. It works on a program application based software using C# and SQL server. The activities in the system will serve upon the inputs and request of the user. The system first will be open with a splash screen. After entering the splash screen the login screen will be appeared. The login screen is the first user interface which the end-user will have to interact with the system to proceed relative functions and duties.

In the development of the Mess Management System to the KDU mess, it is planned to use the windows based technology. The use of the windows based technology is due to the reason because, after the development of this system, this system will be used only by a single end-user in the mess. The programming language that is discussed to be used for development is because the Mess Management System is highly dependent on the accuracy and efficiency.

B. Functional requirements

In order to build up a more efficient and time saving mess management system to manage all information on the users of the mess the best software solution is to have a computerized mess management application program which has all the functions in order to proceed with day to day transactions done within the mess and generating the necessary monthly bills or reports for the mess.

- Application should be able to provide secure authentication.
- Application should be able to store data and to maintain the database.
- Application should be able to get details of the users of the mess.
- Application should be able to get details on the payment amounts.
- Application should be able to get details on the stock amounts.
- Application should be able to calculate the total expenditure and balance of each individual user.

Figure 1. Top level diagram of proposed system

- Application should be able to generate the monthly mess bill for each user.

C. Non-Functional requirements

Non-functional requirements statement features of the system other than the detailed functions it performs. These features include system performance, speed, security, reliability and time management system characteristics. The non-functional requirements also talk aspects of the system development process and in use personnel. It includes the following:

- The system will not allow unauthorized accesses.
- The system will not allow users to access pages which permission not granted to access.
- The system will enable efficient management with search and retrieval of data records.
- The system should be able to reduce the time that take to process a record than in the current system.
- The system will allow the data stored to be available for updating or deletion.
- The system will be able to protect from data losses through backing up data.

- User friendly interface.
- Details on each button and functionalities should be provided within the interface.
- Easy to handle with and consisting a help guide.
- Changing skins.
- Proceed with generating monthly mess bills for all users in a less time.
- Perform calculations quickly on payments and stock.
- Data needs to be processed in a minimum required time limit.

IV. HOW THE SYSTEM WORKS

The activities in the system will serve up on the inputs and request of the user. The system first will be open with a splash screen. After entering the splash screen the login screen will be appeared. The login screen is the first user interface which the end-user will have to interact with the system to proceed relative functions and duties.

A. Login section

The cadet mess login screen will be processed for correct authentication to enter the system and handle it. The end-user will be allocated a specific username and password to be entered and if any error occurs in invalid usernames or passwords the system will automatically deliver an error message. The error message will be generated for incorrect usernames or passwords separately and if both are not entered a message box will be shown that user should enter it properly.

The user authentication is given in order to secure the details from out siders who can make changes in the mess management system without any authorization. In the same screen the end-user will get the option to retrieve the password he or she forgets it by correctly providing the emails details to get back the login details to re-enter the system.

B. Main User Interface (ribbon form view)

After correct Verification of user name and passwords the end-user can access the cadet main menu screen. The main screen will be consisting of a ribbon type screen as shown in Figure 1 which will be made from the DevExpress User Interface designer. The ribbon will be grouped into 4 main sections as the end-user requested to include in the system on the modules such as cadet, bar data and application configuration. In each section it consists of sub sections which perform the usability tasks within the system.

C. Cadet Details Section

Cadet details option the end-user will be given an interface to enter cadet details according to the requested attributes of the mess management staff. The cadet details will be added under sections such as whether it is KDU Rathmalana or KDU Sooriyawawa or KDU Werahara, degree programs and respective troops. An additional grid view will be also provided to end-user to view all the cadet details which were previously added by the end-user. The cadet's details can be searched with the search option given and relative information is given in the grid.

A row of the grid the end-user can access the selected information from the text boxes provided to enter details. This is to access information accurately without any end-user mistakes in reading data through the grid. The same form will give another option to view the grid in a separate form in order to enter, delete or update details within the system as the request of the end-users of the mess staff. Options to add, delete, update will be provided with buttons in the ribbon form.

In the grid view details of the cadet can be easily found from the find option above and details can be grouped as the user wants by dragging the columns under which preference needed to be viewed. The chosen preference details will be only displayed in that information section.

D. Cadet Payments Section

The payment section screen the details of costs, which should include in the mess bill at the end of the month are included. The form is run on the cadet's service numbers, intake wise expenses and main costs will be included it. If there are any changes to be done the end-user can choose the specific cadet and make changes in costs as in for the services taken

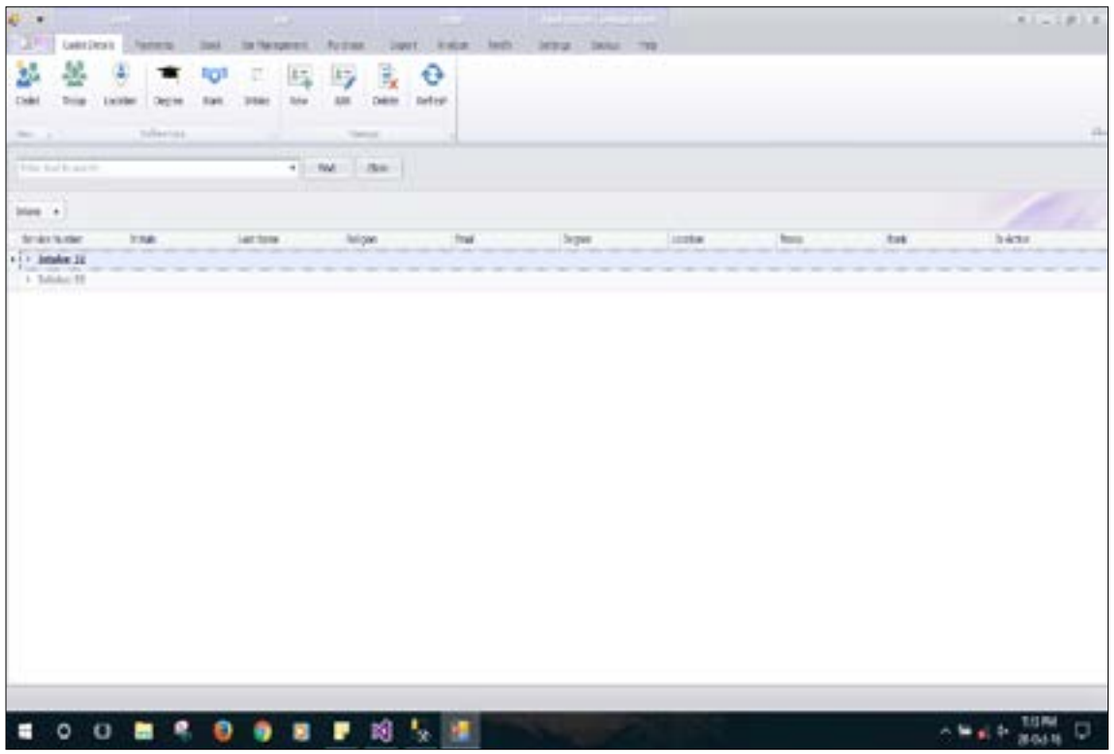

Figure 2. Interface of the main ribbon form

by that cadet for the month. Options such as add new, update, delete and view details will be included for the end-user on their request. The payment form will also give an option to view all payment details in a form of a grid for more user convenience.

In the additional payments form the additional details costs will be included. Additional costs are the costs which will be not always included in the monthly mess bill and if only that cost or service is made it will be included into the mess bill. The additional costs will be added to each cadet after searching the cadets' service number and for sudden events more empty text boxes will be included in order to enter the event name and costs amount. This form too will compromise with add and update in the additional payments detail form.

F. Bar Management

In the Bar management section it will be mainly about the adding of products and product categories for the system. products are added under the product category and each product can be edited, deleted or updated as the user requests in the mess management system. The products will be displayed in a grid for the user to display and view in any need.

G. Mess Stock Section

In the stock section the details of the stocks in the mess of all products are managed. The stock option will be under main functions. One for adding a purchased item to the stock and the other is to update any detail in the stock items. The purchased items for the stock are detailed with its Quantity, prices and expiry dates etc.

If a purchase is done this is added to the stock under a batch number system. in this non-functional requirement if the cost price, sales price and expiry date is different in the same products previously added details a new batch number is issued for the new batch to be entered to the stock details under a new batch number. If cost price, sales price and expiry date is same the purchased quantity will be added to the same product under its old batch number.

In the stock option in the stock section the stock details such as the cost price, sales price and expiry date can be edited on a certain product under its batch number. All details are provided to be viewed in a grid view of the user interface in the stock section.

H. Sales Section

In the sales section the details of the cadet's sales are included. The cadet should be displayed first and the product which he or she will be purchasing will be displayed with the respective batch number and the quantity. After entering all the sold items for the cadet the system will send its details to the reporting section to include it in the mess bill as required.

I. Data Section

This will be on the reporting and exporting of reports. The reports can be generated as needed by clicking the options given in the export button in the ribbon form.

J Application Configuration Section

There will be option for the users to change the skins of the Mess Management Systems user interfaces as required for easy sight preferences. The help option will give the access to the help menu where the end-user can get details and help on the whole mess management system

Even new end-users will be able to handle the mess management system with the reference of the help menu provided. The about the system option will provide a screen which gives the details of the developers and product license of the mess management system. In the Backup option it will be beneficial to backup all details of the system to a cloud. This feature will be provided by the engine will be important to the end-user to save all details of the database of the mess if any error or information is lost within the system. Therefore, through the backup option, all information is secure at any moment.

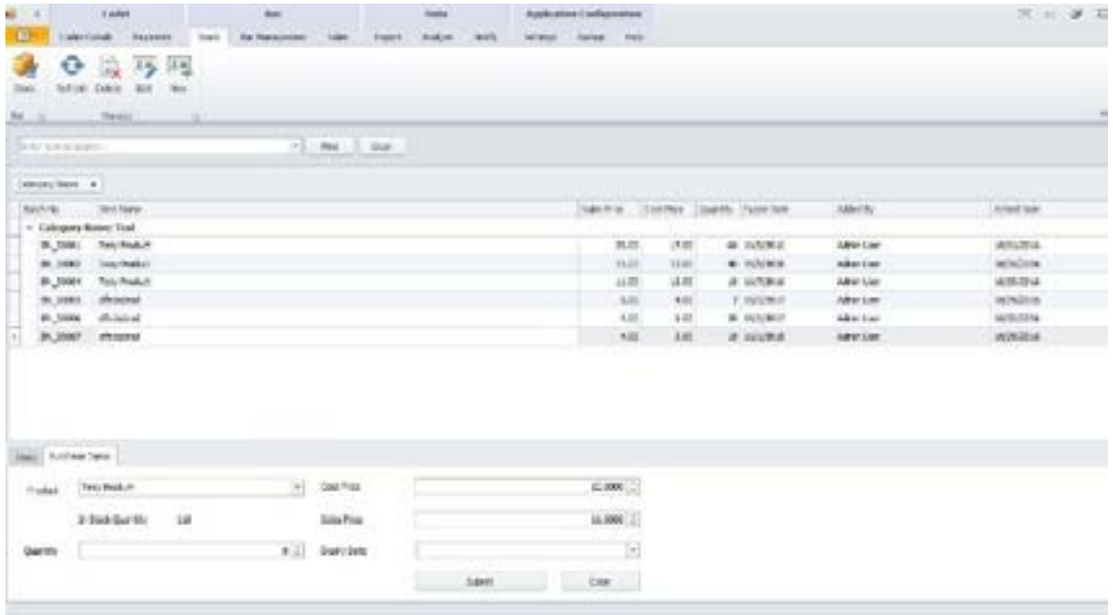

Figure 2. Interface of stock section

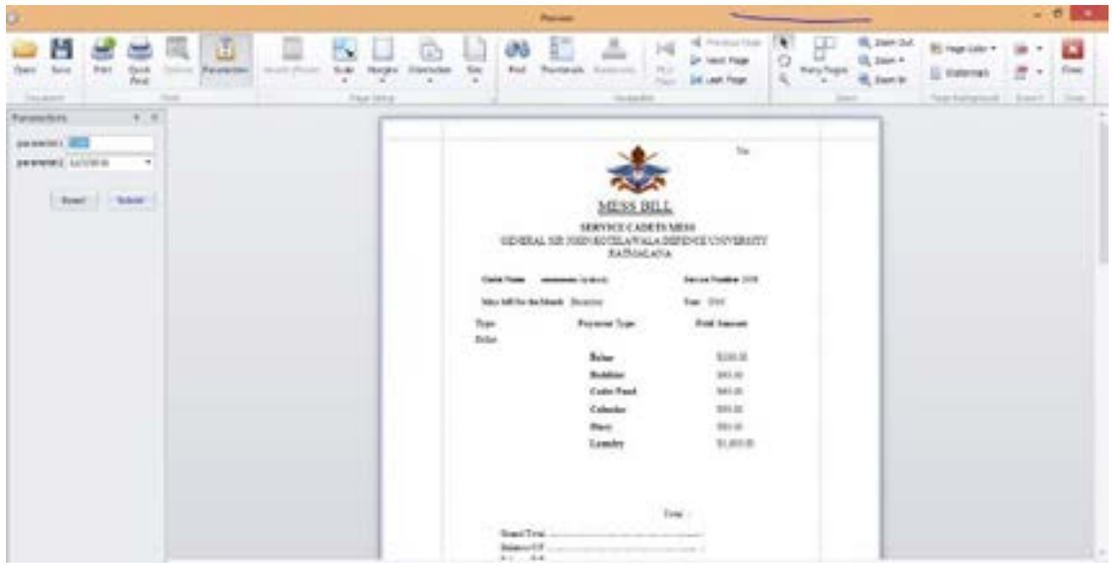

Figure 3. Mess bill preview

The update process of the system will be done by the administrators in charge of the system assigned by mess. They will keep in touch of the frequent changes of the system as required. The system is 24 hours accessible and therefore the system should be frequently updated. Within the process of this mess management system always keep track of the accounts within the system and other bill clearances.

V. DISCUSSION

The aim of this project was to develop an automated mess management system as a solution for manual mess management system of KDU cadet mess. The development team implemented this system in order to determine its ability to satisfy the entire functional and non-functional requirement with special qualities such as flexibility, reliability efficiency and etc., to overcome the drawbacks identified in the system.

The study found out that it is feasible to use the language C# in .NET frame work to develop the mess management system since it brings direct advantage of platform independency, automated monthly mess bill calculation, automated stock control system and report generation which were identified as main necessities to enhance the productivity of the cadet mess environment. Calculating monthly mess bills by manually using MS Excel, unavailability of separate function for taking backups of daily transactions, not compatible with new operating systems are some issues which are clearly answered by new computerized mess management system.

VI. CONCLUSION AND FURTHER WORKS

The computer based mess management system is able to gain various achievements which will satisfy user expectations. The user is provided the option of monitoring the records entered earlier and can get details of the users of the system. Data storage and retrieval will become faster and easier to maintain because data is stored in a systematic manner and in a single database. Also the system is able to backup all data and make data updates easily.

In result the system is able to provide secure authentication with using md5 authentication. The representation of interfaces with a more creative and user friendly way also will be beneficial to the mess management system. Having the required features in order to the mess management staff to do their daily data entries, updates and retrievals are also something which can be gained by the new Mess Management System.

As further work we are hoping to implement this system to the KDU officer mess and combine the two systems for easy management within the University for payment, stock and report generation purposes. Introducing new features according to the user requirement and their expectations. So as a future enhancement, hope to introduce the system in web based to coordinate the processes through the web. By implementing and facilitated the site with the web service it is possible to increase the usability of the system.

ACKNOWLEDGMENT

We want to thank all the lecturers of KDU IT Department and KDU mess who gave us very helpful feedback to complete this work.

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