
ABSTRACT

The main objective of this study was to develop a computerized electronic counter and timer using LCD monitor to be used in cashier's office of Naval State University, Naval, Biliran, Philippines. This study used the application rapid development as a tool in making the project. The Computerized Electronic Counter and Timer Using LCD Monitor was designed to ease the effort and boredom of the students falling in line waiting for their turn to be entertained by the cashier in whatsoever purposes they have. It is a great help to the administrator in making the students entertain while they are waiting for their turn. It may also be a venture for the administrator to post important announcements to the students. Computerized Electronic Counter and Timer Using LCD Monitor was design taking into account various industry needs and practices. The system is an ideal solution for one service environment such as the cashier, thus optimizing the space and enhancing the office operational efficiency. Computerized Electronic Counter and Timer Using LCD Monitor is a simple and user friendly system which has teller button service whereby the teller/agent instantly calls the next customer in the queue. This system is also equipped with a ticketing dispenser, and display units alerting the customer to proceed to the available counter, video player for the customer to be entertained while waiting, and a moving text to post important announcements. Moreover, more than one single line queue systems can also be integrated together allowing more teller's/agents to serve increasing customers. This system allows us to enhance the customer experience in any environment. There is a need of future study to enhance the implementation of this system.

KEYWORDS: Computerized; Electronic Counter; LCD Monitor; Timer.

INTRODUCTION

In the present generation where Information Technology becomes larger and more refined as it rapidly developing, usage of electronic machines and gadgets even in the simplest way is very helpful. Development in Information Technology indeed makes our daily life easier and effortless through modernization. It is really true that with the advancement in the area of computation, the role of human had decreased drastically but not completely (*Mohamad, 2007*).

Standing in a long queue or waiting for your turn is not anyone's favorite activity. It is the low quality of service which results in long waits thus decreasing the efficiency of the organization. Many industries face enormous customer footfall and companies have to serve more people than it can handle.

EQMS (2014) contended that consulting; customers always over estimate their wait time by 50%. Waiting is extremely frustrating, distressful and time consuming. Failure in meeting the time service expectation of a customer leads to boredom, boredom leads to frustration, and frustration leads to argument. It is obviously the problem seen by the respondents in any transactions at the Naval State University especially at the cashier during enrolment and examination period.

With this regard, the proponents present a prototype computerized electronic counter and timer using LCD monitor which help the institution and their employees to manage, track and prioritize the service to ensure timely and efficient delivery to every customer.

It is the system which has an exceptional customer experience through Single & Multiple line queue system. Moreover, the system has the capability to inform and entertain the customers through a video presentation and moving text. This might be the solutions in reducing wait time and arguments in any school transactions. It may also provide fair delivery and in return eliminate stress among the customers. It is on this premised that the proponents motivated to conduct this study to a good delivery of service. (*Benjaafar, S., Gayon, J., and Tepe, S., 2010*).

OBJECTIVES OF THE STUDY

This study aimed to develop a Computerized Electronic Counter and Timer using LCD Monitor for the Cashier's Office of the Naval State University. Specifically, the study sought to attain the following objectives:

- [1] Promote and maintain orderliness in queuing at the cashier's office during payment period.
- [2] Inform students with the latest news about the university through scrolling text
- [3] Entertain the students while waiting for their transaction.
- [4] Prevent insertion of those students who are not following the rules during payment period.

Framework of the Study

In the development of the Computerized Electronic Counter and Timer Using LCD Monitor, the proponents based the construction of the system from the different components that the users need from the present queuing system. With these components, the development of the system was based on the objectives of the study, transcript of interview and survey questionnaire.

The researchers incorporated different concept in the formulation of this thesis. As a part of designing which is the preliminary phase of software development Entity Relationship Diagram (ERD) was being used. It is a data modelling technique that creates a graphical representation of the entities, and the relationship between entities within an information system. The proponent used visual basic 6.0 in creating the application system. It is considered as the simplest way on creating such system, with the aid of Winsock component for the system to control over the network. Figure 1.0 shows the conceptual framework of the study

This study aimed to develop a Computerized Electronic Counter and Timer using LCD Monitor for the Cashier's Office of the Naval State University.

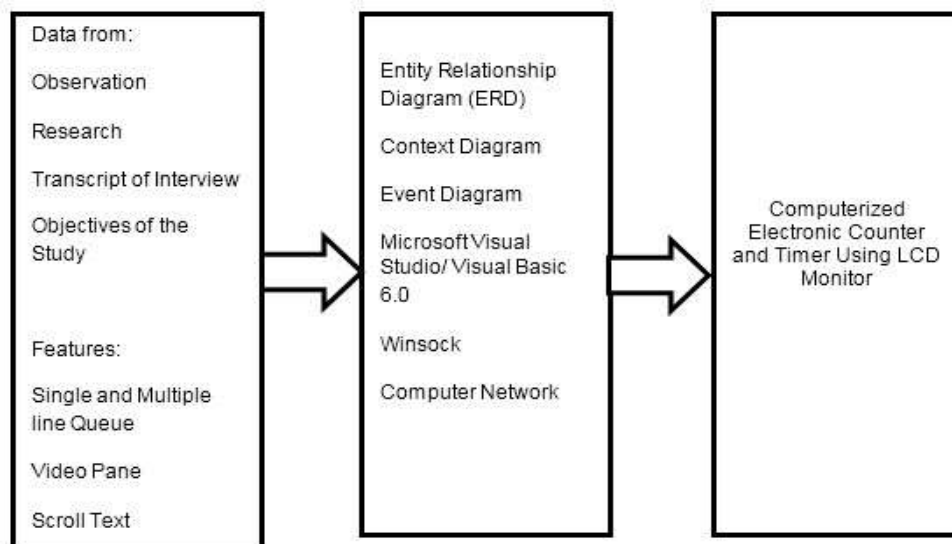


Figure 1.0 The Conceptual Framework of the Study

Scope and Delimitation of the Study

This study only focuses on the development of computerized electronic counter and timer using LCD monitor at the cashier’s office for this S.Y. 2014-2015.

METHODOLOGY

The Computerized Electronic Counter and Timer Using LCD Monitor use the Rapid application development wherein the team believes that it is the most advisable among the other processing models for the creation of the system research. Also it is reasonable to use in projects where business goals are unstable. It would be easy for the programmers to fix the changes made by the clients. Although it is risky, it could give satisfaction to the clients.

Rapid application development (RAD) is a software development methodology that uses minimal planning in favour of rapid prototyping. The “planning” of software development using RAD is interleaved with writing the software itself. The lack of extensive pre-planning generally allows software to be written much faster, and makes it easier to change requirements and it is a type of incremental model. In RAD model the components and functions are developed in parallel as if they were mini project. The development are time boxed, delivered and then assembled into working prototype. This can quickly give the customer something to see and use and to provide feedback regarding the delivery and their requirements. There are four phases in the Rapid Application Development Model.

Requirements planning phase. This phase is a combined element of the system planning and system analysis phase of the System Development Life Cycle (SDLC). The proponents came out with the system proposal and conducted data gathering, research and schedule of activities. The members discuss and agree on project needs, project scope, constraints, and system requirements. It ends when the team agrees on the key issues and obtains management authorization to continue.

User Design Phase. During this phase, users interact with systems analysts and develop models and prototypes that represents all system processes, inputs, and outputs. The RAD use a combination of Joint Application Development (JAD) techniques and CASE tools to translate user needs into working models. User Design is a continuous interactive process that allows user to understand, modify, and eventually approve a working model of the system that meets their needs.

Construction Phase. This phase focuses on program and application development task similar to the SDLC. In RAD, however, users continue to participate and can still suggest changes or improvements as actual screens or reports are developed. Its tasks are programming and application development, coding, unit-integration and system testing.

Cutover Phase. This phase resembles the final task in the SDLC implementation phase, including data conversion, testing changeover to the new system, and user training. Compared with traditional methods, the entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner. Its tasks are data conversion, full-scale testing, system changeover, user training.

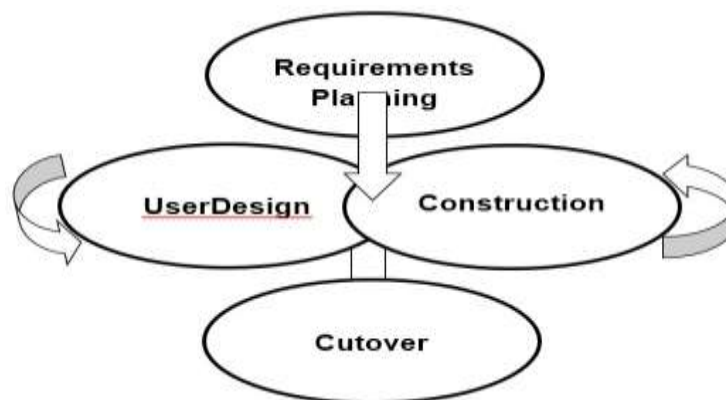


Figure 2.0 Rapid Application Development (RAD)

The venue or the locale under which this study was taken is inside the campus of Naval State University, specifically at the Cashier's office and all other offices where queuing of customer is possible. The respondents involved in this study were the Cashiers Staffs, and the students of the Naval State University. The formulated questionnaires was used by the researchers to gather information from the cashier's staff and students. Actual observations also helped in filling the events and ideas that the questionnaires failed to incur.

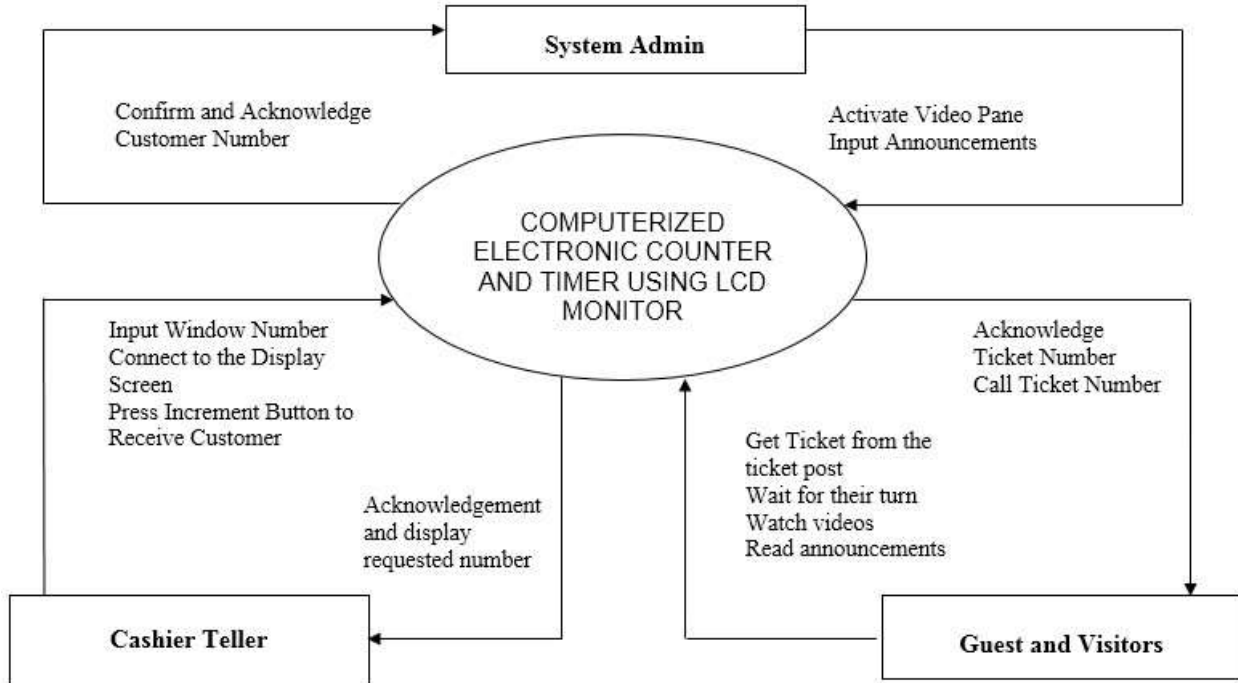


Figure 2.1 Context Data Flow Diagram of the Study

EVENT DIAGRAM

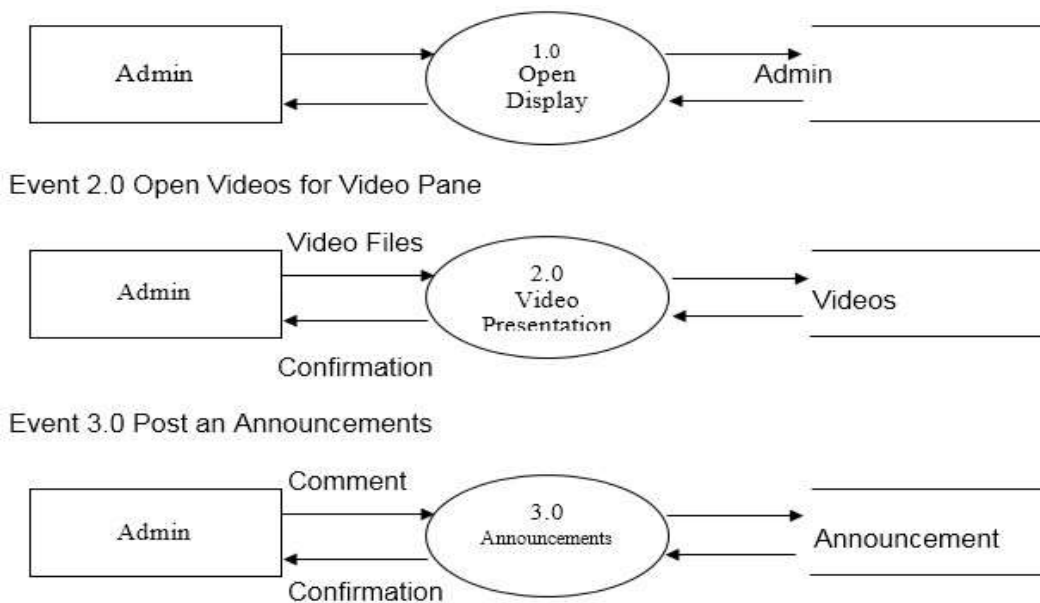
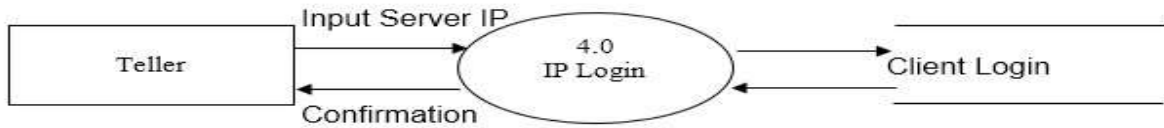
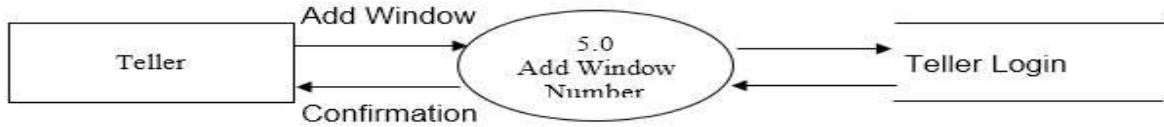


Figure 2.2 Event Diagram for the Display Window

Event 4.0 Add User Teller



Event 5.0 Add Window Number



Event 6.0 Start Counter Operation

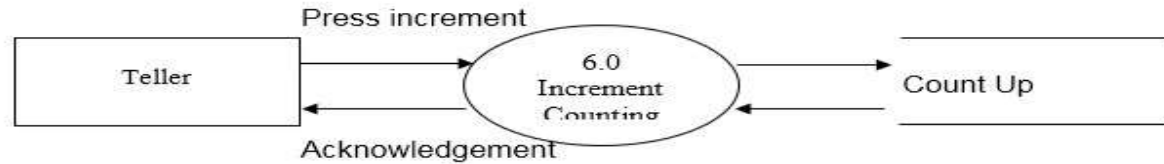
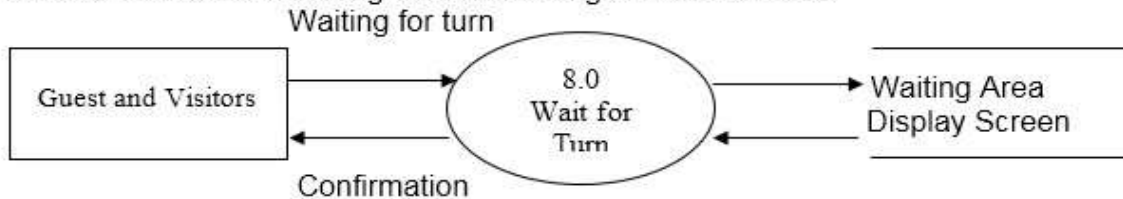


Figure 2.3 Event Diagram for the Teller Client

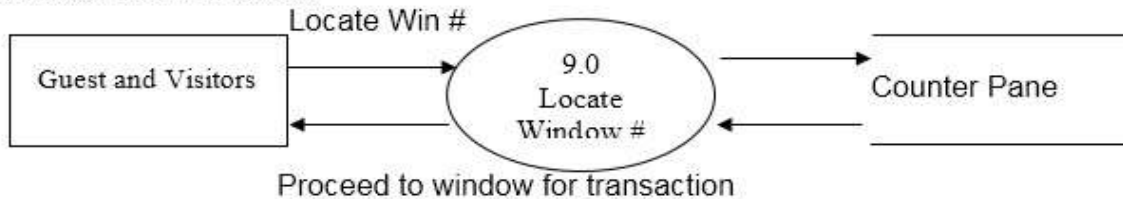
Event 7.0 Pick Number at Ticker Post



Event 8.0 Wait while watching videos/Reading Announcements



Event 9.0 Number Called



Proceed to window for transaction
Figure 2.4 Event Diagram for the Guest and Visitors

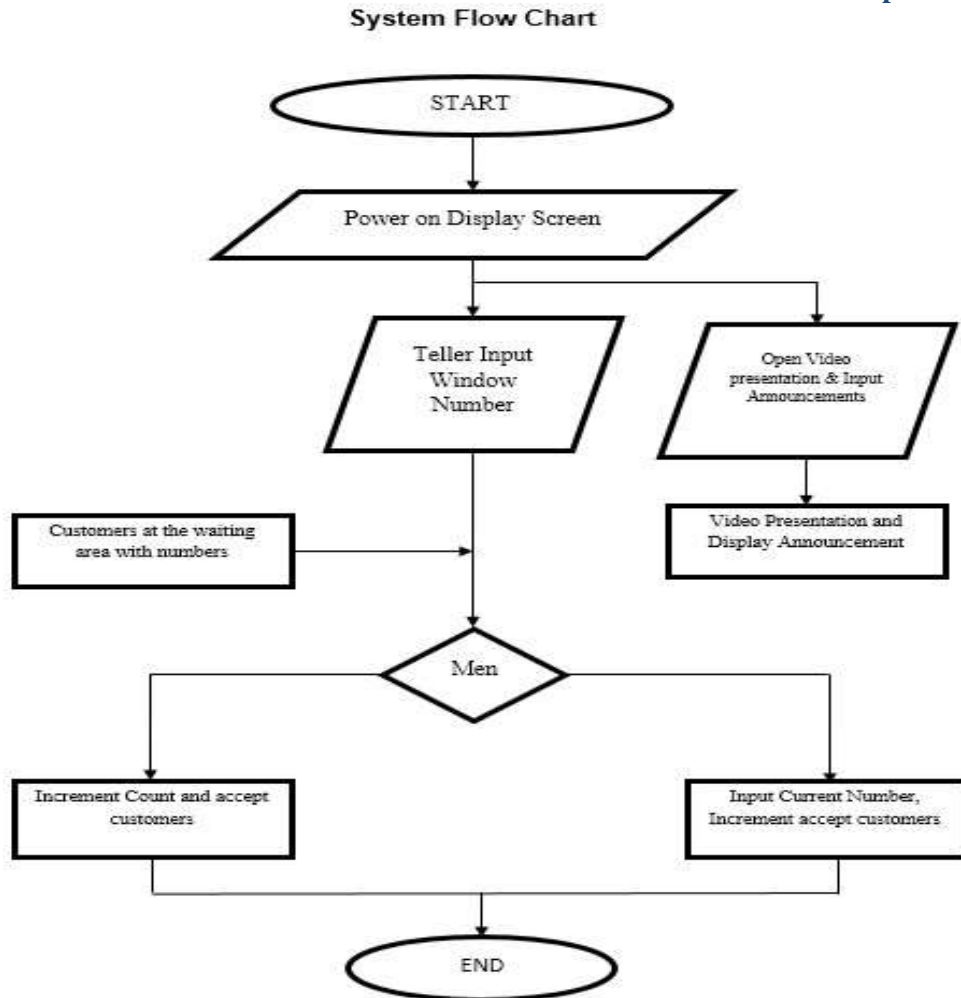


Figure 2.5 Flow Chart of the System

RESULTS AND DISCUSSION

This chapter discusses the presentations of the result based on the objectives of this study. This includes the installation of the display and control windows, graphical user interface of main display window having moving text and video presentation capabilities, moreover also describe counter interface and control window interface.

Installation of Display and Control Window

To use the Computerized Electronic Counter and Timer using LCD Monitor, installation of the application software will be the first thing to do. Shown below are the figures on how to install the Display Window.

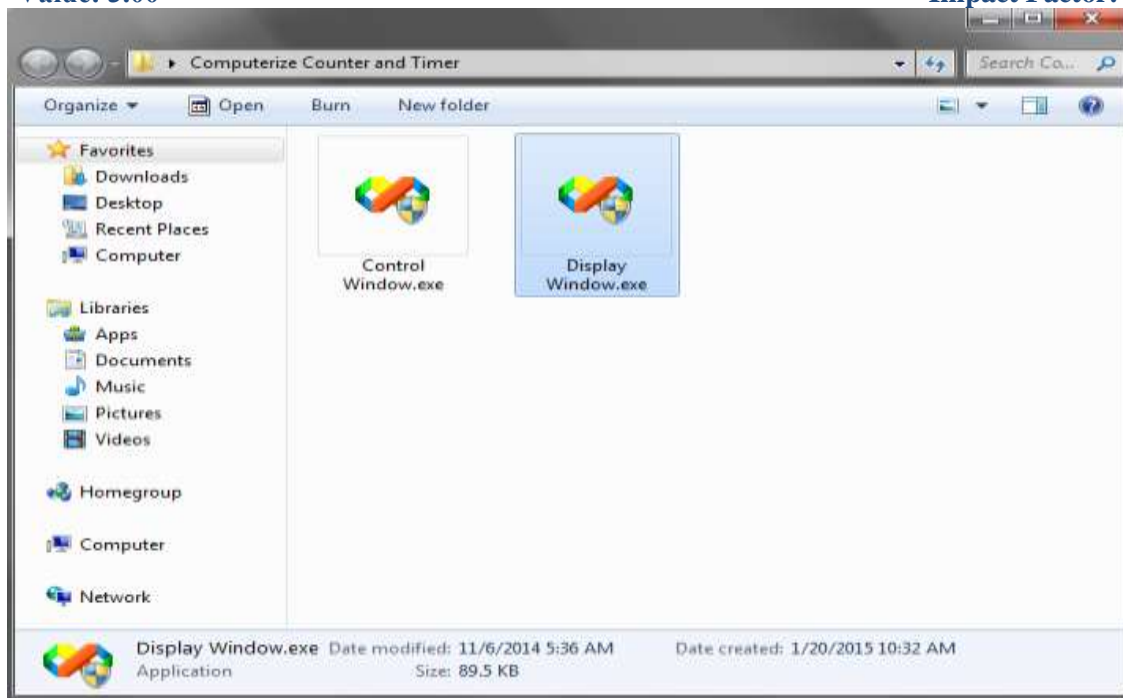


Figure 3.0 Installer of Computerized Electronic Counter and Timer using LCD Monitor



Figure 3.1 First Part of Display Window Installation Process.

Figure 3.1 is the first part of the extraction process of the installer for display module, it shows the welcoming screen. The user must click Next in order to proceed, or Cancel to abort installation.



Figure 3.2 Second Part of Display Window Installation Process

Figure 3.2 is the second part of the installation process of the display module, where it tells about the information of the software to be installed. The user must click Next in order to proceed, or Cancel to abort installation.



Figure 3.3 Third Part of Display Window Installation Process

Figure 3.3 is the third part of the installation process of the display module, where it displays the license agreement of the software. The user must click I agree with the above terms and conditions and Next in order to proceed, or Cancel to abort installation.



Figure 3.4 Fourth Part of Display Window Installation Process

Figure 3.4 is the fourth part of the installation process of the display module, where it allows user to choose where to install the software. The user must identify the directory where the software to be installed. The user must click Next in order to proceed, or Exit to abort installation.



Figure 3.5 Fifth Part of Display Window Installation Process

Figure 3.5 is the fifth part of the installation process of the display module, where the software awaits confirmation to the directory chosen by the user. The user must click Start to complete the installation or click Exit to abort installation.



Figure 3.6 Sixth Part of Display Window Installation Process

Figure 3.6 is the Sixthpart of the installation process of the display module, where the software loads the program files to the computer. The user must wait for the software to install or click Cancel to abort installation.



Figure 3.7 Seventh and Final Part of Display Window Installation Process

Figure 3.7 is the seventhpart of the installation process of the display module, where it shows the user that the installation process of the display module was done. The user must click Exit to finish the installation and close the setup window.

Installation of Control Window. Shown below are the figures on how to install the Control Window.



Figure 3.8 First Part of Control Window Installation Process

Figure 3.8 displays the starting screen of the extraction process of the installer of the control window. The user must click Next to proceed and Exit to abort the installation process.



Figure 3.9 Second Part of Control Window Installation Process

In figure 3.9 the setup window displays the information about the control window. The user must click Next to proceed installation or Exit to abort.



Figure 3.10 Third Part of Control Window Installation Process

Figure 3.10 displays the terms and conditions about the software to be installed. The user must read and agree to the installation software agreement to proceed or the user might click Exit to abort the installation.



Figure 3.11 Fourth Part of Control Window Installation Process

Figure 3.11 shows the directory of the software to extract the files required by the system to install. The user must specify directory and click Next afterwards, or Exit to abort the installation.



Figure 3.12 Fifth Part of Control Window Installation Process

Figure 3.12 shows the confirmation of the computer directory chosen by the user to extract the installer of the control window. The user must click the Start button to begin the installation, or Exit to abort it.

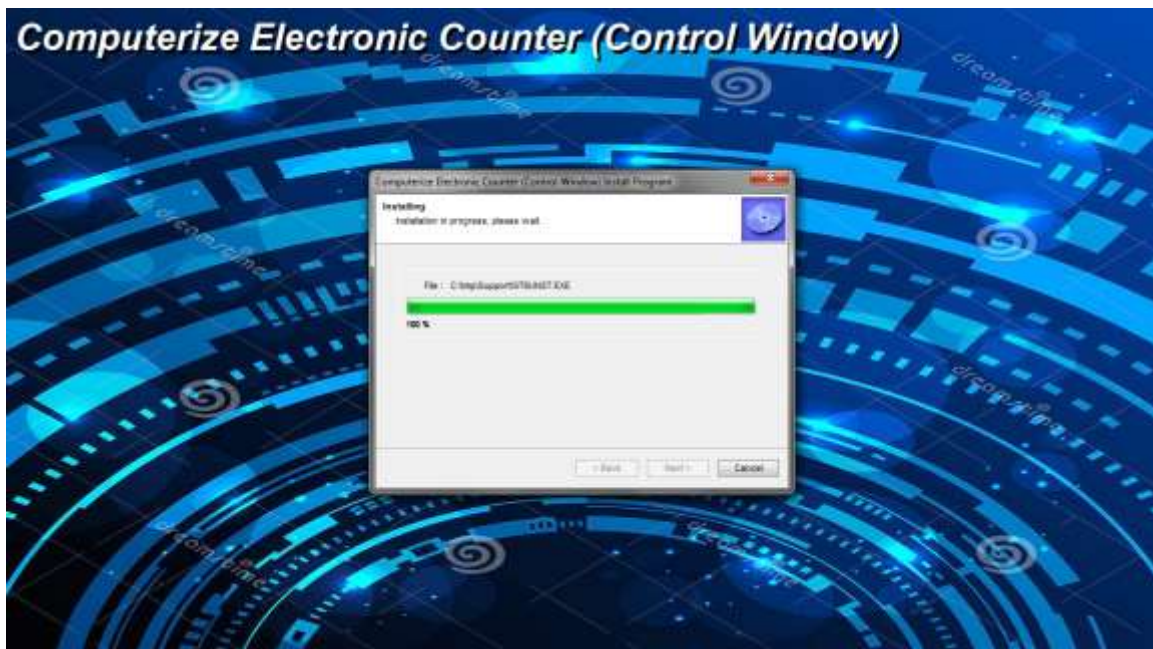


Figure 3.13 Sixth Part of Control Window Installation Process

Figure 3.13 shows the extraction of installation files for the control window to the directory chosen by the user.

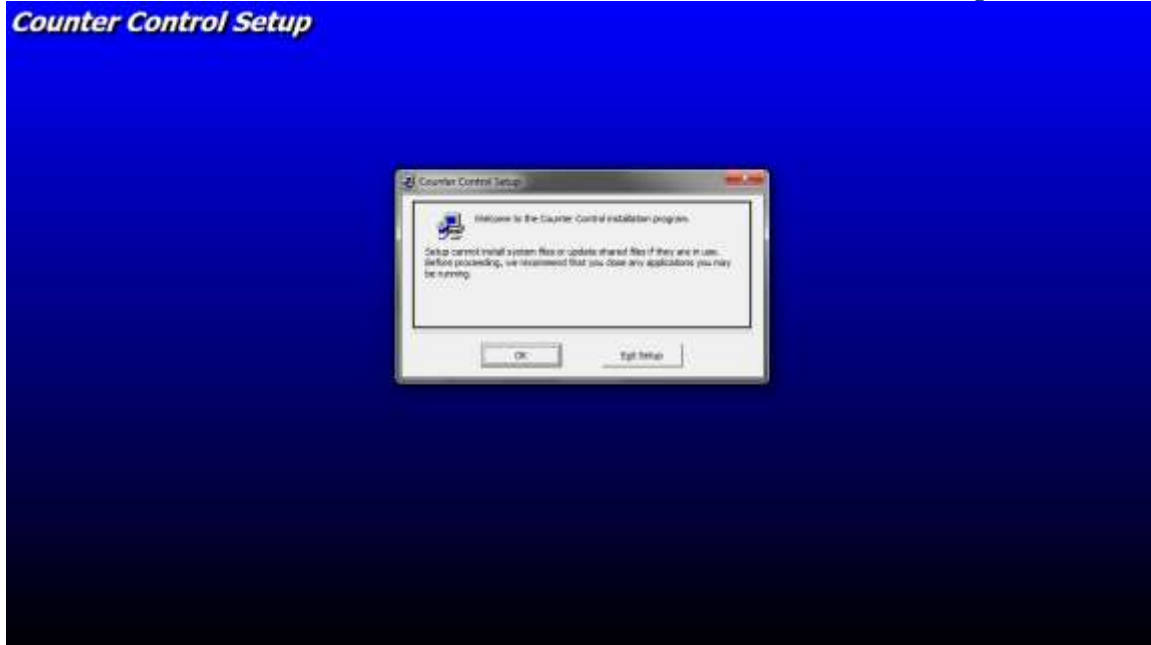


Figure 3.14 Seventh Part of Control Window Installation Process

Figure 3.14 show the starting installation of the control window. The user must click OK to proceed or Exit Setup to abort.



Figure 3.15 Eight Part of Control Window Installation Process

Figure 3.15 shows the default directory where to install the control window. The user must click the button having computer icon to proceed or Exit Setup to abort.

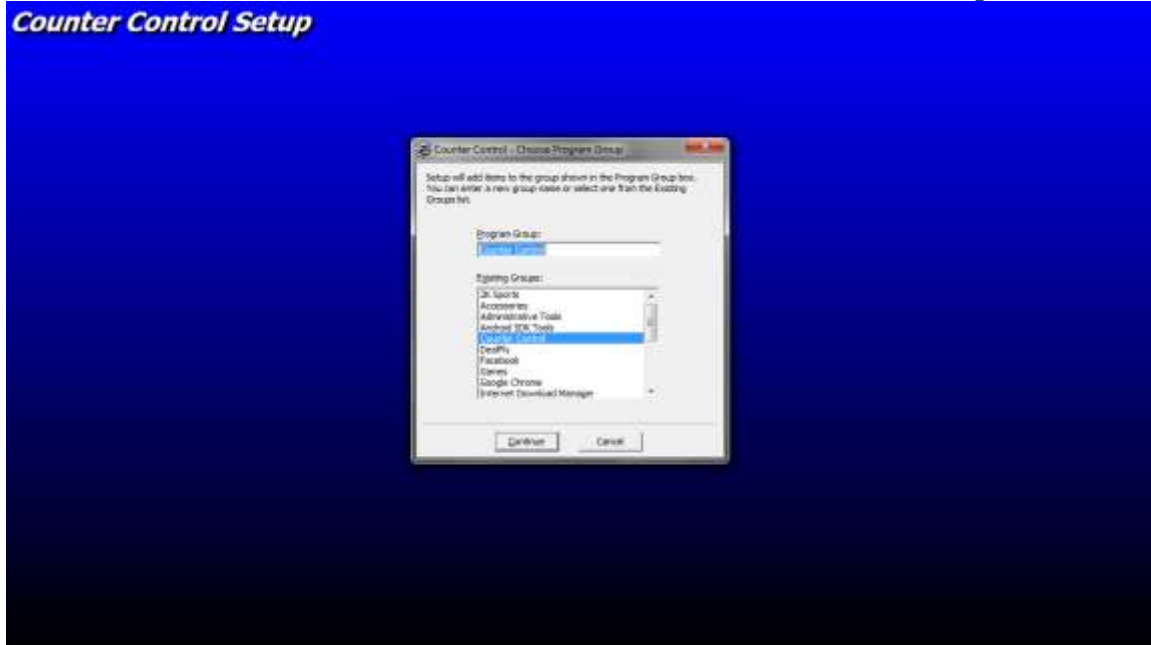


Figure 3.16 Ninth Part of Control Window Installation Process

Figure 3.16 allows the user to confirm the installation process. The user must click Continue to proceed or Cancel to abort installation.

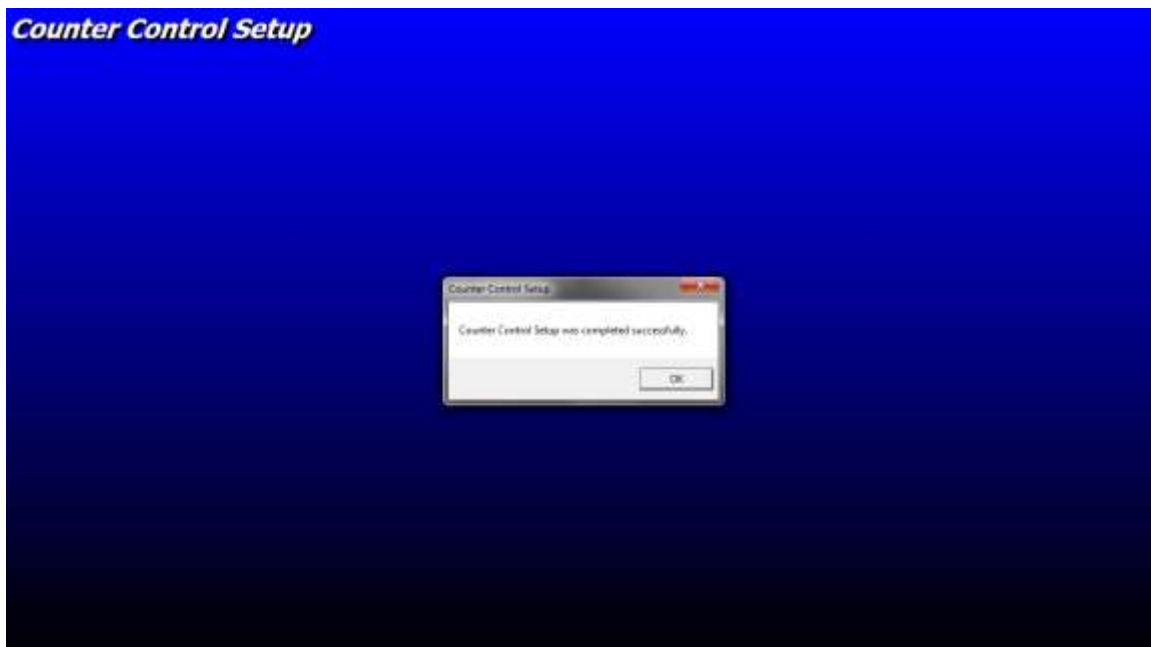


Figure 3.17 Tenth and Final Part of Control Window Installation Process

Figure 3.17 Show the final window of the installation process of the control window. The user must click the OK button to end and exit installation window.

After Installation of Display and Control Window

Upon finishing all of the installation processes, Icons will appear at the desktop and start menu of your computer as shown in Figure 4.0.

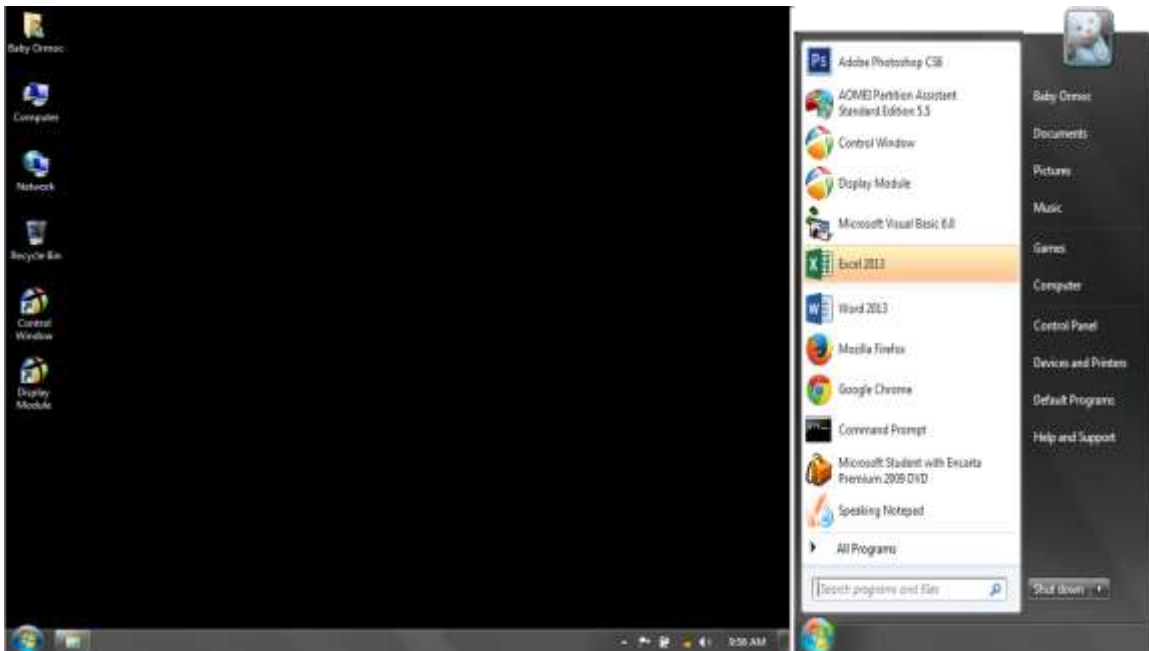


Figure 4.0 Display and Control Window Icons Created at Desktop and Start Menu After Installation

Display Window



Figure 5.0 Computerize Electronic Counter and Timer Using LCD Monitor Display Window

Figure 5.0 shows snapshot of the working display window of the system. It illustrates the service it can render in real working condition especially in the queuing at the cashier's office of the Naval State University. The display window has ten features;

- Counter.* Serves as the queuing sequence of the customers having ticket;
- Teller Number.* Represents the window number at the cashier's office;
- Number of Teller Available.* Shows how many available tellers for Service;
- Digital Time Clock.* Allows customers be oriented on what time it is;
- Video Player.* Entertains customers through video or movie showing while waiting;
- Scrolling Text.* Scrolling text can be useful for the administration to post News and Announcements for the customers to the students, faculty and staff;
- Playlist.* The system has an ability to store video, movies and music in a playlist;
- Network Controlled.* The counter of the display window is controlled by a control window which is installed on a computer connected through network;
- User Friendly.* All of the operations of this system is based on a windows application to secure a user friendly interface that can be used by an average computer user;
- Supports Full Screen Resolution.* The display window is a full screen resolution having a minimum of 1366 x 768. Thus, the system can also run using LED monitors capable of higher resolutions.

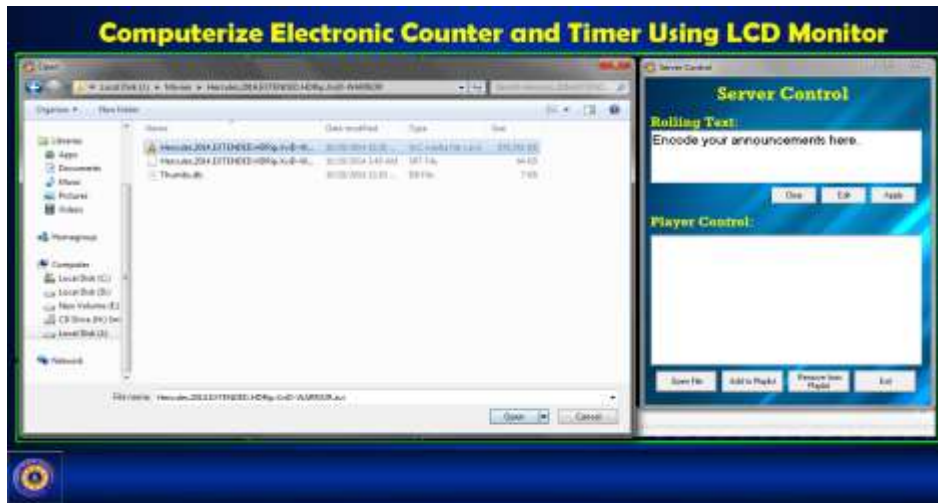


Figure 6.0 Window Used to Enter Scrolling Text and Movie to the Display Window

Control Window

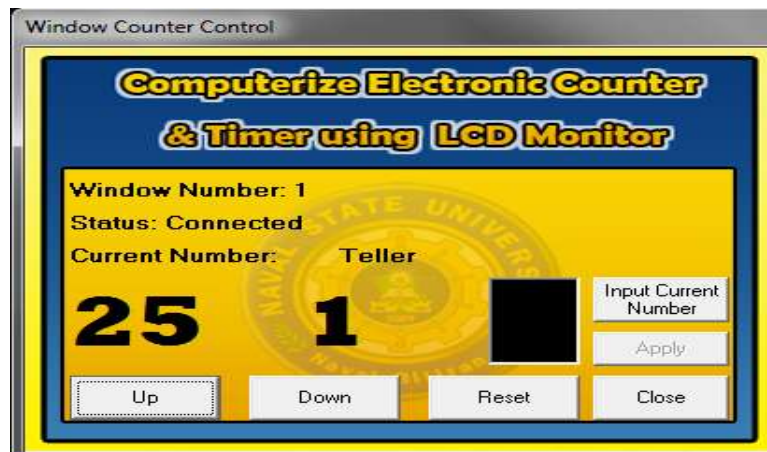


Figure 7.0 Computerize Electronic Counter and Timer Using LCD Monitor Control Window

Figure 7.0 shows snapshot of the working control window of the system. The control window an application included in Computerize Electronic Counter and Timer that will be installed to the tellers' computer. It will be the tool in controlling the counter at the display window.

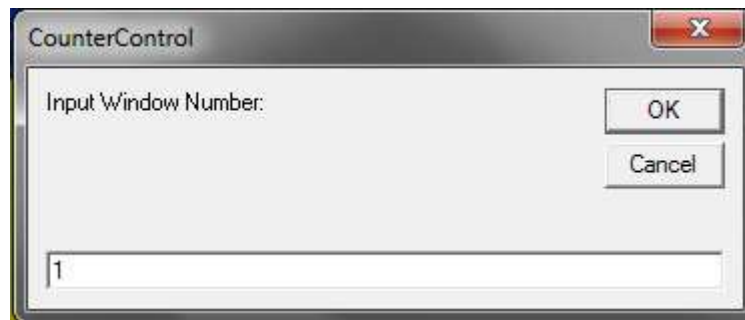


Figure 8.0 Control Window Let the Teller Input the Window Number

Figure 8.0 allows the teller to register its window number to the system. This number will be used by the system to identify what window call the sequence number at the display window.



Figure 9.0 Control Window Starting Interface

Figure 9.0 illustrates the starting physical appearance of the control window after the teller enters the window number. The control window is divided into some parts;

Window Number. The entered number by the teller during the startup of the system will registers to this area which represents the window number used by the teller.

Status. It is the part where the control window tells if you are connected to the display window or not.

Current Number. Shows the current sequence number shown at the display window

Teller Number. Shows what teller calls the last number.

Up button. Represent the count up command to counter at the display window

Down Button. Represents the count down if a teller doubled press the up button.

Reset Button. Reset the number located at the display window.

Close Button. Close the control window.

Input Current Number Button. Serves as an emergency purpose button in terms of brownouts. The teller can enter the current available number at the queue outside before brownout for it to display at the counter display window, then they can proceed with the count up process.

Requirements Analysis and Specification

Hardware Requirements. The proposed system run in network environment, it needs a client-server computer. Its minimum system requires a Pentium 4 or higher computer specification, at least 1 GB memory, and 100 MB Hard Drive space.

Software Requirements. The system can run perfectly with Windows XP Service Pack II (SP2) or higher windows operating system.

Software and Application Being Used

The software application being used to develop the system is Microsoft Visual Basic 6.0. It was chosen by the proponents for it is the simplest and most suitable application builder software that can cater full functionality of the system.

Personnel

Personnel involve in using this system is the tellers and staff of the cashier's office. They have all the authority to use the system, for this system is intended for them to improve more their tasks.

Testing Strategies

Functionality Testing. Computerize Electronic Counter and Timer using LCD Monitor should undergo testing to eliminate errors that usually occur from constant running of the program. Various testing activities were conducted during the defense to check the systems performance and back end of this project.

System Testing. Users should evaluate the system accurately. Series of test should be conducted to ensure the flow of the system in able to detect and debug immediately the error that may occur.

Installation and Maintenance Process

With the hardware and software requirements will be set up correctly, it will be followed by the installation of the Computerize Electronic Counter and Timer using LCD Monitor. Instructions and User's Manual should be properly observed.

CONCLUSIONS

Based on the findings of this research, the following conclusion are drawn Computerized Electronic Counter and Timer using LCD Monitor for cashier's Office. Computerized Electronic Counter and Timer using LCD Monitor promotes and maintain orderliness in queuing at the cashier's office during payment period. It Inform students with the latest news about the university through scrolling text. It also entertains the students while waiting for their transaction. Moreover, it prevents insertion of those students who are not following the rules during payment period. Thus, Computerized Electronic Counter and Timer using LCD Monitor is relevant to the NSU cashier's office and students because the system will make their transaction fairly, easier, faster, most of all it is entertaining and less stressful.

RECOMMENDATIONS

In the light of the findings the following conclusions are forwarded: Replacement of system with the latest Computerized Electronic Counter and Timer Using LCD Monitor comes with the sense of urgency. For the realization and implementation of the Computerize Electronic Counter and Timer using LCD Monitor, both hardware and software requirements should be followed. The administration should put up the number ticketing post near the cashier's office where the numbers are available. Further research should be conducted in region wide for the future researchers with the same interest on Computerize Electronic Counter and Timer using LCD Monitor to optimize the result of the present study.

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- [7] DATABYTE VIRTUAL QUEUE SYSTEM: <http://eqmconsulting.com/>
- [8] QUEUE MANAGEMENT SYSTEM: <http://databyteindia.com/QMS.html>

APPENDIX

SCREEN DESIGN

Screen No.: 1

Screen Name: Display Window

Description: Displays the Electronic Counter and Timer. It has video player and scroll text that can be useful in entertaining the customers while waiting for their turn to be served. It has also a capability to create movies and videos playlists.



Screen No.: 2

Screen Name: Server Control/Display Window Control

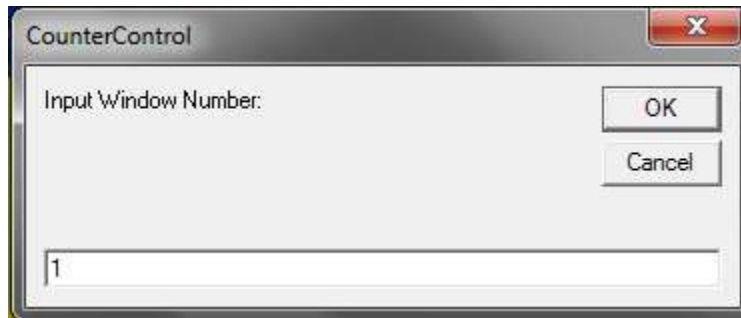
Description: Used by the users to input scrolling text. It also used in opening videos/movies and storing it to the playlist.



Screen No.: 3

Screen Name: Window Number Input box

Description: Use by the teller to input the window number they assigned to.



Screen No.: 4

Screen Name: Main Control Window

Description: Used by the teller to call a number from the customer queuing outside the cashier's office.

