

Development of Inventory Database System Using Radio Frequency Identification

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Abstract: Inventory database system using Radio-frequency identification (RFID) is a database management system with RFID tag as a triggering input and as a security to the system. The idea is to develop a systematically database for lecturer to request stationary from office's faculty by enhancing it with the RFID and establish a Local Area Connection (LAN) connection. The aim for this project is to enable user to have an easy access for requesting stationary from office's faculty stationary. The RFID tag that has a unique identification number will be the input/password for user/administrator to access into the system. The Microsoft SQL Server 2005 will be used as a database that stored all the information and inventory related to this system. The interface for this system will be developed using Microsoft Visual Basic 6.0 and as the interaction between the hardware and software integration. As the result, the configuration of hardware to software can be done thus enabling the user and administrator to begin using the system. As the future work, the e-mail alert reminder can be adding-up as an additional notification on approval status of the requested item in order to enhance the system.

Keywords: Graphical User Interface (GUI), Inventory, Radio-frequency identification (RFID), Serial Communications

1. Introduction

The faculty already had a system for requesting stationary, but it is not too efficient and systematic since it's involved with the usage of several filling-in forms. Nowadays a system called Database Management System (DBMS) is a common in an environment of an organization. A DBMS allow a systematically database to be built. In order to enhance the previous system, an RFID will be used as security precautions and a database will be built [1], [2], [3]. The previous system needed a lecturer to manually fill-in the form at the office's faculty which is located on the ground floor. Then the lecturer will wait for approval from PIC/administrator [4], [5], [6], [7]. There is no specific notification when the form will be processed by PIC/administrator either it is approved or rejected. There is also a possibility that the form might disappeared in the process. By building-up this Inventory Database System using RFID, the problem stated above can be avoided. Basically this project has several objectives to be completed which are:

- (i) To enable user to have an easy access for requesting stationary from office's faculty office's stationary.
- (ii) To learn and understand working on how to use programming language which involving Microsoft SQL and Microsoft Visual Basic 6 for database and GUI development [8], [9].
- (iii) To develop an inventory database system using RFID system with Microsoft Server Language as database and

client-server application as the connection to faculty office's stationary [10], [11], [12].

Figure 1 shows the actual RFID reader used in this project and a laptop as a test bed for a database host.



Figure 1: RFID reader connected to the laptop as host database before it linked to the faculty's local area network.

Figure 2 shows the overview of this project which the RFID reader is connected to the desktop station as a database/host through USB [13]. This database/host station is controlled by the person whom in charge with the inventory item. The database/host station will be connected to others lecturers' desktop station via available network in the faculty.

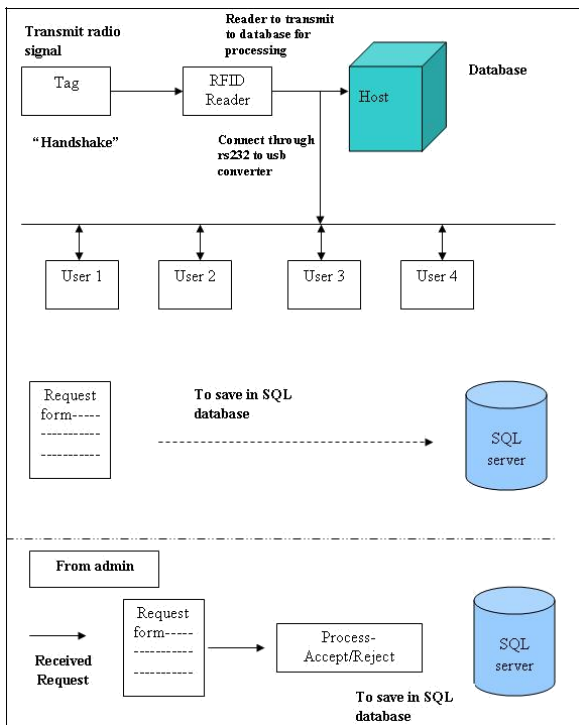


Figure 2: Diagram of the Project

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If MSCComm1.PortOpen = False Then ' If comm port is not open
    MSCComm1.PortOpen = True ' Open it
End If

If MSCComm1.InBufferCount > 0 Then ' If theres data in comm buffer
    inst = inst + MSCComm1.Input ' Get the data
    txttagid = inst ' Show its value
    Call pilhihtag
End If

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Figure 4: Read input from tag

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Dim ocn As ADODB.Connection: Set ocn = New ADODB.Connection
Dim ors As ADODB.Recordset: Set ors = New ADODB.Recordset
Dim i As String

ocn.ConnectionString = "DRIVER={SQL Server};SERVER=A-AN,DATABASE=trytest;
trusted_connection=no;user id=sa;password=raininata;"
ocn.Open

ors.Open "SELECT * FROM [user] WHERE ID=" & txttagid.Text & "", ocn, adOpenDynamic,
adLockOptimistic

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Figure 5: Open connection

2. Methodology

There are two main phases in this research. The first phase is about the configuration of hardware and second phase is the software part. Each phase is significant for developing this project. The RFID port need to be configured by firstly determines the port number [14], [15]. This can be done by checking the hardware properties on My Computer. In order to connect the hardware and software, a component called MSCComm is needed and can be found on software Microsoft Visual Basic 6.0 [16], [17]. The MSCComm controller provides serial communications for the application by allowing the transmission and reception of data through a serial port.

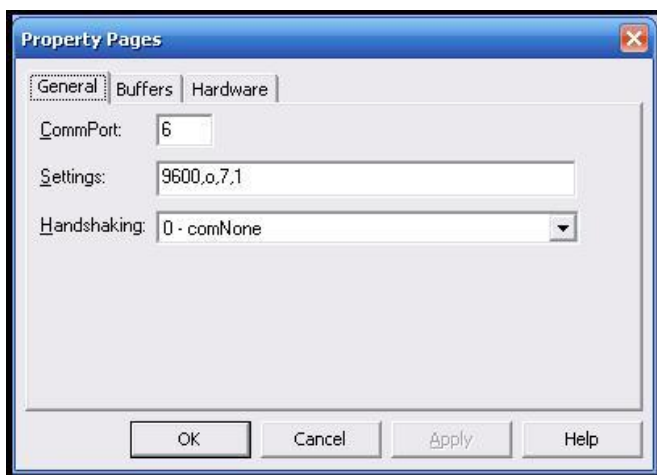


Figure 3: Setting up properties for MSCComm in VB6

The second phase is to configure the software. To connect between interface and database, the ADO method is used [18]. Both Figure 4 and 5 show programming to open database through interface and to retrieve unique identification from RFID tag.

In order to configure the SQL Server 2005 for Remote Connections, the SQL Server Surface Area Configuration was selected from the menu selection [16], [17]. Then, the suitable type of protocol for designers will be selected.

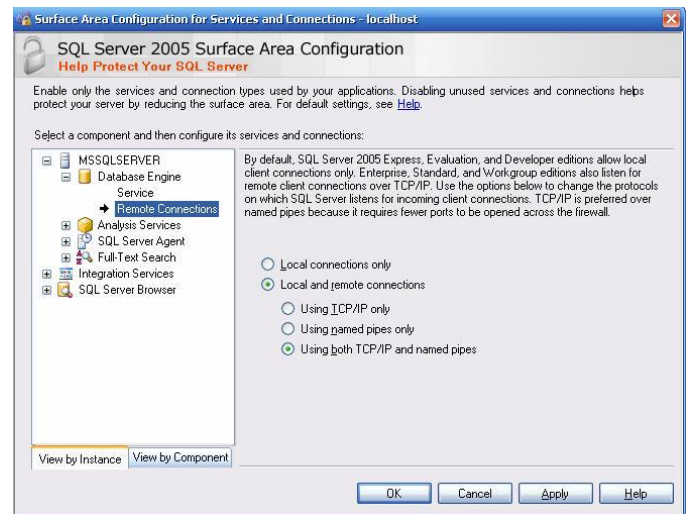


Figure 6: Surface Area Configuration for Services and Connections

Finally to setup the Local Area Network RJ-45 cable and IP configuration need to be done.

3. Results and Discussions

The result from the completed project is discussed in this section. The GUI from the completed system explains the flow on how the end-user will implement it later. Figures 9 and 10 show the GUI of the system develop using Visual Basic. Firstly user will need to register their account where all the information will be kept in database.

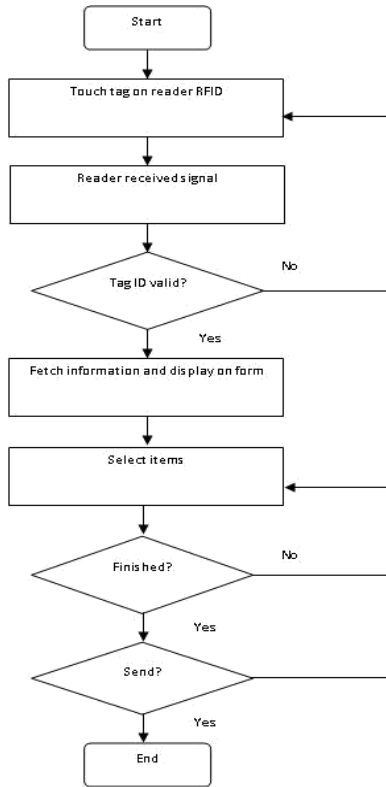


Figure 7: User's Flow Chart

Both Figure 7 & 8 show both user and client flow chart of the software design part realizing using Microsoft Visual Basic.



Figure 9: Manually selection

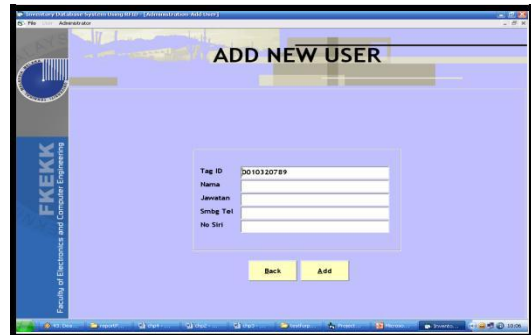


Figure 10: Registration of New User

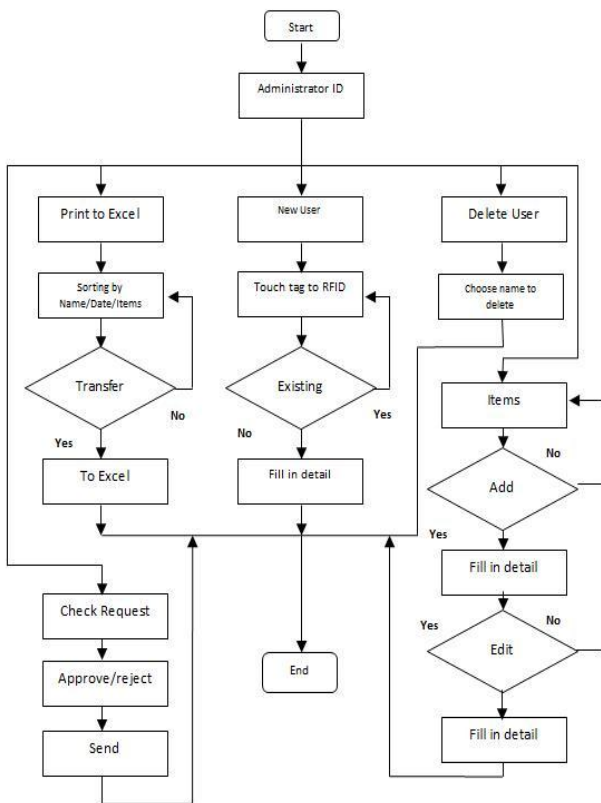


Figure 8: Client's Flow Chart



Figure 11: User Request

Each of the inventory items can be represented by the RFID tag, so the user just need to pick up the RFID tag and touch the RFID reader. The information of the tag will be picked-up by the software and updated the database. All the information of the user needed will be passed-on to the next stage where the administrator who controlled the approval notification will get a notice on desktop. Figure 12 below show the GUI of the approval that will be reject or accept the request inventory item.

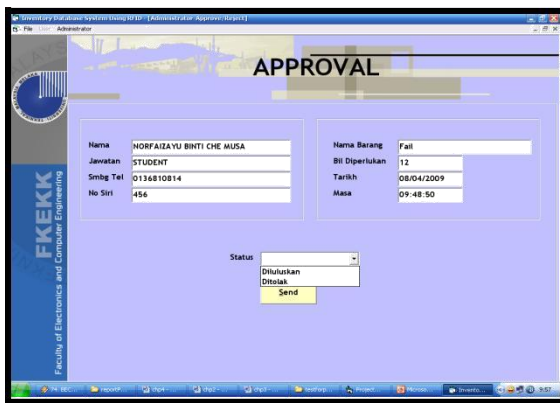


Figure 12: Administrator Approval/Reject

Once the request items have been approved, the notification message will be appeared at user's station.

4. Conclusions

By understanding the basic function and specification of the RFID, the configuration of hardware to software can be done thus enabling the user and administrator to begin using the system. The RFID tag is used as a security since each tag has its own unique identification number on it where it represents the inventory item. The development of Microsoft SQL Server as a database is to store all the information regarding user's information and stationary. This project will enable user to have an easy access for requesting stationary from faculty office's stationary. The implementation of this project increased the quality time and saving man power. The network connection will be configured by using Local Area Network. Microsoft SQL Server allowing the client server application between database and system which is one of its features. Thus, all the objectives and scope that related to problem stated has successfully solved.

5. Future Works

In the future, this project can be fully implemented at the faculty on the items that involved inventory since it has a database management system which is more practical and systematic. The system can be successfully implemented if the faculty is ready to provide both an RFID reader and a desktop workstation for each level. Besides, the RFID reader and desktop as the host can be located inside the inventory store room for database updated from any new purchasing inventory item. In addition, the software can be further improved on both admin and user. The comment section can be added to let the administrator know about the request item. To enhance the system, the e-mail alert reminder can be add-up as an additional notification on approval status of the requested item.

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