E – TICKET FOR BUS USING RFID

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report **"E-TICKET FOR BUS USING RFID"** is the bonafide work of **"SM. LAXMAN, R.MANIKANDAN and P. PUSHPARANGAN"**, who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

We,

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Hereby declare that the project entitled **"E TICKET FOR BUS USING RFID",** submitted in partial fulfillment to ANNA University as the project work of Bachelor of Technology (Information Technology) degree, is a record of original work done by us under the supervision and guidance of Department of Information Technology, Kumaraguru College of Technology, Coimbatore.

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[Mrs.S. Kavitha]

ACKNOWLEDGEMENT

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We also feel elated in manifesting our deep sense of gratitude to all the staff and lab technicians in the department of Information Technology.

ABSTRACT

The main objective of this project is to improve the ticketing system in Bus using Radio Frequency IDentification (RFID). In this project RFID card is used as prepaid ticket.

Now a day's more and more people prefer to use the public transport facilities such as bus. This project uses RFID card as ticket. It improves the performance of the ticketing system as it uses money less transaction and speed processing.

At the same time it has one or more added features, the money value in the card can be recharged. If anyone tries to get down from the bus without using the RFID card, a fine amount will be deducted from their respective account. And if there is a RFID card with insufficient balance, then the ticket can be reused only after recharging it.

This application can be used in any organization which has transportation facility. It can be used in public transportation facilities, private organizations such as colleges, schools.

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1. INTRODUCTION

General

Radio frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders and RFID readers. RFID tag is an object that can be attached to or incorporated into a product, animal or the person for the purpose of identification using radio waves. RFID reader consists of a transceiver and a decoder that read and writes data to the tag. RFID is more advantageous than the existing Bar Code System. It is the advanced technology used in many areas for the identification of products.

Table 1.1 Benefits of RFID technology over the commonly used Bar code technology

S.no	Properties	RFID	Barcode Technology
1	Visibility	Works in any direction, does not require line of sight.	Directional, requires line of sight
2	Read range	Between 4 and 80cm using passive tags, up to 100 meters using active tags	Typically 15-30cm(6-12 inches)
3	Read rate	Up to 200 tags per second	Limited to rate at which objects can be physically

			located in front of scanner
4	Automation	No human intervention required	Often requires human intervention to ensure correct orientation
5	Data storage	Up to 4 KB using passive tags and 32 KB using active tags.	None
6	Durability	Withstands harsh environments(snow, rain, sunlight)	Prone to scratching and tearing
7	Flexibility	Tags can be packaged for a wide variety of applications	Must be located on outside of package, on a relatively flat surface
8	Environment	Low frequency technology can read tags located underground	Cannot read without the line of sight.
9	Security	Near impossible to replicate	Simple to replicate
10	Maintenance	Can operate for extended periods of time with no maintenance	Lenses must be cleaned periodically

A basic RFID system consists of two components:

- RFID reader
- RFID tags

1.1.1 RFID readers

The RFID reader consists of two main components

- An antenna or coil
- A transceiver

Antenna or coil:

The antenna emits radio signals to activate the tag and read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. Antennas are available in a variety of shapes and sizes; they can be built into a door frame to receive tag data from persons or things passing through the door. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected simultaneously. If constant interrogation is not required, the field can be activated by a sensor device.

Transceiver:

The transceivers are used to decode the data that are passed by the antenna. It is used to regulate the frequency between the antenna and the circuit. While transmitting data, it oscillates the data to correct transmitting frequency of the antenna using an LC circuit. It decodes the information and passes the information to a microprocessor or microcontroller for processing the data. The reader emits radio waves in ranges pf anywhere from one inch to 100 feet or more, depending upon its power output and the radio frequency used.

The interrogator, an antenna packaged with a transceiver and decoder, emits a signal activating the RFID tag so it can read and write data to it. When an RFID tag passes through the electromagnetic zone, it can detect the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit and data is passed to the host computer. The application software on the host processes the data and may perform various filtering operations to reduce the numerous often redundant reads of the sane tag to a smaller and more useful data set.

1.1.2 RFID tags

The tag contains a transponder with a digital memory chip that is given a unique electronic product code. RFID tags come in a wide variety shapes and sizes. Tags can be screw-shaped to identify trees or credit cards for use in access applications. The anti-theft hard plastic tags attached to merchandise in stores are RFID tags. In addition

Heavy duty 5-by 4-by 2inch rectangular transponders used to track container trucks and railroad cars for maintenance.

Active RFID tags:

Active RFID tags are powered by an internal battery and are typically read/write. An active tags memory size varies according to application requirements. In a typical read/write RFID work in process system, a tag might give a machine a set of instructions and the machine would then report its performance to the tag. This encoded data would then become part of the tagged part's history. The battery supplied power of an active tag generally gives it a

longer read range. The trade off is greater size, greater cost and a limited operational life.

Passive RFID tags:

Passive RFID tags operate without a external power source and obtain operating power generated from the reader. Passive tags are consequently much lighter than active tags, less expensive and offer a virtually unlimited operational lifetime. The trade-off is that they have short read ranges than active tags and require a high powered reader. Read-only tags are typically passive and programmed with a unique set of data.

Developments in RFID technology continue to yield large memory capacities, wide reading ranges and faster processing. It is highly unlikely that the technology will ultimately replace barcode even with the inevitable reduction in raw materials couple with economies of scale; the integrated circuit in an RF tag will never be as cost-effective as a barcode label. However, RFID will continue to grow in its established niches where barcode or other optical technologies are not effective.

1.1.3 Communication between Tag and Reader:

The Tag-it transponder is half- duplex, the fundamental operation being a transaction which consists of:

A request sent by the reader to the transponder

A response sent back by the transponder to the reader

Both the request and the response contain certain Command Code which specifies the operation to be performed by the transponder. The transponder never initiates a response without having been instructed to do so by the reader. The request must have been fully understood by the transponder before it can respond. His presence of the 13.56 MHz carrier frequency will power up the transponder but does not generate a spontaneous emission (response) of any kind by the transponder.

Each Tag-it transponder has a unique address which is factory-programmed and 32 bits long, thus allowing an address range of more than 4 billion individual addresses.

If several transponders are expected to be present in the read area, the first step is to inventory them. This is done by the Simultaneous Identification (SID) mechanism which results in the reader storing in its memory the addresses of each transponder present within its range. At this point, the reader may pass them on to the application processor.

A transaction is carried out with a single transponder, which is identified by its address.

1.2 Problem definition :

This system aims at developing an automated ticketing system in using the concept of Radio Frequency Identification (RFID). It aims at minimizing the manual intervention at all possible levels and providing complete automation of the ticketing process. The system makes use of RFID tags and readers.

The Students are given RFID card, which consists of tag number. The tag number is unique identification number which differs from one RFID card to another. After paying the college bus fees, the student details are stored in the database and a RFID card is issued.

Initially, RFID tag is issued to each student after the payment of the bus fees and the amount paid is stored in the Balance table. The balance table is copied to the On Board module.

Access control can be provided by fixing RFID reader on all college bus at entry point. While entering, each individual need to show the RFID tag allotted for them. When each individual shows their card, their entry is registered in the onboard system. During exit, the individual must should show the RFID tag again. At this time, their journey amount is calculated using predefined amount based upon the distance travelled. Finally the usage amount is deducted from their balance.

Periodically, backup is taken from every onboard module and it's restored in the administrator module.

After completion of every academic year, the students can claim their balance amount through their RFID tag number.

1.3 Problems of the existing manual ticketing system:

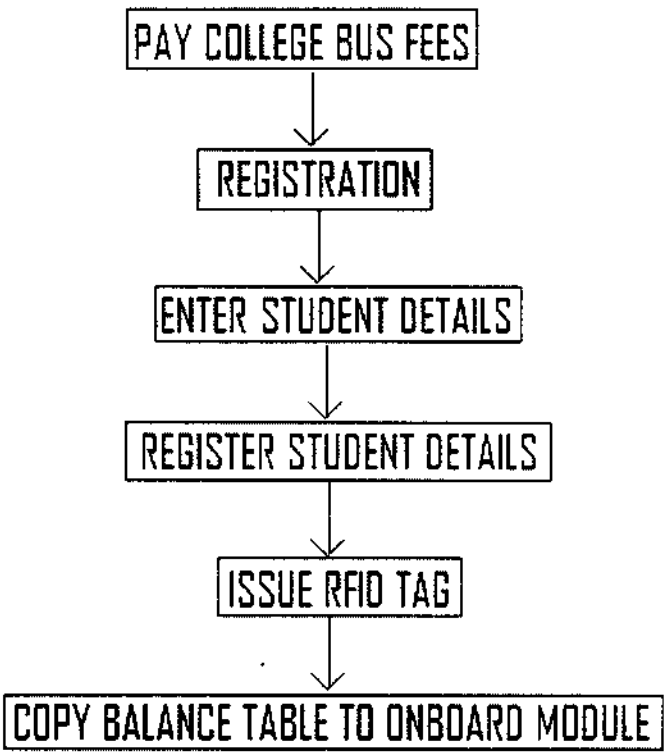
Managing the access control manually in the college bus is a tedious job. In the existing system, even the students who did not pay the college bus fees can use the bus. It is a difficult to find the students who had paid the fees and who had not paid the fees. In the existing system, a yearly bus fess is collected from the students. If the student is not using the bus facility, then the balance amount is not returned. It is difficult to identify every student's exact usage of the bus.

1.4 Advantages of the proposed system:

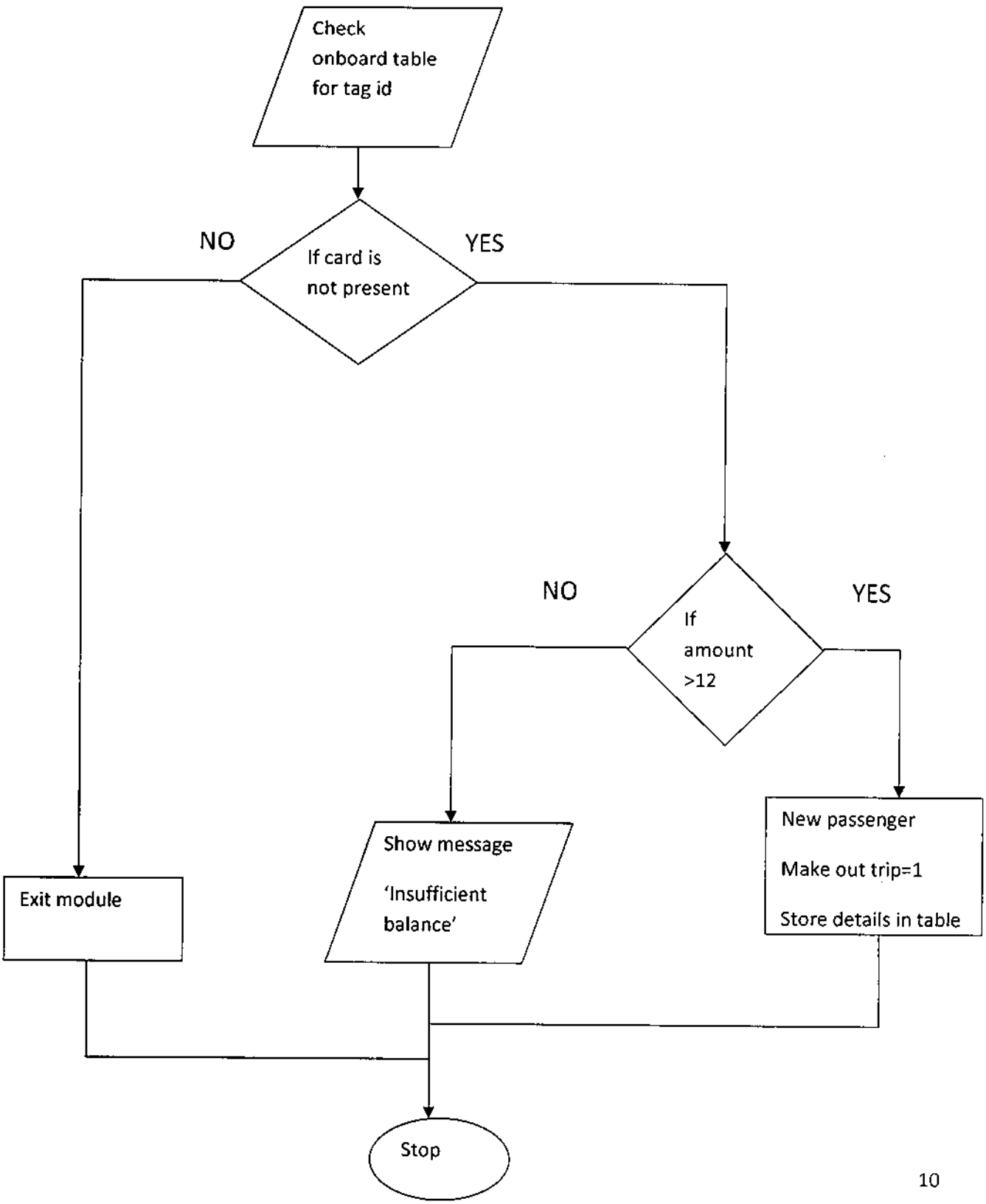
- Provides an access control solution that is truly hands-free and creative.
- Provides the facility of knowing the correct usage of the college bus for every student.
- It is used for collecting balance amount based on the usage.
- Minimum man hour involved in the system and therefore more efficiency will be achieved.

1.5 SYSTEM FLOW:

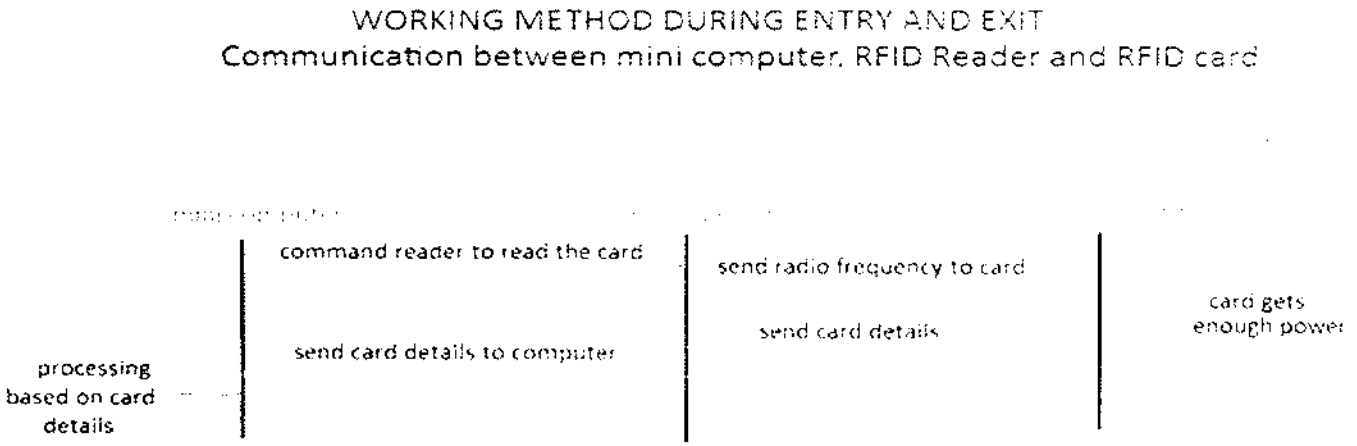
1.5.1 Registration Module:



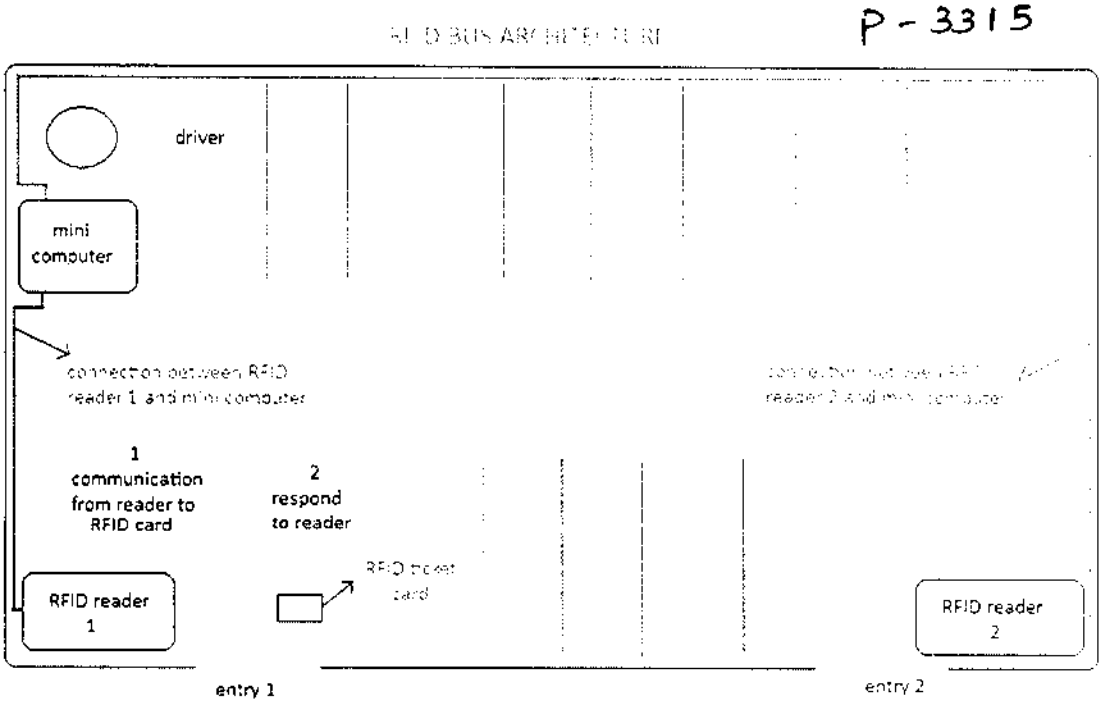
1.5.2 Onboard Module:



1.5.3 Communication between computer, RFID reader and RFID tag:



1.5.4 Bus Architecture:



2 DETAILS OF METHODOLOGY ADOPTED:

2.1 Registration

2.2 On Board Module

2.3 Entry Module

2.4 Exit Module

2.5 Calculate usage for cheating passenger

2.6 Balance and Usage enquiry

2.7 Database design

2.1 Registration

Initially, the student has to pay the college bus fees. After paying the college bus fees, the student has to register his details to get the RFID tag. In the registration process, the details such as Tag id, customer id, Student name, address, phone number, fees paid are required.

After registration, the student details are stored in the table and the details such as Tag Id, Fees paid, Usage Amount, Balance Amount, and Balance Date are stored in balance table. When the registration process is complete, the Balance table is copied to the On Board module.

2.2 On Board Module

The RFID readers are installed in the entry and exit way of the bus. A mini computer is also installed in the bus. The balance table is copied from the administrator module and it's pasted in the on board module and it has another table onboard table. The onboard table is used for report generation.

For every new entry made, the out trip field for that tag id is made as 1 meaning the passenger is inside the bus. And calculate cheating user field is made as 'no'. It's also used to differentiate between a genuine passenger and a cheating passenger.

For every exit, the ticket value is calculated based on the trip. The ticket value is deducted from the balance table for its respective tag id and out trip field is made as 0.

Cheating user is one who does not show the RFID tag during exit. For every cheating user, at the end of each trip ten rupees is deducted from their balance and calculate cheating user field in the onboard table for the respective tag id is made as 'yes'.

2.3 Entry Module

Driver presses the 'bus stop' button to get the name of the bus stop. The bus stop name is stored in a temporary variable. The passenger shows the RFID tag to RFID reader. The RFID tag details are assigned to temporary variables.

The onboard table is searched for presence of the shown RFID tag id. If data is not there for the current date and current trip and the out trip field is zero then it means that a new passenger is entering the bus.

Then the tag's balance amount is searched. If the balance amount is greater than 12, then the student's details such as tag id, customer id, source, in time, trip date, and trip number is stored. The out trip field is made as 1 and the calculate cheating user field is made as 'no'

2.4 Exit Module

Driver presses the 'bus stop' button to get the name of the bus stop. The bus stop name is stored in a temporary variable. The passenger shows the RFID tag to RFID reader. The RFID tag details are assigned to temporary variables.

The onboard table is searched for presence of the shown RFID tag id. If data is present for the current date and current trip and the out trip field is one, then it means that the passenger is getting out of the bus.

The source detail is taken from the onboard table and it's appended with the destination. The source to destination trip is searched in the ticket value table to get the ticket value. The ticket value obtained is deducted from the balance of the respective tag id. Then the out time, destination, ticket value information is stored in the onboard table for the corresponding tag id.

The out trip field for the corresponding tag id is made as 0.

2.5 Calculate usage for cheating passenger

When each trip completes, the driver presses the calculate usage for cheating user button. At this time, the tag id that's out trip field is not 'zero' and calculate cheating user field is 'no' ten rupees is deducted from that tag id. And its usage is written as ten rupees.

The destination field of the cheated passengers will be null and the calculate cheating user field is made as 'yes'

2.6 Balance and Usage enquiry

At the end of every academic year, the onboard details and balance details are taken from the onboard module and copied into administrator module. With the new details, the students can check their usage amount and the balance amount. Getting to know the balance amount, the students can claim their balance fees.

2.7 Database design

A database is designed to register the passenger information in the onboard module, update the balance in onboard module, register new student and issue RFID tag. Microsoft access serves as the back-end. Five tables are maintained in the database namely Balance TABLE, issue and passenger details TABLE, Onboard TABLE, ticket value TABLE and users TABLE. Based on the information stored in the database, required reports are generated. The tables that are used are as follows

2.7.1 Balance TABLE:

This table is used to store the balance details of issued tag id. The fields included are tag id (primary key), fees paid, usage amount, balance amount, balance date.

Tag Id	Paid Fees	Usage Amount	Balance Amount	Balance Date
12345	1000	100	900	06-04-2010
12346	1000	50	950	06-04-2010

2.7.2 Issue and passenger details TABLE:

This table is used to store the registered details and passenger details. The fields included in this table are tag id (primary key), customer id, name, address, phone number, issue date, issue time, amount, user.

TAG_ID	CUSTOMER_ID	NAME	ADDRESS	PHONE N.O	ISSUE DATE	TIME	AMOUNT	USER
12345	123	Laxman	Cbe	3204858	5-4-10	10:24	1000	Lax
12346	123	Mani	Salem	3215566	5-4-10	10:30	1000	Lax

2.7.3 Onboard TABLE:

This table is present in the onboard module and it stores the passenger information. The fields included in this table are tag id (primary key), customer id, source, in time, destination, out time, ticket value, trip date, trip number, out trip, Calculate usage Cheating User.

TAG ID	CUSTOMER ID	SOURCE	IN TIME	DESTINATION	OUT TIME	TICKET VALUE	TRIP DATE	TRIP NO	OUT TRIP	CAL CHEAT USER
12345	153	ganapathy	8:25	kct	8:30	3	29-3-10	1	0	nc

TAG ID	CUSTOMER ID	SOURCE	IN TIME	DESTINATION	OUT TIME	TICKET VALUE	TRIP DATE	TRIP NO	OUT TRIP	CAL CHEAT USER
12345	153	ganapathy	8:25			10	29-3-10	1	1	yes

2.7.4 Ticket value TABLE:

This table gives the details about the trip and its ticket value. The fields included in this table are trip (primary key), ticket value.

TRIP	TICKET_VALUE
Gandhipuram to saravanampatti	5
Gandhipuram to kct	6

2.7.5 Users TABLE:

This table is used to store the administrators and drivers username and password. The fields included in this table are username (primary key), password and user type.

Username	Password	User_type
Lax	23	Admin
Vinoth	58	user

3. REPORTS:

The GUI also generates a number of reports when requested for analysis purpose. All the reports are generated based on the data in the database. The reports generated include

- Registered details
- Onboard details

3.1 Registered details:

The registered details for a particular day, for a particular period of time, for a particular tag, for total period can be generated as a report. This report can also be saved in a text document and can be used for future references.

3.2 Onboard details:

It displays the total trip details, details of a particular trip, particular date...Etc. This report can also be saved in a text document and can be used for future references.

4. CONCLUSION:

The RFID ticketing system is successfully designed and implemented with all the functionalities. The RFID tags are issued to the students after registration. The students use the RFID tag as a prepaid ticket and use is for transport purpose. At the end of every academic year, students getting to know the balance amount can claim their balance fees.

And this software also generates a number of reports when requested for analysis purpose. All the reports are generated based on the data in the database.

This application can be used in any organization which has transportation facility. It can be used in public transportation facilities, private organizations such as college, school.

5. FUTURE ENHANCEMENTS:

The RFID ticketing model created can be used to provide authenticity, helps the students to know their exact usage of the college bus thereby allowing them to claim their balance amount.

The enhancements that can be further added to the project are,

- Balance amount can be written in the RFID tag during issue itself and this can be updated when using the onboard module. Backup and restore of balance table from the onboard module is not required then.
- A website can be created where passengers can know their usage in online.
- The balance details can be stored in a centralized database.

APPENDIX-1 SOURCE CODE:

REGISTRATION FORM:

```
Dim txtbox As Boolean
Dim yes As Integer
Dim s As String
Dim pos_tagid As Integer
---------------------------------------------------------------------------------------
Private Sub BtnCancel_Click()
RegisterationForm_clear
'MSComm1.PortOpen = False
Me.Hide
FrmAdmin.Show
End Sub
---------------------------------------------------------------------------------------
Private Sub BtnIssue_Click()
checktxtbox
If txtbox = True Then
   yes = MsgBox("Do u want to save the details??", vbYesNo, Me.Caption)
End If

If yes = 6 Then
assign
Data1.Recordset.Update
Data2.Recordset.Update
Data3.Recordset.Update

MsgBox "record added"
Data1.Refresh
MSFlexGrid1.Refresh
End If

End Sub
---------------------------------------------------------------------------------------
Private Sub BtnNewRecord_Click()
RegisterationForm_clear
```

```
TxtName.SetFocus
Data1.Recordset.AddNew
Data2.Recordset.AddNew
Data3.Recordset.AddNew
End Sub
---------------------------------------------------------------------------------------------
Private Sub BtnViewDetails_Click()
RegisterationForm_clear
Me.Hide
FrmRegisteredDetails.Show
End Sub
---------------------------------------------------------------------------------------------
Private Sub Form_Activate()
LblDate.Caption = Format$(Now, "d,mmm,yyyy")
RegisterationForm_clear
TxtName.SetFocus
MSComm1.PortOpen = True
End Sub
---------------------------------------------------------------------------------------------
Private Sub Form_Deactivate()
RegisterationForm_clear
MSComm1.PortOpen = False
End Sub
---------------------------------------------------------------------------------------------
Private Sub Form_Load()
Data1.DatabaseName = App.Path + "\database.mdb"
Data1.RecordSource = "issue_and_passenger_details"
Data1.Refresh

Data2.DatabaseName = App.Path + "\database.mdb"
Data2.RecordSource = "Balance"
Data2.Refresh

Data3.DatabaseName = App.Path + "\database.mdb"
Data3.RecordSource = "Usage"
Data3.Refresh

On Error GoTo errhandle
With MSComm1
```

```
    'make sure the serial port is not open (by this program)
    If .PortOpen Then .PortOpen = False
    'set the active serial port
    .CommPort = 1
    'set the badurate,parity,databits,stopbits for the Connection
    .Settings = "9600,N,8,1"
    'set the DRT and RTS flags
    .DTREnable = True
    .RTSEnable = True
    'enable the oncomm event for every reveived character
    .RThreshold = 1
    'disable the oncomm event for send characters
    .SThreshold = 0
    'open the serial port
'    .PortOpen = True
  'End With 'MSComm1
  'With Text9
   ' 'set the properties for the displaying textbox
    '.BackColor = vbCyan
   ' .Locked = True
    '.Text = ""
  'End With 'Text1
  End With
errhandle:
If Err.Number = 8002 Then
MsgBox "The external devices of this project are not connected properly!!!!" +
vbNewLine + "Hence, the project will not work properly", vbCritical,
FrmCardDetails.Caption
End If

End Sub
-------------------------------------------------------------------------------------------
Private Sub MSComm1_OnComm()
Dim strinput As String
strinput = MSComm1.Input
Text1.Text = Text1.Text & strinput
'strinput = HexIt(strinput)
'List1.AddItem strinput
'Label3.Caption = Len(Text1)
```

```
s = Mid(Text1, 16, 3)
TxtCustomerID.Text = s
pos_tagid = InStr(1, Text1, "Tag Number: ")
s = Mid(Text1, pos_tagid + 12, 8)
TxtTagId.Text = s
End Sub
```

```
Private Sub Timer1_Timer()
LblTime.Caption = Time
End Sub
```

```
Private Sub RegisterationForm_clear()
TxtTagId.Text = ""
TxtCustomerID.Text = ""
TxtName.Text = ""
TxtAddress.Text = ""
TxtPhoneNo.Text = ""
Text1.Text = ""
End Sub
```

```
Private Sub checktxtbox()
If TxtTagId.Text <> "" And TxtCustomerID.Text <> "" And TxtName.Text <> ""
And TxtAddress.Text <> "" And TxtPhoneNo.Text <> "" And TxtAmount.Text =
"100" Then
txtbox = True
Exit Sub
Else
MsgBox "please fill all the textboxes!!", vbCritical, FrmRegisteration.Caption
txtbox = False
Exit Sub
End If

If TxtTagId.Text = "" Then
txtbox = False
MsgBox "Tag Id textbox is empty", vbCritical, FrmRegisteration.Caption

ElseIf TxtCustomerID.Text = "" Then
txtbox = False
MsgBox "Customer Id textbox is empty", vbCritical, FrmRegisteration.Caption
```

```
ElseIf TxtName.Text = "" Then
txtbox = False
MsgBox "please enter Name", vbCritical, FrmRegisteration.Caption
ElseIf TxtAddress.Text = "" Then
txtbox = False
MsgBox "please enter address", vbCritical, FrmRegisteration.Caption
ElseIf TxtPhoneNo.Text = "" Then
txtbox = False
MsgBox "please enter phone no", vbCritical, FrmRegisteration.Caption
ElseIf TxtAmount.Text <> 100 Then
TxtAmount.Text = "100"
End If
End Sub
```

```
Private Sub assign()
Data1.Recordset("tag_id") = TxtTagId.Text
Data1.Recordset("customer_id") = TxtCustomerID.Text
Data1.Recordset("name") = TxtName.Text
Data1.Recordset("address") = TxtAddress.Text
Data1.Recordset("phone_no") = TxtPhoneNo.Text
Data1.Recordset("issue_date") = LblDate.Caption
Data1.Recordset("issue_time") = LblTime.Caption
Data1.Recordset("amount") = Val(TxtAmount.Text)
Data1.Recordset("user") = LblUser.Caption


Data2.Recordset("TagId") = TxtTagId.Text
Data2.Recordset("PaidFees") = Val(TxtAmount.Text)
Data2.Recordset("UsageAmount") = 0
Data2.Recordset("BalanceAmount") = Val(TxtAmount.Text)
Data2.Recordset("BalDate") = LblDate.Caption

Data3.Recordset("TagId") = TxtTagId.Text
Data3.Recordset("UsageAmount") = 0
End Sub
```

SELECT BUS STOP TRIP 1: ONBOARD PROCESS

```
Dim busstop, strinput, RFIDtag_id, RFIDcustomer_id, RFIDflag, RFIDamount,
trip, source, destination, passengerTrip As String
Dim tempIn_trip, tempOut_trip, TripNo, PassengerTicketValue, temp_usage,
exiting As Double
Dim temp_date As Date
Dim pos_tagid, pos_customerid As Integer
```

```
Private Sub BtnCalculateCheatingUser_Click()
calculateforcheatinguser
End Sub
```

```
Private Sub BtnClose_Click()
Me.Hide
FrmOnBoardTrip1.Show
End Sub
```

```
Private Sub BtnGanapathy_Click()
busstop = BtnGanapathy.Caption
'Text1.Text = busstop
BtnGandhipuram.Enabled = False
BtnGanapathy.Enabled = False
BtnSaravanampatti.Enabled = True
BtnKct.Enabled = False

End Sub
```

```
Private Sub BtnGandhipuram_Click()
busstop = BtnGandhipuram.Caption
'Text1.Text = busstop
BtnGandhipuram.Enabled = False
BtnGanapathy.Enabled = True
BtnSaravanampatti.Enabled = False
BtnKct.Enabled = False
'BtnTrip.Enabled = True
```

```
End Sub
---------------------------------------------------------------------------------------------

Private Sub BtnKct_Click()
busstop = BtnKct.Caption
'Text1.Text = busstop
BtnGandhipuram.Enabled = True
BtnGanapathy.Enabled = False
BtnSaravanampatti.Enabled = False
BtnKct.Enabled = False

End Sub
---------------------------------------------------------------------------------------------

Private Sub BtnSaravanampatti_Click()

busstop = BtnSaravanampatti.Caption
'Text1.Text = busstop
BtnGandhipuram.Enabled = False
BtnGanapathy.Enabled = False
BtnSaravanampatti.Enabled = False
BtnKct.Enabled = True

End Sub
---------------------------------------------------------------------------------------------

Private Sub Form_Activate()
LblDate.Caption = Format(Now, "d,mmm,yyyy")
MSComm1.PortOpen = True
End Sub
---------------------------------------------------------------------------------------------
Private Sub Form_Deactivate()
MSComm1.PortOpen = False
End Sub
---------------------------------------------------------------------------------------------
Private Sub Form_Load()
BtnGandhipuram.Enabled = True 'change for trip 2
BtnGanapathy.Enabled = False
```

```
BtnSaravanampatti.Enabled = False
BtnKct.Enabled = False 'change for trip 2

'button enabling changes for the other trip

TripNo = 1 'change for the other trip

Data1.DatabaseName = App.Path + "\database.mdb"
Data1.RecordSource = "Onboard"
Data1.Refresh

Data2.DatabaseName = App.Path + "\database.mdb"
Data2.RecordSource = "ticket_value_table"
Data2.Refresh

Data3.DatabaseName = App.Path + "\database.mdb"
Data3.RecordSource = "Usage"
Data3.Refresh

Data4.DatabaseName = App.Path + "\database.mdb"
Data4.RecordSource = "Balance"
Data4.Refresh

On Error GoTo errhandle
With MSComm1
  'make sure the serial port is not open (by this program)
  If .PortOpen Then .PortOpen = False
  'set the active serial port
  .CommPort = 1
  'set the badurate,parity,databits,stopbits for the Connection
  .Settings = "9600,N,8,1"
  'set the DRT and RTS flags
  .DTREnable = True
  .RTSEnable = True
  'enable the oncomm event for every reveived character
  .RThreshold = 1
  'disable the oncomm event for send characters
  .SThreshold = 0
  'open the serial port
```

```
'    .PortOpen = True
  'End With 'MSComm1
  'With Text9
   ' 'set the properties for the displaying textbox
    '.BackColor = vbCyan
   ' .Locked = True
    '.Text = ""
  'End With 'Text1
  End With
errhandle:
If Err.Number = 8002 Then
MsgBox "The external devices of this project are not connected properly!!!!" +
vbNewLine + "Hence, the project will not work properly", vbCritical,
FrmCardDetails.Caption
End If
End Sub
-------------------------------------------------------------------------------------------
Private Sub MSComm1_OnComm()
strinput = MSComm1.Input
MsgBox "one" & MSComm1.Input, , mscomminput
'Text1.Text = Text1.Text & strinput
Text2.Text = Text2.Text & MSComm1.Input
'MsgBox strinput
'strinput = HexIt(strinput)
'List1.AddItem strinput
'Label3.Caption = Len(Text1)
pos_customerid = InStr(1, Text2, "Customer Code: ")
Text4.Text = Mid(Text2, pos_customerid + 15, 3)
RFIDcustomer_id = Text4.Text
MsgBox RFIDcustomer_id
'TxtCustomerID.Text = s

pos_tagid = InStr(1, Text2, "Tag Number: ")
Text3.Text = Mid(Text2, pos_tagid + 12, 8)
RFIDtag_id = Text3.Text
MsgBox RFIDtag_id
'TxtTagId.Text = s
```

```
Data1.RecordSource = "select * from Onboard where tag_id='" & RFIDtag_id & "'
and trip_date=#" & Date & "# and out_trip=1 and tripno=1" 'change for other trip
tripno=1
Data1.Refresh

   If Data1.Recordset.RecordCount > 0 Then

   'meaning tag is present on same date and its trip is 1 and  out_trip is 1
   'exit module

   source = Data1.Recordset("source")
   destination = busstop
   passengerTrip = source + " to " + destination
   MsgBox passengerTrip
   'calculate trip value

   Data2.RecordSource = "select * from ticket_value_table where trip='" &
passengerTrip & "'"
   Data2.Refresh

   PassengerTicketValue = Data2.Recordset("ticket_value")
   MsgBox PassengerTicketValue

   'copy details in to onboard table for correct exit
   Data1.Recordset.Edit

   Data1.Recordset("destination") = destination
   Data1.Recordset("out_time") = LblTime.Caption
   Data1.Recordset("ticket_value") = PassengerTicketValue
   Data1.Recordset("out_trip") = 0 'on exit make out_trip as 0

   Data1.Recordset.Update

   'updating entry in usage table....calculating the usage

   Data3.RecordSource = "select * from Usage where TagId='" & RFIDtag_id &
"'"
   Data3.Refresh
```

```
If Data3.Recordset.RecordCount > 0 Then
MsgBox "record is there in usage table"
End If


Data1.RecordSource = "select * from Onboard where tag_id='" & RFIDtag_id &
"' and trip_date=#" & Date & "# and tripno=1" 'change for other trip tripno=2
Data1.Refresh

exiting = Data1.Recordset("out_trip")

Data4.RecordSource = "select * from Balance where TagId='" & RFIDtag_id &
"'"
Data4.Refresh

Dim usg, balanceexit As Double

usg = Data4.Recordset("UsageAmount")
balanceexit = Data4.Recordset("BalanceAmount")

    If exiting = 0 Then 'correct passenger.....exiting...by showing card....so
minus the passenger ticket value

    temp_usage = Data3.Recordset("UsageAmount")
    temp_usage = temp_usage + PassengerTicketValue

    MsgBox temp_usage
    Data3.Recordset.Edit
    Data3.Recordset("UsageAmount") = temp_usage
    Data3.Recordset.Update

    Data4.Recordset.Edit
    Data4.Recordset("UsageAmount") = temp_usage
    balanceexit = balanceexit - temp_usage
    Data4.Recordset("BalanceAmount") = balanceexit
    Data4.Recordset("BalDate") = Date
    Data4.Recordset.Update

    MsgBox "passenger exit", vbInformation, FrmSelectBusStopTrip1.Caption
```

```
        End If

        'ElseIf exiting = 1 Then ' passenger did not show the card while exit ....so
minus 10

        'temp_usage = Data3.Recordset("UsageAmount")
        'temp_usage = temp_usage + 10

        'Data3.Recordset.Edit
         'Data3.Recordset("UsageAmount") = temp_usage
         'Data3.Recordset.Update

       ' MsgBox "passenger exit", vbInformation, FrmSelectBusStopTrip1.Caption
       ' End If


   Else

   'new passenger in bus.....
   'entry module
   Data4.RecordSource = "select * from Balance where TagId='" & RFIDtag_id &
"'"
   Data4.Refresh

   Dim temp_bal As Double

   temp_bal = Data4.Recordset("BalanceAmount")

   If temp_bal > 12 Then

   Data1.Recordset.AddNew
   Data1.Recordset("tag_id") = RFIDtag_id
   Data1.Recordset("customer_id") = RFIDcustomer_id
   Data1.Recordset("source") = busstop
   Data1.Recordset("in_time") = LblTime.Caption
   Data1.Recordset("trip_date") = LblDate.Caption
   Data1.Recordset("tripno") = TripNo
   Data1.Recordset("out_trip") = 1 ' when passenger is in bus, out_trip is made as 1
```

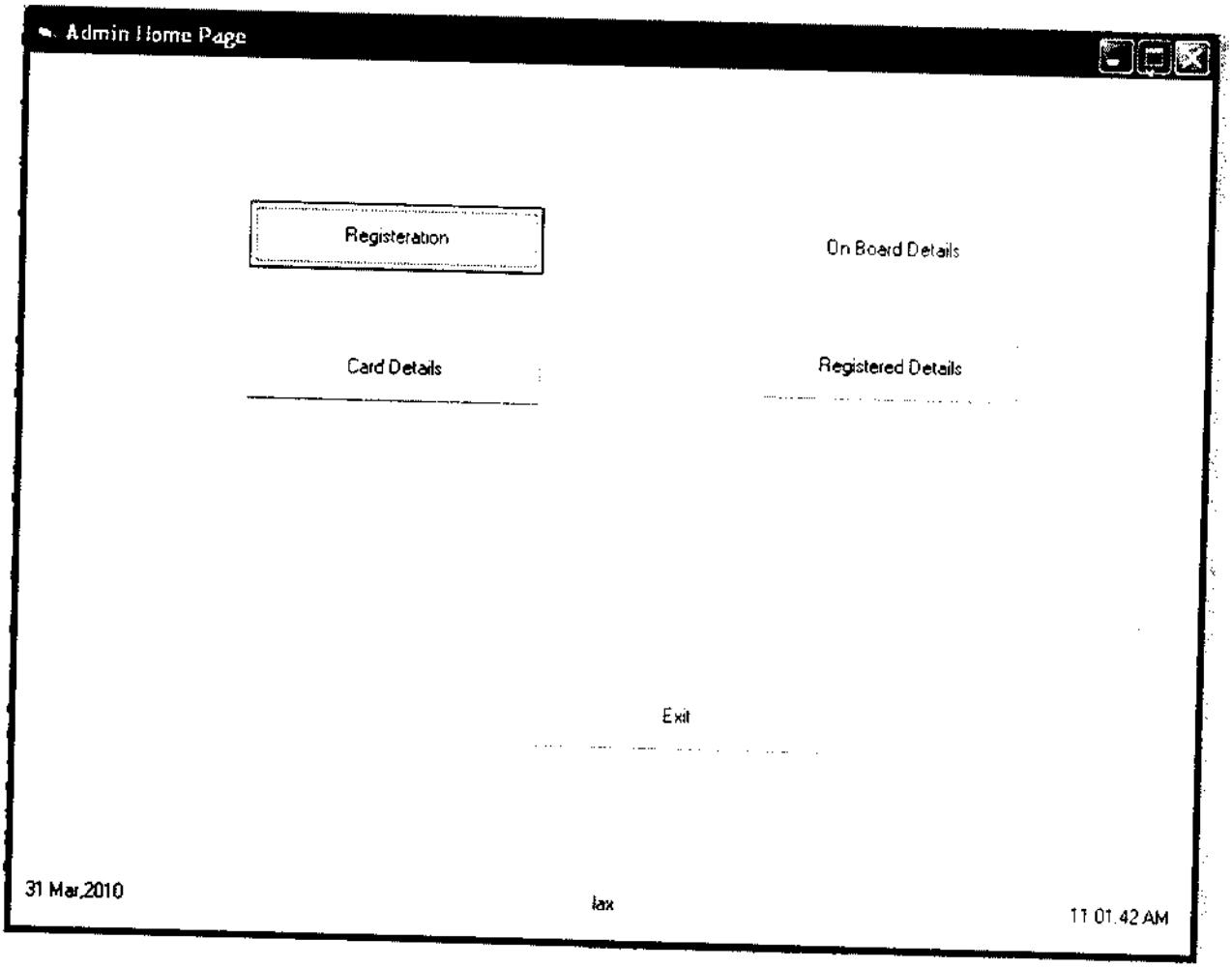
```
    Data1.Recordset("CalCheatUser") = "No" ' calculated or not....change to yes
after calculating cheating user
    Data1.Recordset.Update
    MsgBox "new passenger entered", vbInformation,
FrmSelectBusStopTrip1.Caption

    Else
    MsgBox "balance is low!", vbInformation, FrmOnBoardTrip1.Caption
    End If

    End If

    'emptying textbox and variable values for new user

    Text1.Text = ""
    Text2.Text = ""
    Text3.Text = ""
    Text4.Text = ""

    RFIDtag_id = ""
    RFIDcustomer_id = ""

End Sub
---------------------------------------------------------------------------------------
Private Sub Timer1_Timer()
LblTime.Caption = Time
End Sub
---------------------------------------------------------------------------------------
Private Sub calculateforcheatinguser()

    Dim rfidtagid As String
    Dim i, x As Integer
    i = 0 ' used to calculate the total number of cheating passengers
    Data1.RecordSource = "select * from Onboard where trip_date=#" & Date & "#
and tripno=1 and out_trip=1 and CalCheatUser='No'" 'change for other trip
tripno=2
    Data1.Refresh

    If Data1.Recordset.RecordCount > 0 Then
```

```
x = 1 ' means...there are cheted passengers for today
Data1.Recordset.MoveFirst

Do Until Data1.Recordset.EOF = True


rfidtagid = Data1.Recordset("tag_id")
Data3.RecordSource = "select * from Usage where TagId='" & rfidtagid & "'"
Data3.Refresh

Data4.RecordSource = "select * from Balance where TagId='" & rfidtagid & "'"
Data4.Refresh

Dim usg, balanceexit As Double

usg = Data4.Recordset("UsageAmount")
balanceexit = Data4.Recordset("BalanceAmount")

' passenger did not show the card while exit ....so minus 10

    temp_usage = Data3.Recordset("UsageAmount")
    temp_usage = temp_usage + 10

    Data3.Recordset.Edit
     Data3.Recordset("UsageAmount") = temp_usage
     Data3.Recordset.Update

    Data1.Recordset.Edit
    Data1.Recordset("ticket_value") = 10
    Data1.Recordset("CalCheatUser") = "yes" ' calculated or not....changed to
yes after calculation
    Data1.Recordset.Update

    Data4.Recordset.Edit
    Data4.Recordset("UsageAmount") = temp_usage
    balanceexit = balanceexit - 10
    Data4.Recordset("BalanceAmount") = balanceexit
    Data4.Recordset("BalDate") = Date
    Data4.Recordset.Update
```

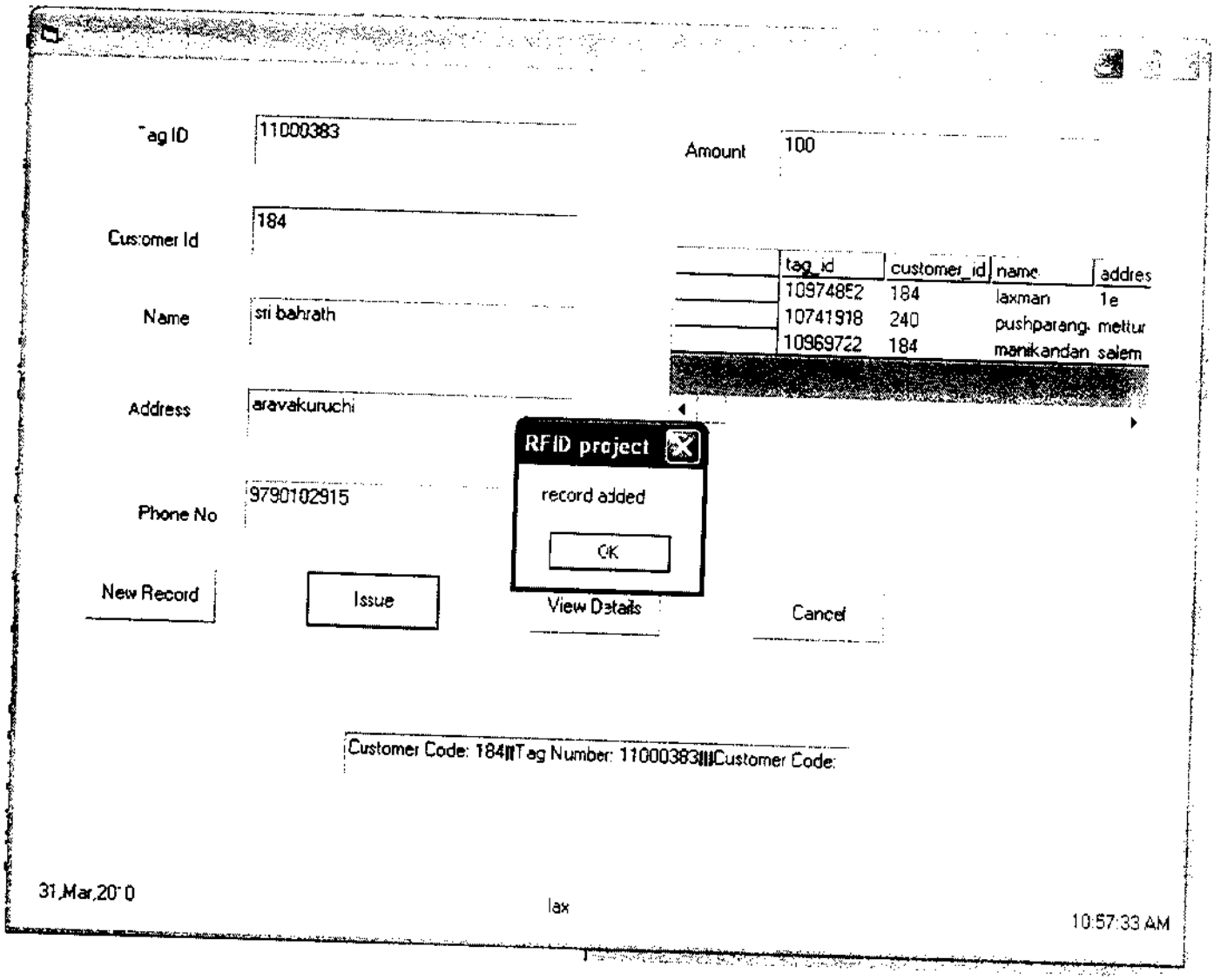
```
        i = i + 1
        Data1.Recordset.MoveNext
        Loop


        Else

        x = 0 'there are no cheating passengers for today or cheating users has been
calculated


        End If

   If x = 1 Then
   MsgBox " today" & i & " passengers cheated", vbInformation, "MESSAGE"
   ElseIf x = 0 Then
    MsgBox "no cheating  user today", vbInformation, "MESSAGE"
   End If
End Sub
```

APPENDIX-II SCREEN SHOTS:

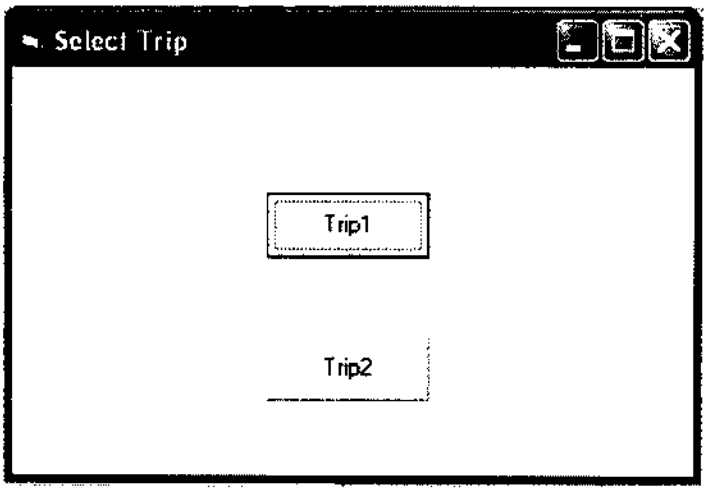
Admin Home Page:



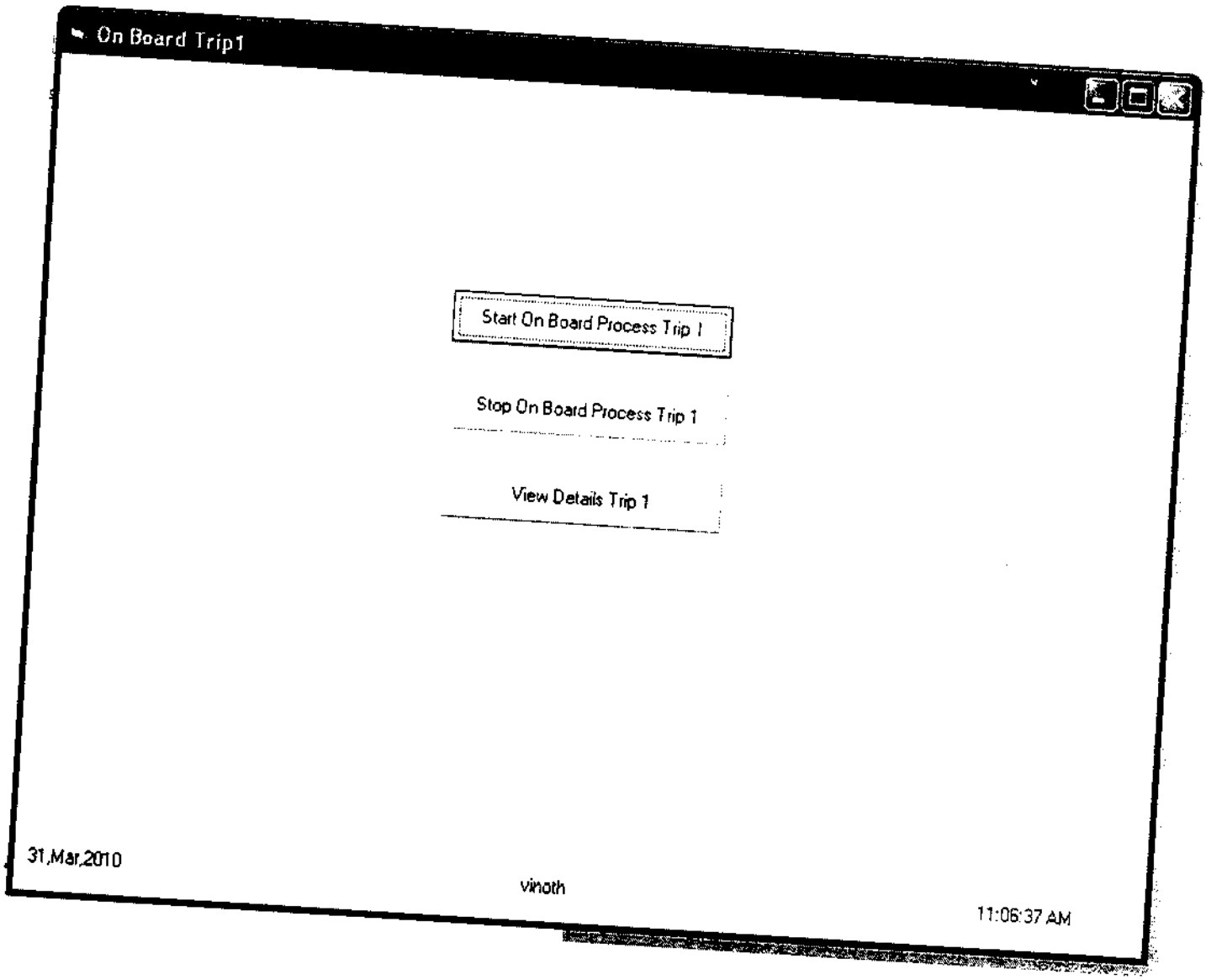
Registration:



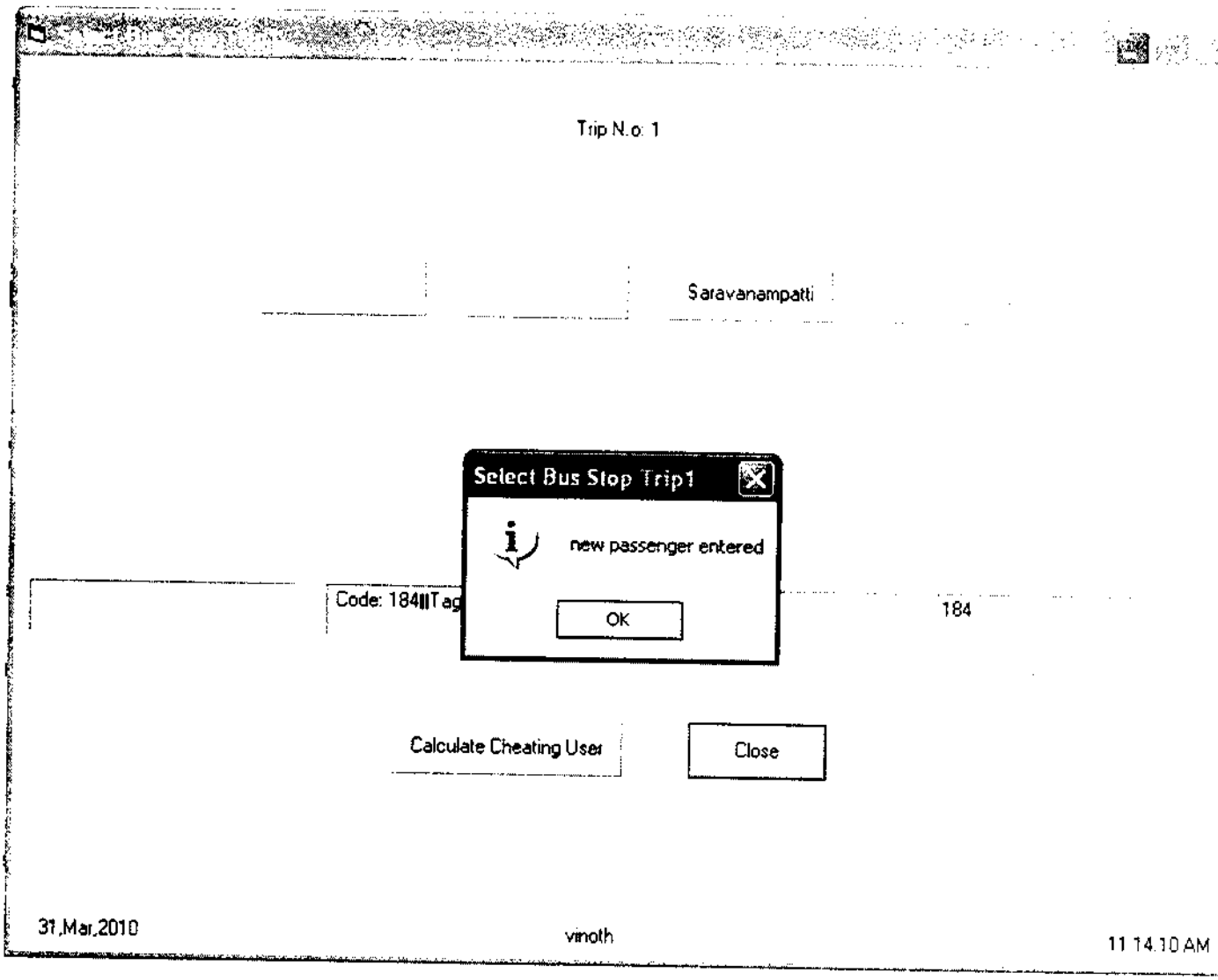
Select Trip:



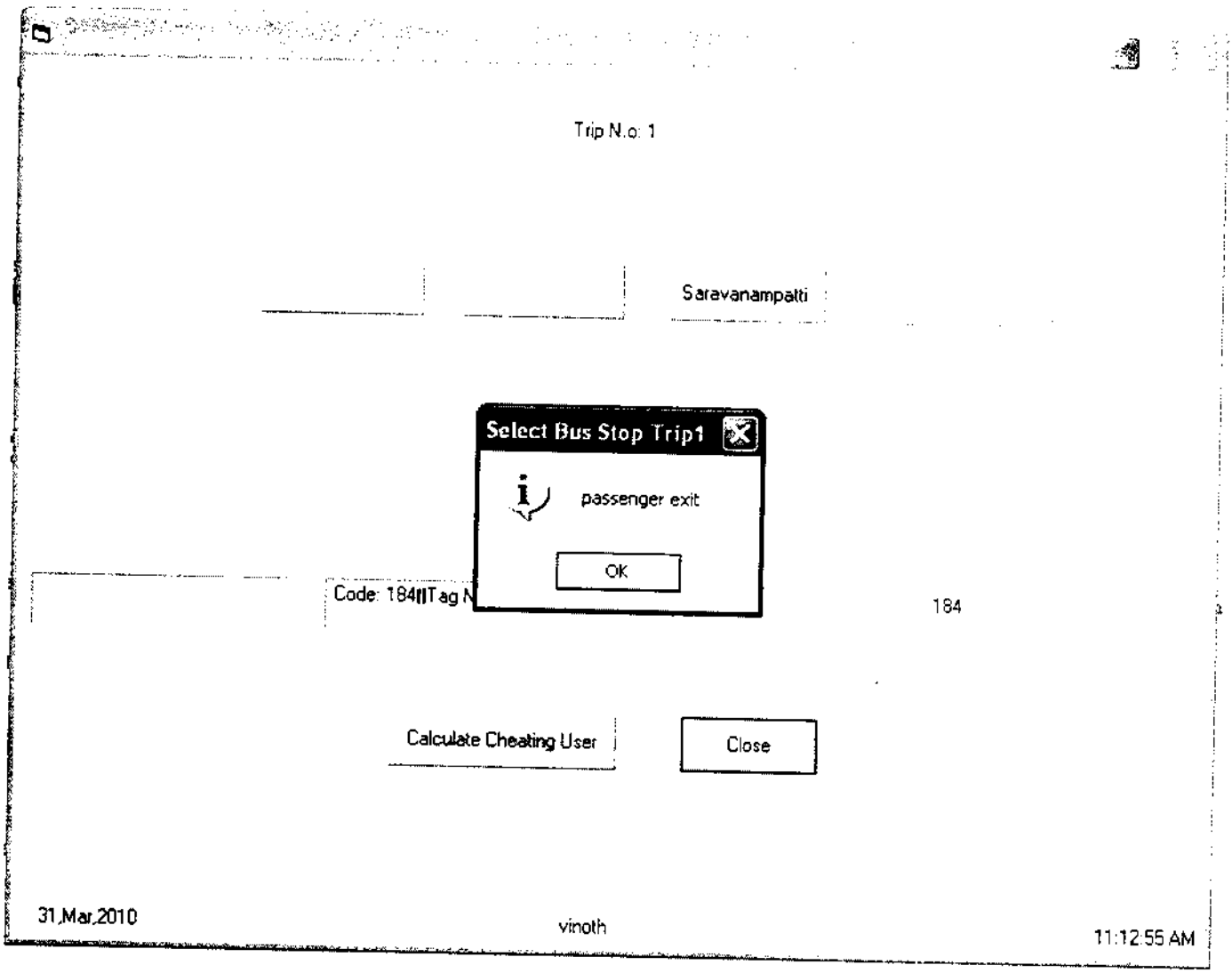
Onboard Trip:



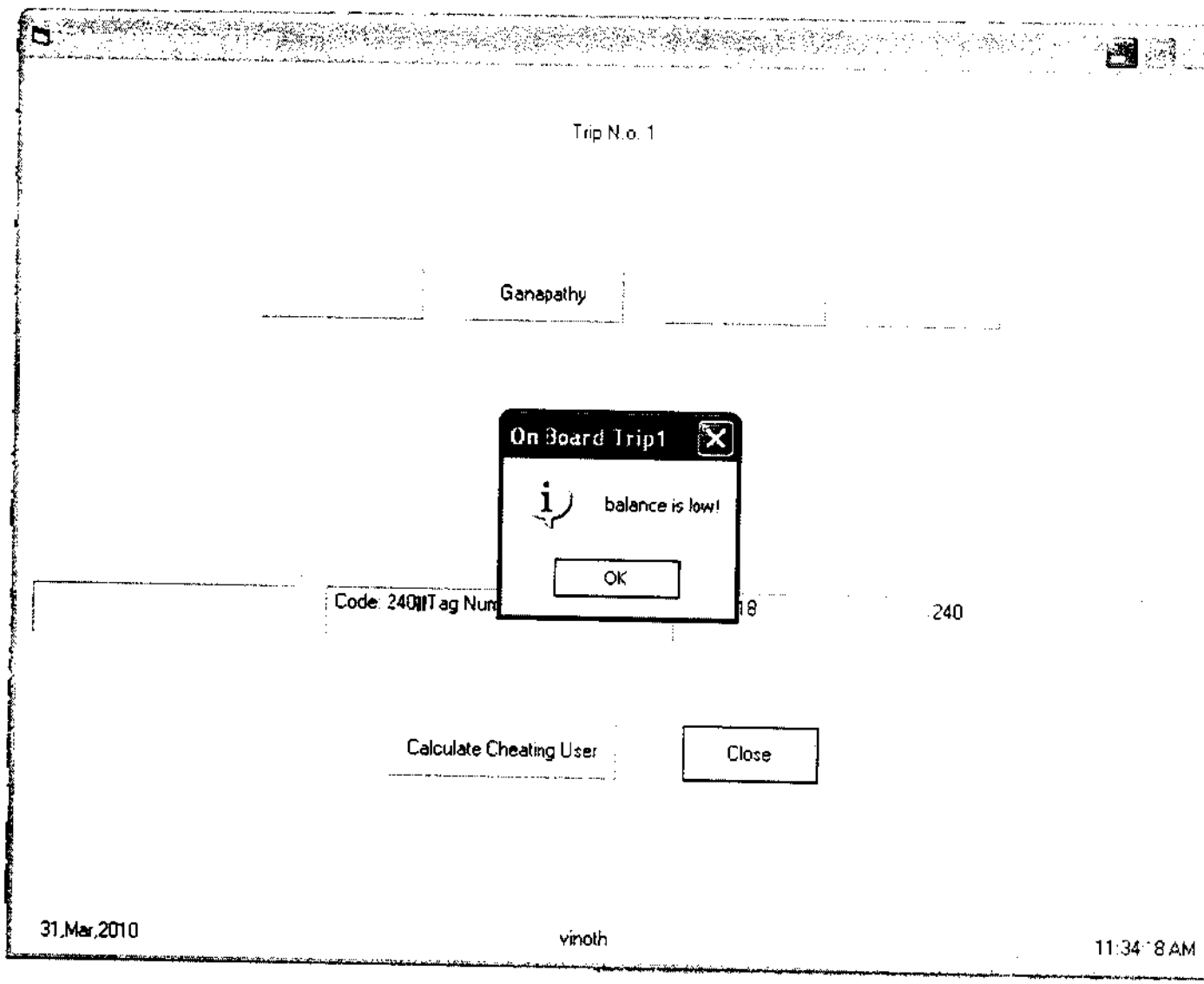
Passenger Entry:



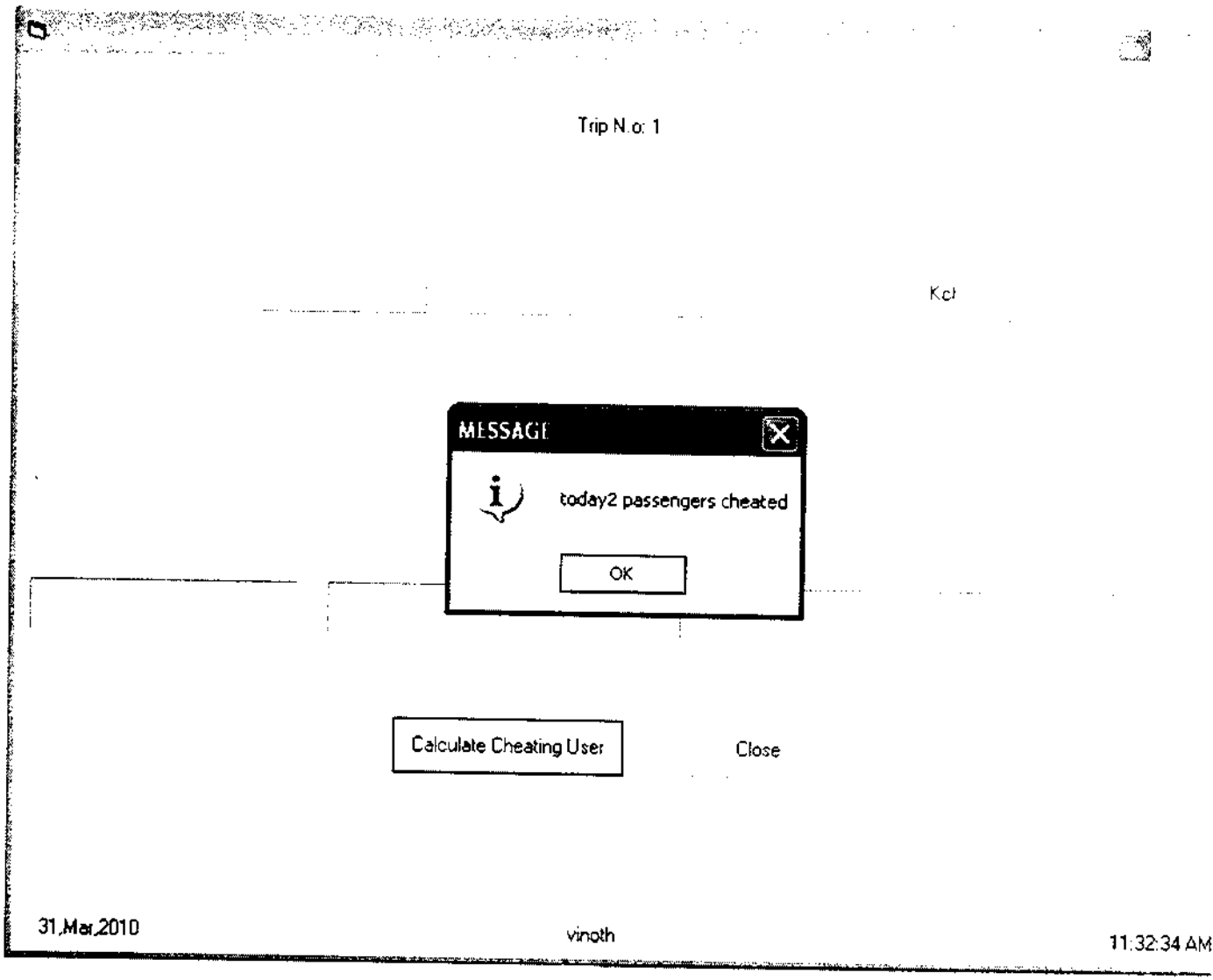
Passenger Exit:



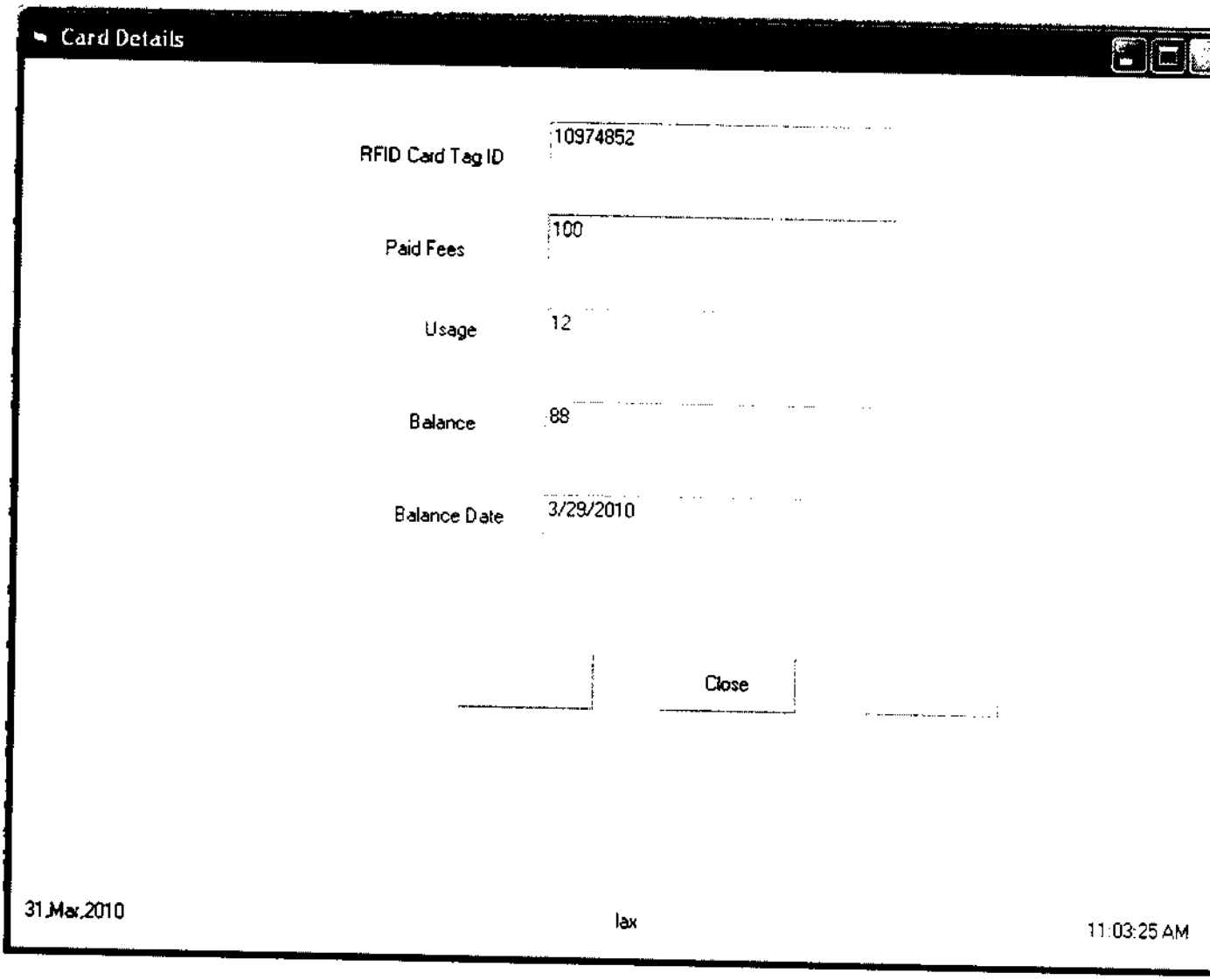
Low Balance Case:



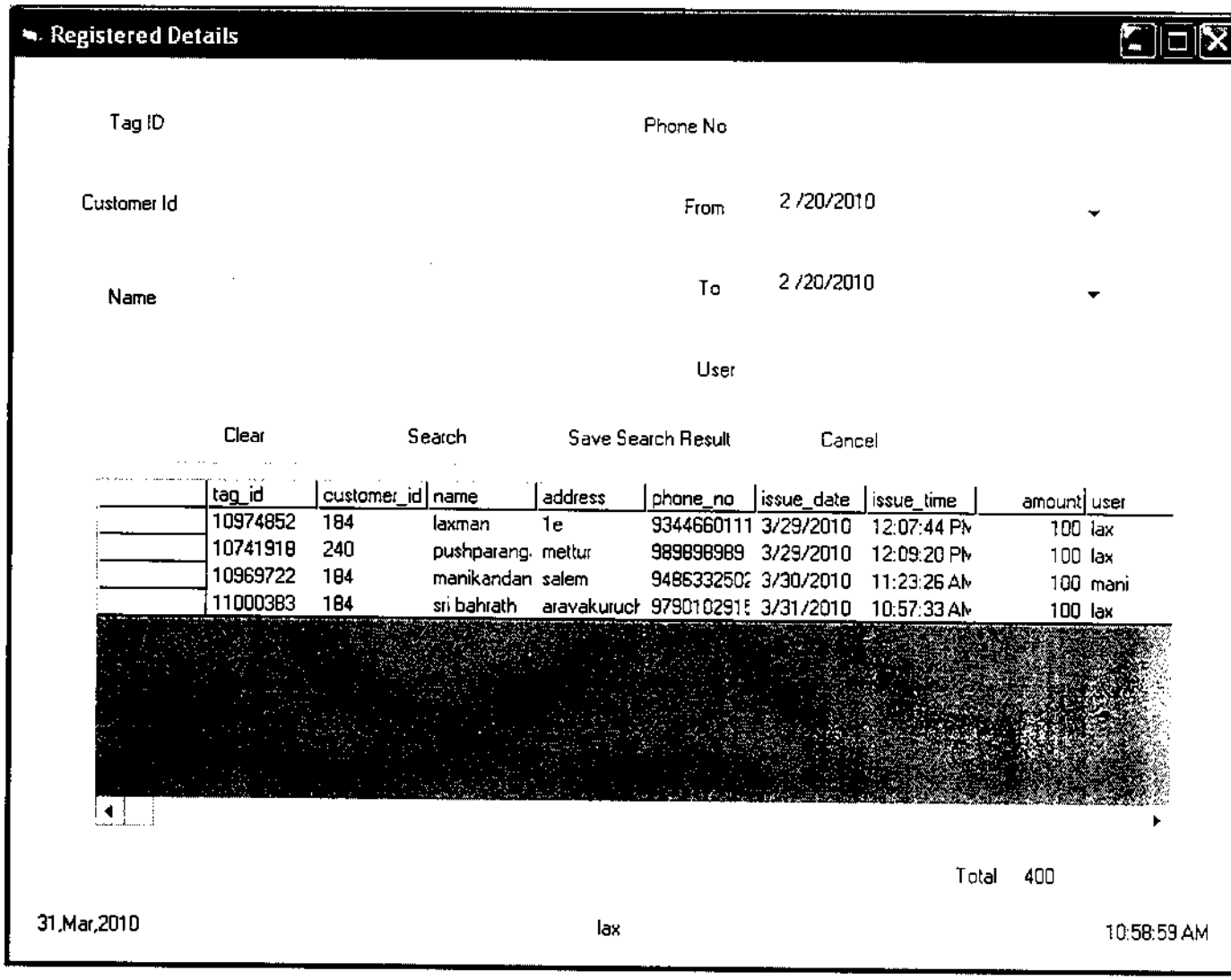
Cheating Passengers:



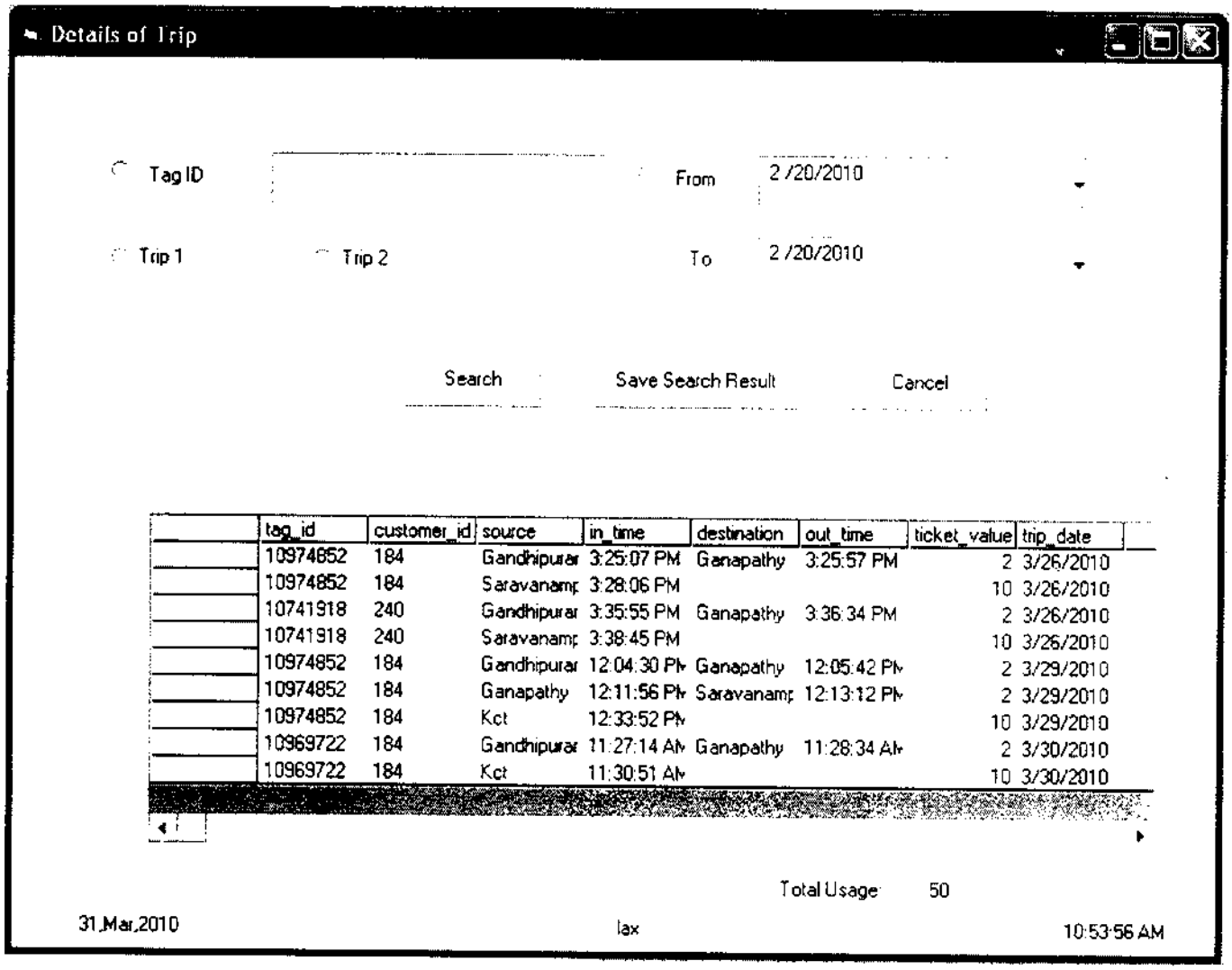
Card Details:



Registered Details:



Onboard Details:



7 REFERENCES

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3. "http://www.rfidjournal.com/"- RFID working and RFID equipments