higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

INTRODUCTION TO SYSTEMS DEVELOPMENT

(Second Paper)
NQF LEVEL 2

(10041022)

26 November 2018 (X-Paper)
09:00–13:00

This question paper consists of 17 pages.

NCV

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TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Write neatly and legibly.

INSTRUCTIONS TO STUDENTS AND LECTURERS

1. Students MUST be seated in the computer laboratory 30 minutes before the start of the examination to ensure that all computers have the appropriate programs.
2. The questions in this question paper must be completed on a computer by making use of MS Office 2003 or a later version and VB.NET 2005 or VB.NET Express or VB.NET 2008 or later.
3. Students must make sure that they print their work immediately after they completed a question. Ensure that your examination number is on ALL printouts. NO QUESTIONS WITHOUT A PRINTED EXAMINATION NUMBER WILL BE MARKED.
4. In the event of problems such as a power failure, computer breakdown or a printer breakdown, the invigilator will make the necessary arrangements to continue with the examination process once the problem has been resolved. Students will NOT be penalised for time lost under these circumstances.
5. ALL work on the computer should be saved at regular intervals to prevent loss of work. NO additional time may be allowed for work lost because it was not saved.

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6. NO student may print his/her work for another student or make a memory stick available to another student or access another student's work on the network. Any attempt to access any information from or transfer information to another student in whatever manner is a contravention of the examination rules and regulations and will be viewed in an extremely serious light.

7. ALL PRINTOUTS and screen prints done during the session MUST be handed in.

8. Make sure that your EXAMINATION NUMBER appears on ALL PRINTOUTS.

9. Students may NOT copy the source code from VB.NET to MS Word and then print it from the word processor.

10. STEPS TO PRINT A VB.NET FORM OR ANY OTHER SCREEN:

    10.1 Run the solution.

    10.2 Hold the ALT key down and press the print screen button. (This will copy the active screen.)

    10.3 Open MS Word and paste the form/screen in a new document.

    10.4 Add your EXAMINATION NUMBER at the top right-hand side of the page.

    10.5 Print the page.

11. You are allowed to make use of the help files in VB.NET.

12. The following files will appear on your hard drive in the folders:

    12.1 QUESTION 1
    … \Library

    IMAGE: library.jpg

    … \IMAGES

    12.2 QUESTION 2
    … \HotelBookings

    12.3 QUESTION 3
    … \TacoShop

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QUESTION 1

The following questions refer to the VB.NET program called ***Library*** that has been saved on your computer.

The library at your college is still using a paper-based approach to assist with the process of renting out books to students. As this approach has become very time-consuming, the decision was made to change to a computer program for this purpose. They approached you, a user-interface design specialist, to design an interface that will help the students using the library to easily send requests for books they want to check out.

The student first has to enter his/her student number, name and surname (using text boxes), after which he/she can search for a book by either entering the book title or the author (using a combo box to make the selection). The result (together with the book's ISBN number) is then displayed in a list box.

The student can then check out the book by entering the ISBN number (in a text box), and then choose to read the book in the library or to check it out. The student then clicks on the Send Request button to send the request. A message will be displayed in a display label.

NOTE: NO CODE IS REQUIRED FOR THIS QUESTION, YOU ARE ONLY REQUIRED TO CREATE THE GRAPHICAL USER INTERFACE

Use FIGURE 1 below and the instructions as a guide to help you complete the interface.

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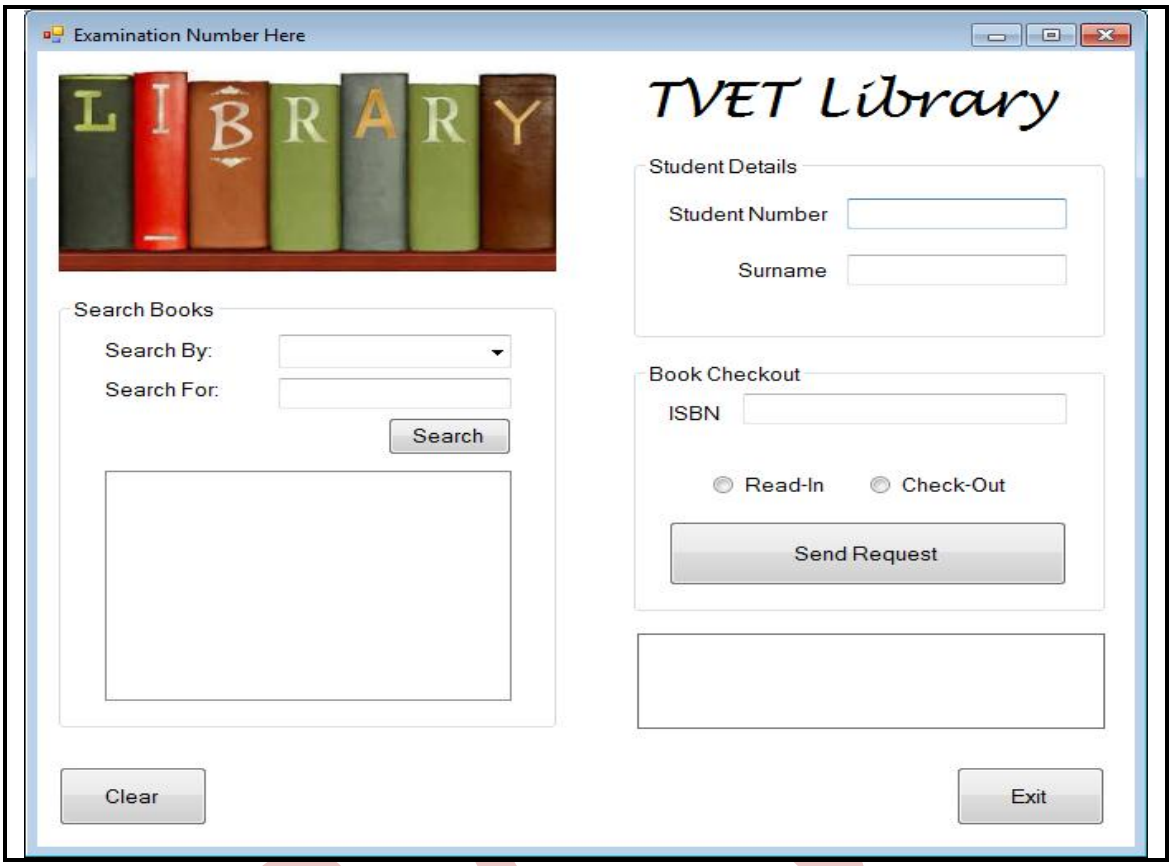

FIGURE 1

A blank interface has been saved on your computer. Open the program ***Library*** and follow the instructions below to complete the interface.

1.1 Add a PICTURE BOX to the form as part of the heading:

CONTROL	NAME	IMAGE
PictureBox	picLibrary	Use the image saved on your computer as "library.jpg"

(2)

1.2 Add THREE GROUP BOXES to the form, to group the Student Details, Search Details and Checkout Details:

CONTROL	NAME	TEXT
Group box	grpStudDetails	Student Details
Group box	grpSearch	Search Books
Group box	grpCheckOut	Checkout Book

(3)

1.3 Add SEVEN LABELS to the form, one for the heading, two for the student details, two for the search details, one for the ISBN number and one to display the message:

CONTROL	NAME	TEXT	SIZE	FONT
Label	lblHeading	TVET Library	26	Lucida Handwriting
Label	lblStudNum	Student Number		Default
Label	lblSurname	Surname		Default
Label	lblSearchBy	Search By:		Default
Label	lblSearch	Search For:		Default
Label	lblISBN	ISBN		Default
Label	lblDisplay	(Blank)	**Border:** Fixed Single **Size:** See FIGURE 1	

(9)

1.4 Add FOUR TEXT BOXES to the form, to enter the student number, surname, search information and ISBN Number:

CONTROL	NAME	TEXT
Text box	txtStudNum	(Blank)
Text box	txtSurname	(Blank)
Text box	txtSearch	(Blank)
Text box	txtISBN	(Blank)

(4)

1.5 Add TWO RADIO BUTTONS to the form to indicate whether or not the student is reading the book in the library or checking the book out:

CONTROL	NAME	TEXT
Radio button	radReadIn	Read-In
Radio button	radCheckOut	Check-Out

(2)

1.6 Add a list box to the form to display the search results:

CONTROL	NAME	TEXT
List box	lstSearchResult	(Blank)

(1)

1.7 Add a combo box to the form, to choose what to search by:

CONTROL	NAME	ITEMS
Combo box	cboSearchBy	Author, Title

(1)

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1.8 Add FOUR BUTTONS to the form, one for the search, one to send the request, one to clear all the fields on the form and one to exit the program:

CONTROL	NAME	TEXT	FONT SIZE
Button	btnRequest	Send Request	Default
Button	btnSearch	Search	Default
Button	btnClear	Clear	Default
Button	btnExit	Exit	Default

(4)

1.9 Change the text in the title of the form to your EXAMINATION NUMBER and make a PRINTOUT of the form. (1)

[27]

QUESTION 2

The following questions refer to the VB.NET program called ***HotelBookings*** that has been saved on your computer.

A hotel hires you and your software development team to develop a program which will help their potential guests determine the cost of their stay at the hotel. The user will first select the *room type* (Standard, Suite or Penthouse). The costs associated with these room types are as follows:

- Standard: R500,00 per day.
- Business Suite: R75,00 per day.
- Executive Suite: R1 200,00 per day.

The user then enters the *number of guests* that will be staying at the hotel, as well as the *number of days* the guests will be staying.

If the guests are staying for more than five nights, they receive a discount of 5% on the total cost due.

The guests can then also choose from a number of extra services available. These services are as follows:

- Breakfast: R15,00 per day.
- Dinner: R150,00 per day.
- Pay Per View Television: R10,00 per day

The program must calculate and display the total cost the client has to pay (See IPO chart below), as well as the discount the guests have received.

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Use the IPO chart below to help you with the program:

INPUT	PROCESSING	OUTPUT
Number of Guests Number of Days Select Room Type Select Extra Services	**Room Rates:** Standard: R500 **Per Day** Business Suite: R750 **Per Day** Executive Suite: R1200 **Per Day** **Extra Services Costs:** Breakfast: R15 **Per Day** Dinner: R150 **Per Day** Pay Per View TV: R10 **Per Day** **RoomCost** = NumberOfNights * RoomRate **Subtotal** = RoomCost + ExtrasCost **Discount:** 5% of subtotal (if number of days are more than 5) **TotalCost** = Subtotal - Discount	Discount TotalCost

FIGURE 2 below is a print screen of what the user interface looks like. The completed interface has been saved on your computer. Open the solution ***HotelBookings*** and follow the instructions to complete the program:

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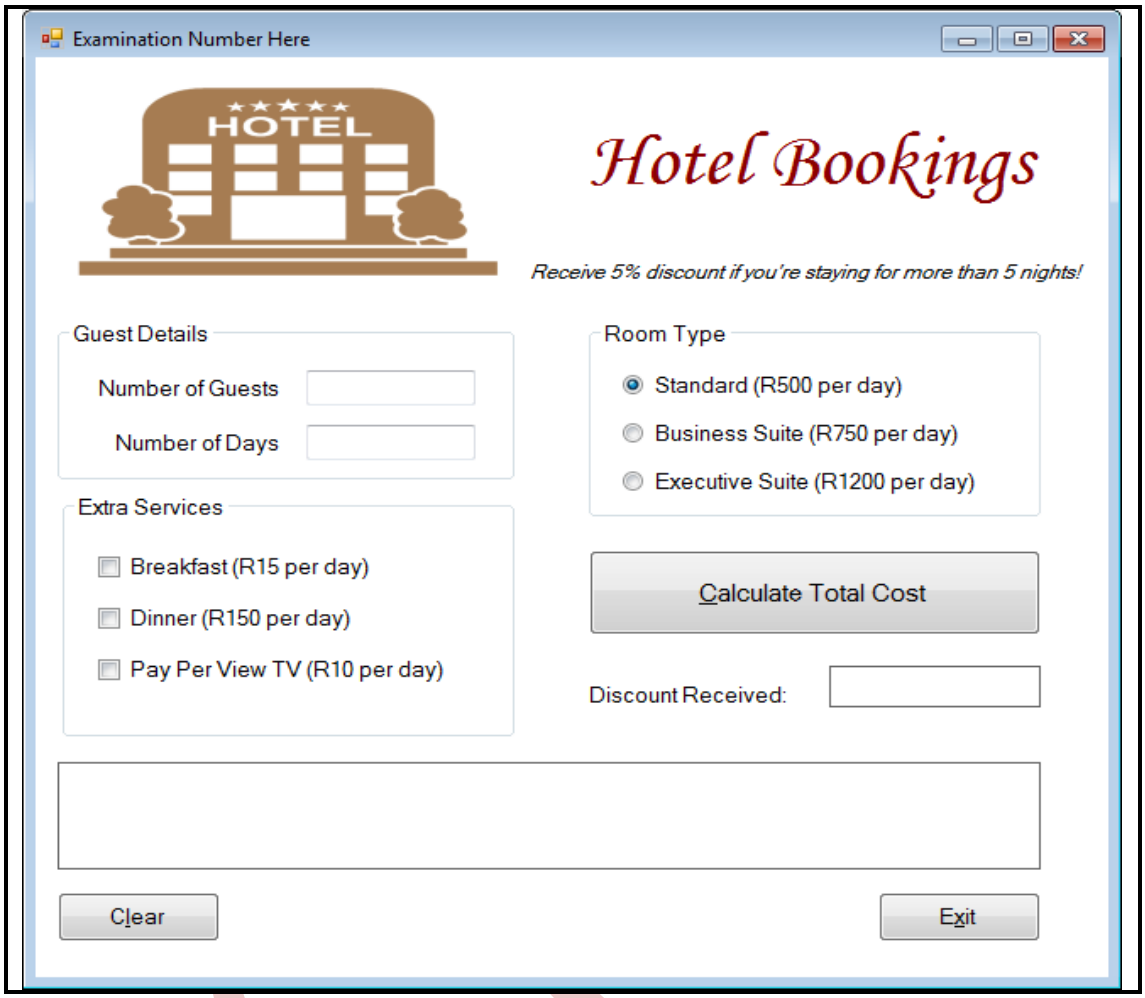
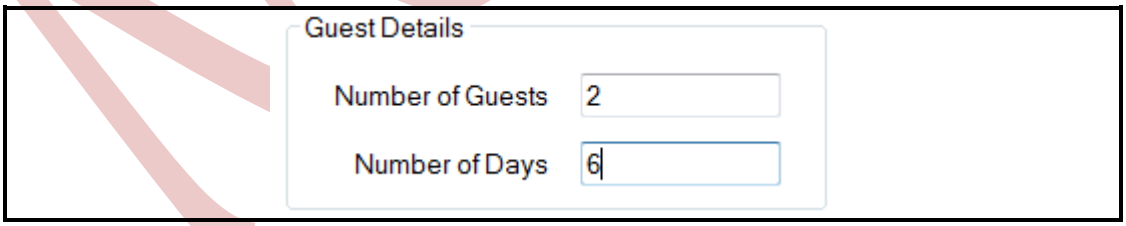


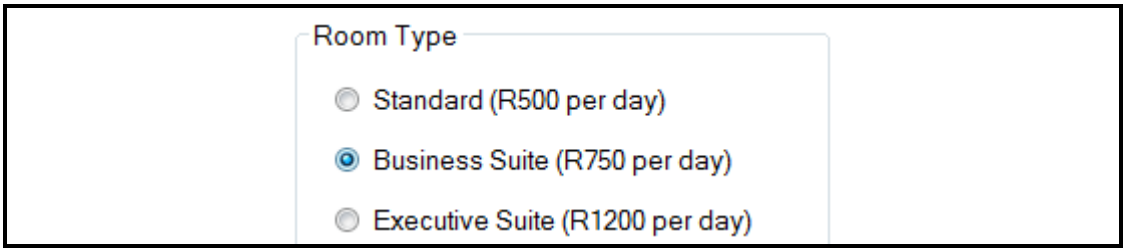
FIGURE 2

The following steps explain how to use the program in order to calculate the cost of a booking:

STEP 1 RUN the program and enter the *Number Of Guests* and *Number of Days*:



STEP 2 Select the *Room Type*:



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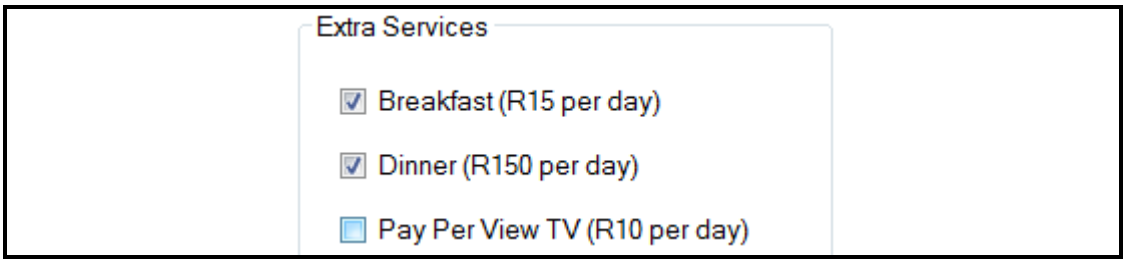
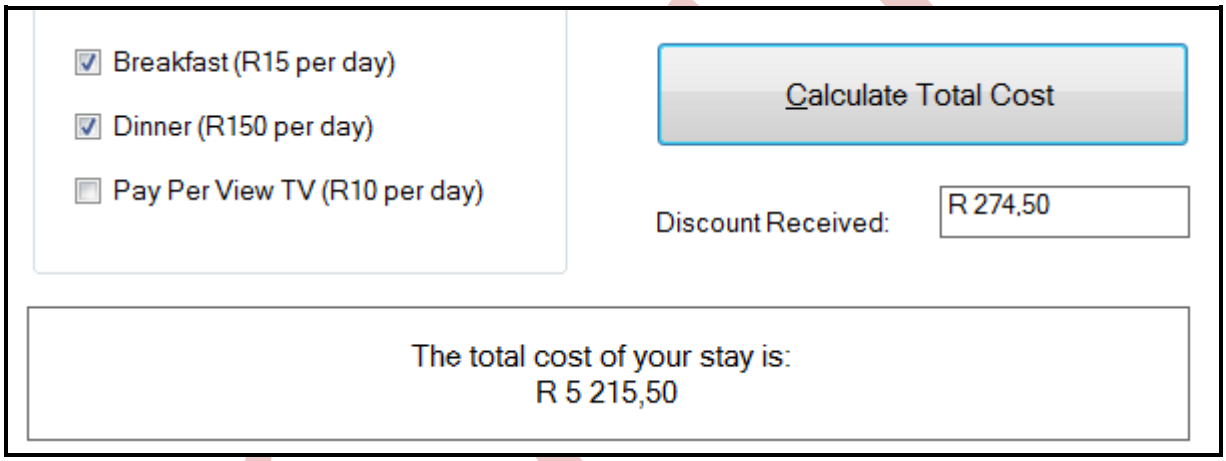
STEP 3 Select the *Extra Services*:



STEP 4 Click the *Calculate* button to calculate and display the *Total Cost* and *Discount Received* as follows:



2.1 A programmer must always adhere to good program documentation principles. To ensure that your program code is user-friendly and easy to interpret, incorporate the following into your program code:

2.1.1 Add your EXAMINATION NUMBER as a comment in your source code.

2.1.2 Add any suitable comments to the program code.

2.1.3 Make use of the Hungarian naming convention

(3 × 1) (3)

2.2 Add the following program code to the click event of the Calculate button:

2.2.1 Declare the *discount percentage* as a *constant*. (1)

2.2.2 Declare ALL the required variables. (6)

2.2.3 Determine that the *number of guests* text box contains a numeric value. If it is not numeric, alert the user with a message box, set the focus to the *number of guests* text box, and stop processing. Else, assign the value entered into the text box to the appropriate variable. (4)

2.2.4 Convert and assign the value from the *number of days* text box to the appropriate variable. (1)

2.2.5 Determine the *Room Rate* based on the selection in the radio buttons, by making use of (an) <if> statement(s). (4)

2.2.6 Determine the *total cost of the extras* by making use of <if> statements. (5)

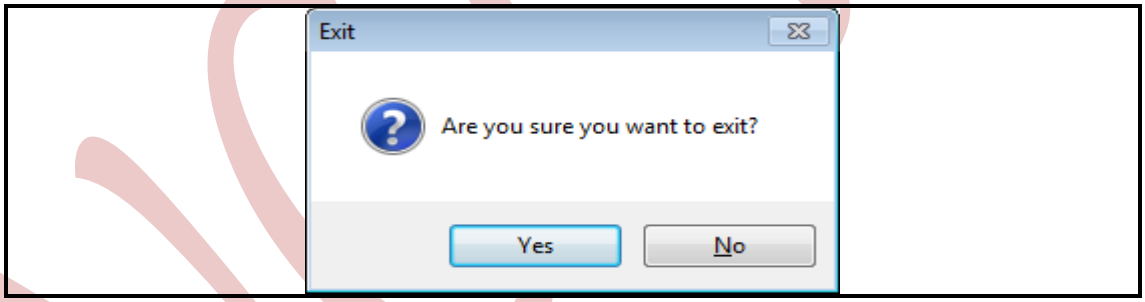
2.2.7 Calculate ALL of the following:

(a) Room cost (3)
(b) Subtotal (3)
(c) Discount (4)
(d) Total cost (3)

2.2.8 Display the calculated *Discount* and *Total Cost* in the appropriate labels as shown in Step 4 above. (5)

2.3 Clicking the *Clear* button should clear ALL the radio buttons, text boxes, check boxes and the display labels. (4)

2.4 Clicking the *Exit* button should display the following message:



Clicking the *Yes* button should exit the program, while clicking the *No* button should leave the program running. (4)

Make a PRINTOUT of the source code.

[50]

QUESTION 3

The following questions refer to the VB.NET program called ***TacoShop,*** that has been saved on your computer.

The owner of a small taco shop asked you and your software development team to design a Point of Sales application to help him get orders out faster.

Customers have a choice of THREE taco types, namely *chicken, beef* and *veggie.* The prices of these options are as follows:

- Chicken: R50
- Beef: R65
- Veggie: R60

Customers can then also choose to add some extras, which include:

- Extra Cheese: R15
- Extra Sauce: R10
- Extra Chillies: R20

The program should then allow the user to select a discount code (which changes every month), if the customers has one, which would result in a small discount. Current voucher codes are as follows:

- Taco105 (2% discount)
- Taco117 (5% discount)
- Taco189 (10% discount)

When the user clicks on the *Calculate Total Due* button, the total due is displayed in the label, and the *amount paid* text box becomes enabled. The user then enters the amount paid by the customer and clicks the *calculate change* button, which results in the *change* being displayed in the *change* label.

The *Next* button clears the controls on the form to get the program ready for the next customer.

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FIGURE 3 below is a print screen of what the user interface looks like:

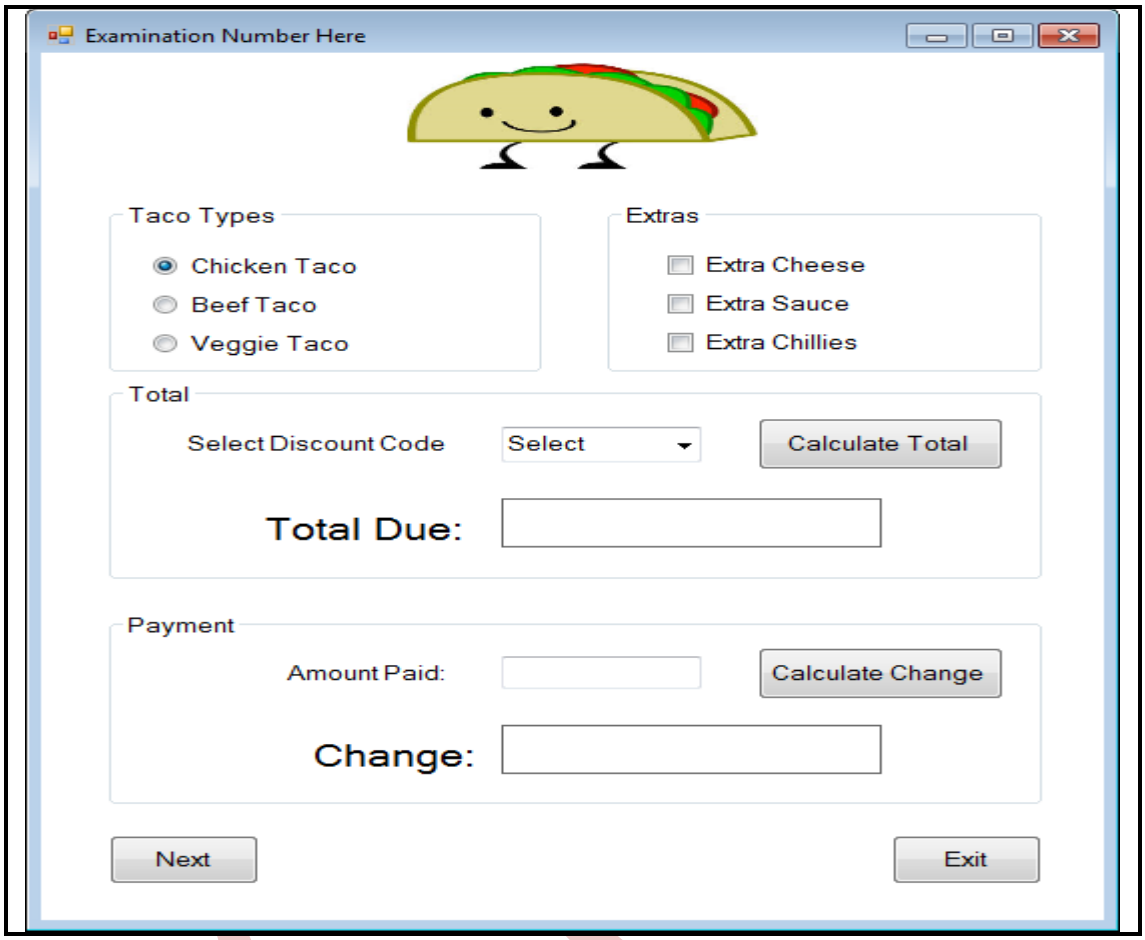


FIGURE 3

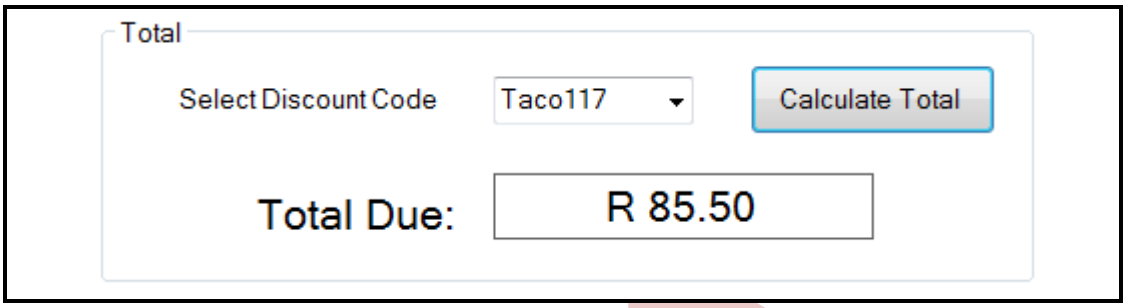
WORKING OF THE PROGRAM EXPLAINED:

The following steps explain how to use the program:

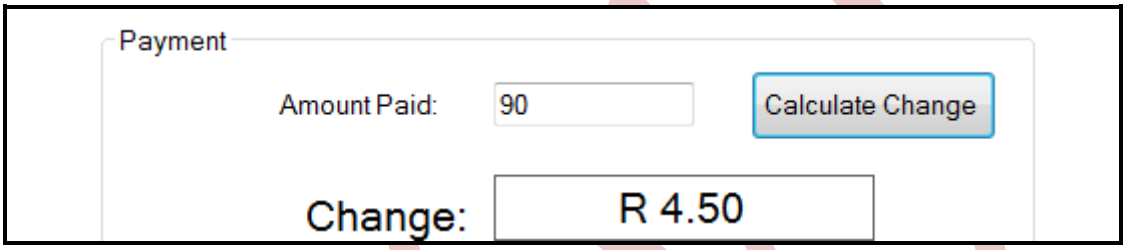
STEP 1 RUN the program and select the *Taco Type* and the *Extras*:



STEP 2 Select the *Discount Code* and click the *Calculate Total* button:

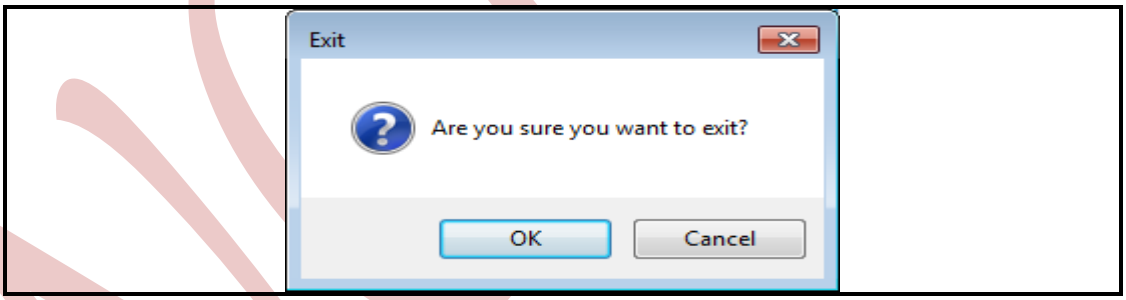


STEP 3 Enter the *Amount Paid* and click the *Calculate Change* button:



STEP 4 The *Next* button resets and clears the controls on the form to get the program ready for the next transaction.

STEP 5 When the *Exit* button is clicked, the following message is displayed:



Clicking the *OK* button closes the application, while clicking the *Cancel* button leaves the program running.

The application has already been designed and coded by one of the other programmers on your team. The application contains numerous syntax and logical errors, and you have been tasked with debugging the source code.

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Below is a PRINTOUT of the program code with all the syntax and logical errors still present:

```
…
Public Class Form1
    'Examination Number Here:
    'Declare global variable
    Dim decTotal As Decimal = 0

    Private Sub Form1_Load(sender As Object, e As EventArgs) Handles
MyBase.Load
        'Add items to combo box
        cboDiscount.Items.Add("Select")
        cboDiscount.Items.Add("Taco105")
        cboDiscount.Items.Add("Taco117")
        cboDiscount.Items.Add(Taco189)

        'Select First Item
        cboDiscount.SelectedIndex = 1
    End Sub

    Private Sub btnCalculate_Click(sender As Object, e As EventArgs)
Handles btnCalculate.Click
        'Declare local variables
        Const decTacoCost As Decimal = 0
        Dim decExtras As Decimal = 0
        Dim decDiscountPercent As Decimal = 0
        Dim decDiscount As Decimal = 0
        Dim decSubtotal As Decimal = 0

        Determine Taco Cost
        If radChicken.Checked = True Then
            decTacoCost = 50
        ElseIf radBeef.Checked = True Then
            decTacoCost = 65
        ElseIf radVeggie.Checked = True Then
            decTacoCost = 60
        End If

        'Determine Cost of Extras
        If chkCheese.Checked = True Then
            decExtras = 15
        ElseIf chkSauce.Checked = True Then
            decExtras = 10
        ElseIf chkChillies.Checked = True Then
            decExtras += 20
        End If

        'Determine discount percent
        Select Case cboDiscount.SelectedIndex
            Case 0
                decDiscountPercent = 0
            Case 1
                decDiscountPercent = 0.02D
            Case 2
                decDiscountPercent = 0.05
```

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```
                Case 3
                    decDiscountPercent = 0.1D
                    End
                    'Calculate Subtotal
                    decSubtotal = decTacoCost + decExtras
                    'Calculate Discount
                    decDiscount = decSubtotal * decDiscountPercent
                    'Calculate total
                    decTotal = decSubtotal + decDiscount
                    'Display Total
                    lblTotalDue.Text = decTotal.ToString("Currecny")
    End Sub

    Private Sub btnChange_Click(sender As Object, e As EventArgs)
Handles btnChange.Click
        'Declare local variables
        Dim decAmountPayed As Decimal
        Dim decChange As Decimal

        'Convert and Assign value from textbox
        decAmountPayed = CDec(txtAmountPaid.Text)

        'Calculate Change
        decChange = decAmountPayed - decTotal

        'Display Change
        lblChange.Text = decChange.ToString("C2")
    End Sub

    Private Sub btnNext_Click(sender As Object, e As EventArgs)
Handles btnNext.Click
        'Clear form controls
        radChicken.Checked = False
        radBeef.Checked = False
        radVeggie.Checked = False

        chkCheese.Checked = False
        chkSauce.Checked = False
        chkChillies.Checked = False

        cboDiscount.SelectedIndex = 0

        txtAmountPaid.Empty()

        lblTotalDue = ""
        lblChange.Text = ""
    End Sub

     Private Sub btnExit_Click(sender As Object, e As EventArgs)
Handles btnExit.Click
        'Exit program
        Dim intAnswer As Integer

        intAnswer = MessageBox.Show("Are you sure you want to exit?",
"Exit", MessageBoxButtons.OKCancel, MessageBoxIcon.Question)

        If intAnswer = vbOK Then

        End If
        Me.Close()
    End Sub
End Class
```

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3.1 The completed program has been saved on your computer, but the program is not functioning properly.

Open the program Taco Shop and correct all the syntax AND logical errors. (19)

3.2 Add your EXAMINATION NUMBER to the source code as indicated and make a printout of the source code. (1)

3.3 Add you EXAMINATION NUMBER to the title bar of the form, and then use the program to calculate the total and change using the following inputs:

- Veggie Taco
- Extra Cheese and Extra Chillies
- Discount Code: Taco105
- Amount Paid: R 100

Make a PRINTOUT of the form showing the correct result. (3)
[23]

TOTAL: 100

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