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)

4 December 2024 (X-paper)
09:00–13:00

This question paper consists of 13 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
INTRODUCTION TO SYSTEMS DEVELOPMENT
NQF LEVEL 2
(Second paper)
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. Students must be seated in the computer laboratory 30 minutes before the start of the examination to ensure that all computers have appropriate programs.

5. Questions must be completed on a computer by using MS Office 2010 or a later version and VB.NET 2008 or VB.NET Express or a later version.

6. Print your work immediately after completing a question. Ensure that your EXAMINATION NUMBER appears on each printout. No questions without a printed EXAMINATION NUMBER will be marked.

7. In the event of problems such as a power failure or a computer or 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 with time lost under these circumstances.

8. 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 due to lack of saving.

9. 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.

10. All printouts or screen prints done during the session must be submitted.

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

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12. Steps to print a VB.NET form or any other screen:

12.1 Run the solution.

12.2 Hold the ALT key down and press the *Prt Sc* key which will copy the active screen.

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

12.4 Add your EXAMINATION NUMBER to the top right-hand side of the page.

12.5 Print the page.

13. You are allowed to use the help files in VB.NET.

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

14.1 QUESTION 1
… \VoterPortal\
… \Images\IEC.jpg

14.2 QUESTION 2

…\ *SiyayaAirLines*
(Microsoft Visual Studio Solution)

14.3 QUESTION 3

…\ *ComputeTipAmount*
(Microsoft Visual Studio Solution)

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QUESTION 1

The following question paper refers to the VB.NET solution *VoterPortal* that has been saved on the hard drive.

You have been hired by the IEC to design and create a program that can be utilized by South African citizens to register for the provincial, local and national elections.

FIGURE 1 below is a screen printout of what the user interface should look like.

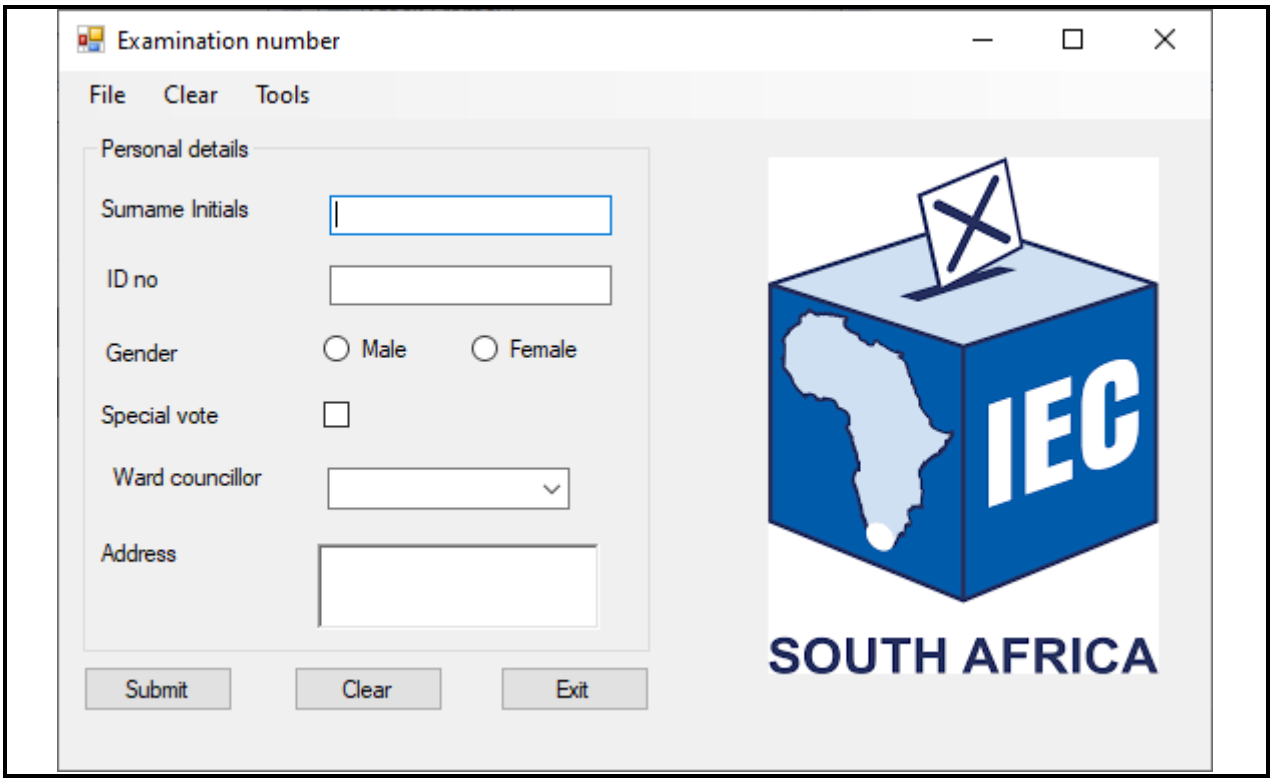

FIGURE 1

A blank form has been saved on the hard drive. Open the solution *VoterPortal* and follow the instructions to create the user interface.

NOTE: Use the style/design tables in each question to assist you in placing and configuring the controls on the form.

1.1 Change the text in the title bar of the form to your EXAMINATION NUMBER. (1)

1.2 Add a `menuStrip` control and populate it with the options as indicated on the screenprint above i.e., *File*, *Clear* and *Tools*. (2)

1.3 Add a picture box to the form and position as in FIGURE 1.

CONTROL	IMAGE
Picture box	Load the image saved on the hard drive called IEC.jpg

(2)

1.4 Add a group box to the form that will contain the voters' personal details.

CONTROL	TEXT
Group box	Personal details

(1)

1.5 Add SIX labels to the form that will be used to identify the various input controls

CONTROL	TEXT
Label	Surname Initials
Label	ID no
Label	Gender
Label	Special Vote
Label	Ward councillor
Label	Address

(6)

1.6 Add TWO text box controls to the form for the voters Surname & Initials and ID number.

CONTROL	NAME	TEXT
Text box	txtSurname	Blank
Text box	txtIDNumber	Blank

(2)

1.7 Add TWO radio button controls to the form to capture the 'Gender'.

CONTROL	NAME	TEXT
Radio button	rdbMale	Male
Radio button	rdbFemale	Female

(2)

1.8 Add a check box control to the form to capture the 'Special Vote'

CONTROL	NAME	TEXT
Check box	chkSpecial	Blank

(1)

1.9 Add a combo box to the form that will show a list of various Wards.

CONTROL	NAME	ITEMS
Combo box	cmbWard	None

(1)

1.10 Add a rich Text Box control to the form to capture the voters' address.

CONTROL	NAME	TEXT
richTextBox	rchAddress	Blank

(1)

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1.11 Add THREE button controls to the form that will trigger the Submit, Clear and Exit events

CONTROL	NAME	TEXT
Button	btnSubmit	Submit
Button	btnClear	Clear
Button	btnExit	Exit

(3)

1.12 Print the form. (1)

[23]

QUESTION 2

The following questions refer to the VB.NET solution *siyayaAirLines* that has been saved on the hard drive.

The Management of Siyaya Airlines asked you to develop a program that will be used by their customers to book and purchase flight tickets. Siyaya offers both *domestic* and *international* flights to various countries. Customers can choose to fly either *economy*, *business* or *first* class.

The airlines also offers a "Frequent Flyer" loyalty program where members will receive a discount of R150 on an *economy* ticket, R300 on a *business* class ticket and R450 on a *first class* ticket.

TABLE 1 below provides a detailed breakdown of the various ticket options and applicable discounts.

TABLE 1: Flight Costs

TICKET TYPE	FREQUENT FLYER DISCOUNT	TICKET PRICES (Before frequent flyer discount)	
		DOMESTIC	INTERNATIONAL
Economy Class	R150.00	R1000.00	R1800.00
Business Class	R300.00	R2000.00	R2500.00
First Class	R450.00	R3000.00	R5000.00

Using the data in TABLE 1, if a client flies *domestic* with a *business class* ticket, the ticket price will be R2000.00. However, if the same client is a "Frequent Flyer" the cost will be R2000.00-R300 = R1700.00.

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Use the IPO chart below to further assist you in completing the program requirements.

Input	Processing	Output

Full name
Ticket type
Flight
FrequentFlyer
	---calculate initial cost--
	If ticket = 'Economy' then
	If flight = 'Domestic' then
	Cost = R1000
	Else cost = R1800
	Elseif ticket ='Business' then
	If flight ='Domestic' then
	Cost=R2000
	Else cost= R2500
	ElseIf ticket ='First' then
	If flight='Domestic' then
	Cost=R3000
	Else cost = R5000
	End if
	--- check to see if discount is applicable
	Discount = 0
	If FrequentFlyer='Yes' then
	If ticket = 'Economy" then
	Discount=R150
	Elseif ticket = 'Business' then
	Discount = R300
	Elseif ticket= 'First' then
	Discount = R400
	End if
	Final Cost = Cost - Discount
		Flight
		Ticket type
		Discount
		Final Cost

FIGURE 2 below is a screenprint of what the user interface looks like

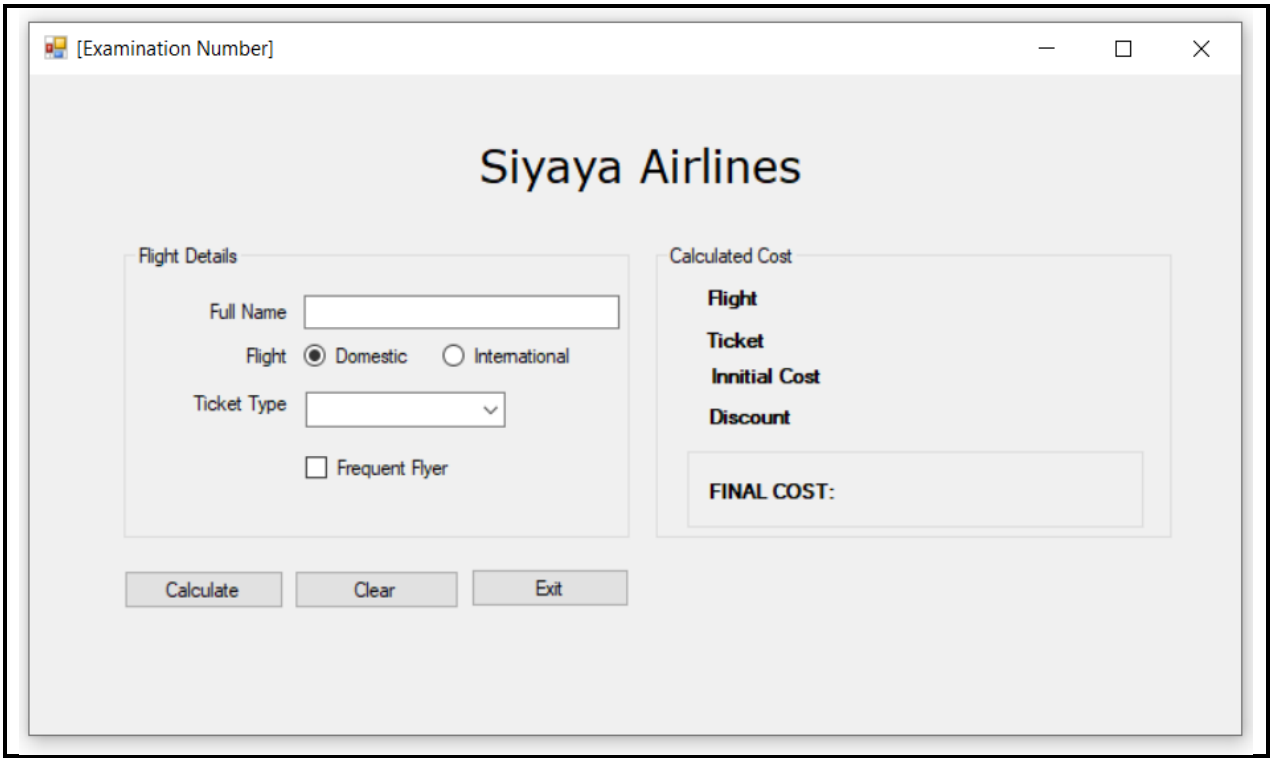

FIGURE 2

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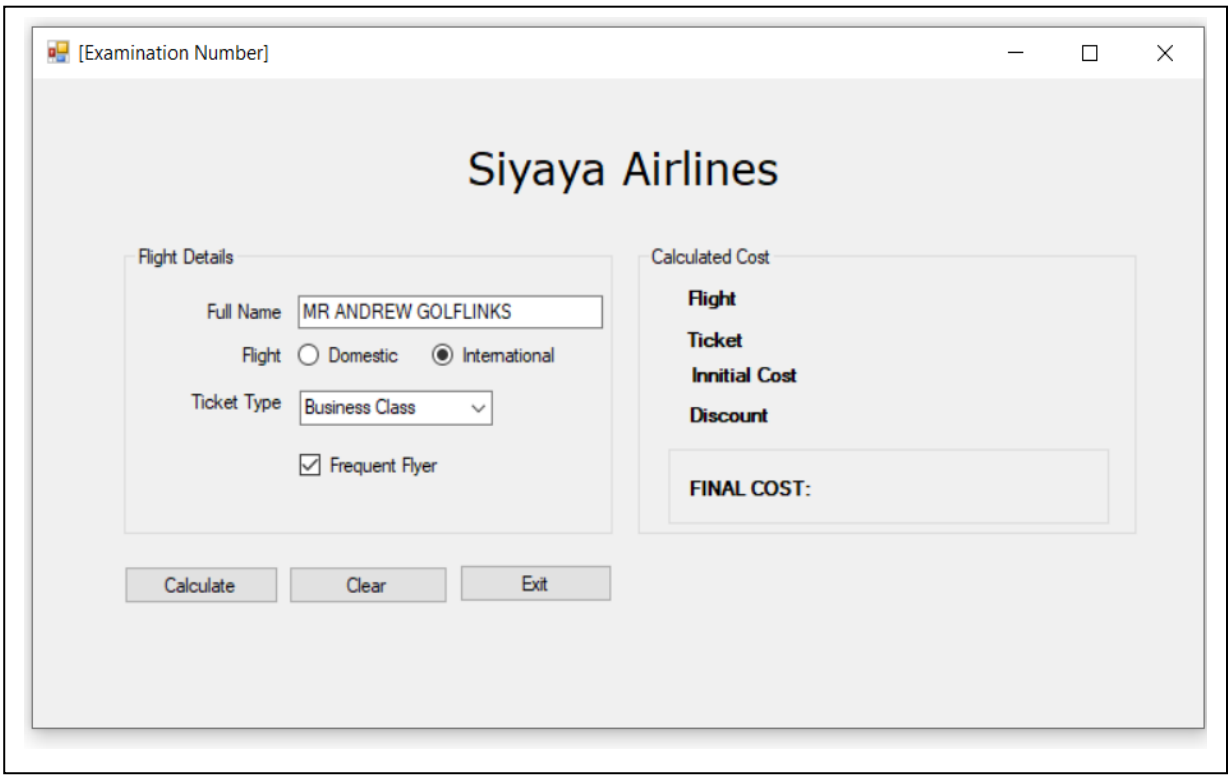
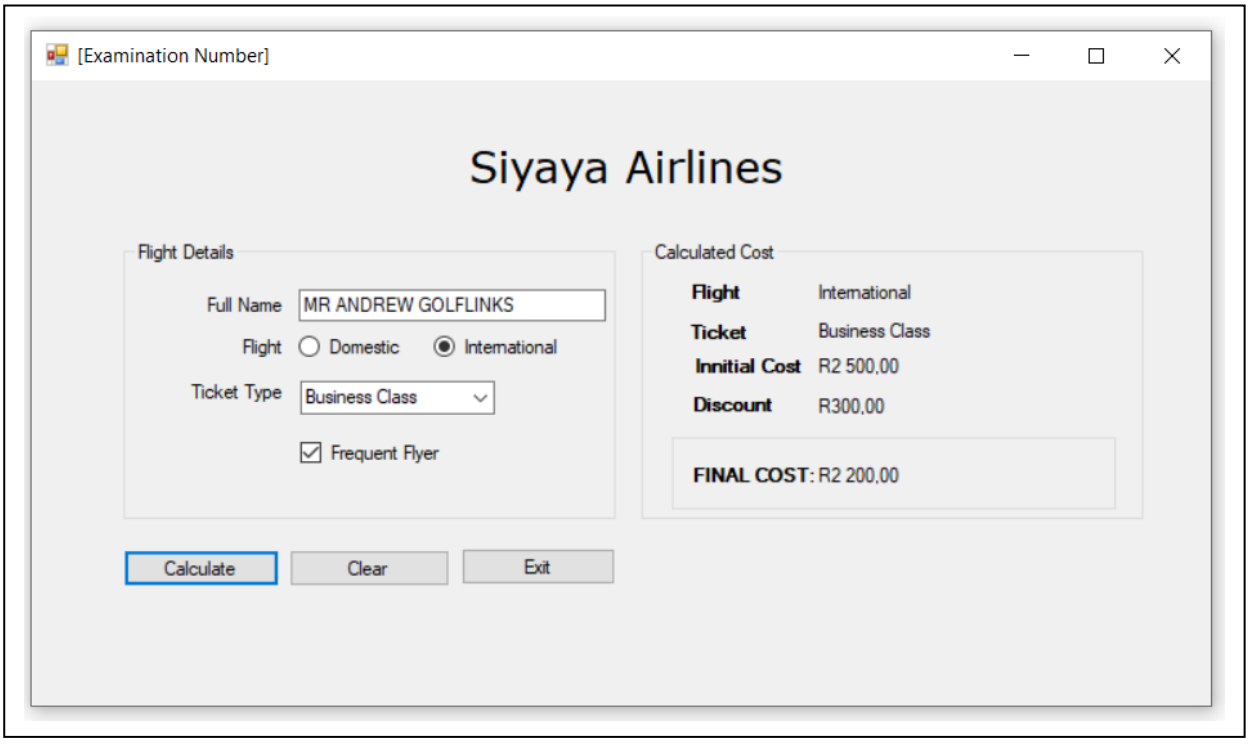
The following STEPS explain how to use the program:

STEP 1 Run the program and complete the inputs as indicated



STEP 2: Pressing the *Calculate* button will calculate and display a breakdown of the totals in the "Calculated Cost" area on the right of "Flight Details"



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The partly completed user interface has been saved on the hard drive in the …\QUESTION2 folder. Open the solution *SiyayaAirLines* and follow the instructions below to complete the program.

NOTE: Do not declare your own variables, use the variables and named controls as indicated in the partly completed solution. Refer to the IPO chart and TABLE 1 above for the actual values and applicable formulas.

2.1 Add your EXAMINATION NUMBER as a comment to your source code. (1)

2.2 Add the following code to the click event of the *Calculate* button.

2.2.1 Determine if the user entered a *full name* and selected *a ticket type*. If not, alert the user with an appropriate message and exit the event. (4)

2.2.2 Assign the user's selected ticket type to the variable called *tickettype.* (1)

2.2.3 Use a selection structure of your choice to determine which type of flight the user selected and assign the value to the variable called *flight.* (4)

2.2.4 Use a selection structure of your choice and the values of the variables *flight* and *tickettype* to calculate the initial cost of the ticket. Store the calculated result in the variable called *initialcost.* (13)

2.2.5 Determine if the user is a frequent flyer by checking whether or not they selected the frequent flyer checkbox. If so, calculate the applicable discount and store the result in the variable called *discount.* (8)

2.2.6 Calculate the final cost using the values in the variables *initialcost* and *discount*. Store the calculated result in the variable called *finalcost* (1)

2.2.7 Assign the various values to the applicable label controls to produce the "*Calculated Cost*" output shown in FIGURE 2 above. As can be seen in the output, all numeric values should be formatted as currency. (5)

2.3 Make a printout of your source code. (1)

2.4 Change the text in the title bar of the form to your EXAMINATION NUMBER
Run your program with the following test data and make a printout of the result.

FULL NAME	FREQUENT FLYER	TICKET TYPE	FLIGHT
MR JOHN LONG	Y	ECONOMY CLASS	INTERNATIONAL

(1)

[39]

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QUESTION 3

The following question refers to the VB.NET solution *ComputeTipAmount* that has been saved on the hard drive.

A local restaurant recruited you to create a program to compute the tip amount for its waiters in addition to the amount payable to the restaurant. The program must allow the waiters to enter their names as well as the subtotal collected from the table they served.

The restaurant allows 10% of the subtotal as a tip-allowance for waiters – the balance belongs to the restaurant. However, if the subtotal collected from the table they served, is R3000.00 or more, they will earn a 20% tip-allowance of which 4% must go to the busboy who helped them set and clear the tables.

The IPO chart below will provide further details about the program specifics.

Input	Processing	Output
waiter busboy subtotal	--check subtotal value If subtotal <3000 Tip_allowance=subtotal * 10% Restaurant = subtotal – tip_allowance Busboy_allowance = 0 Else Tip_allowance = subtotal * 20% Restaurant = subtotal – tip_allowance Busboy_allowance = tip_allowance * 4% Tip_allowance = tip_allowance – busboy_allowance End	Tip_allowance Restaurant Busboy_allowance Transaction Info

FIGURE 3 below is a screenprint of what the user interface looks like

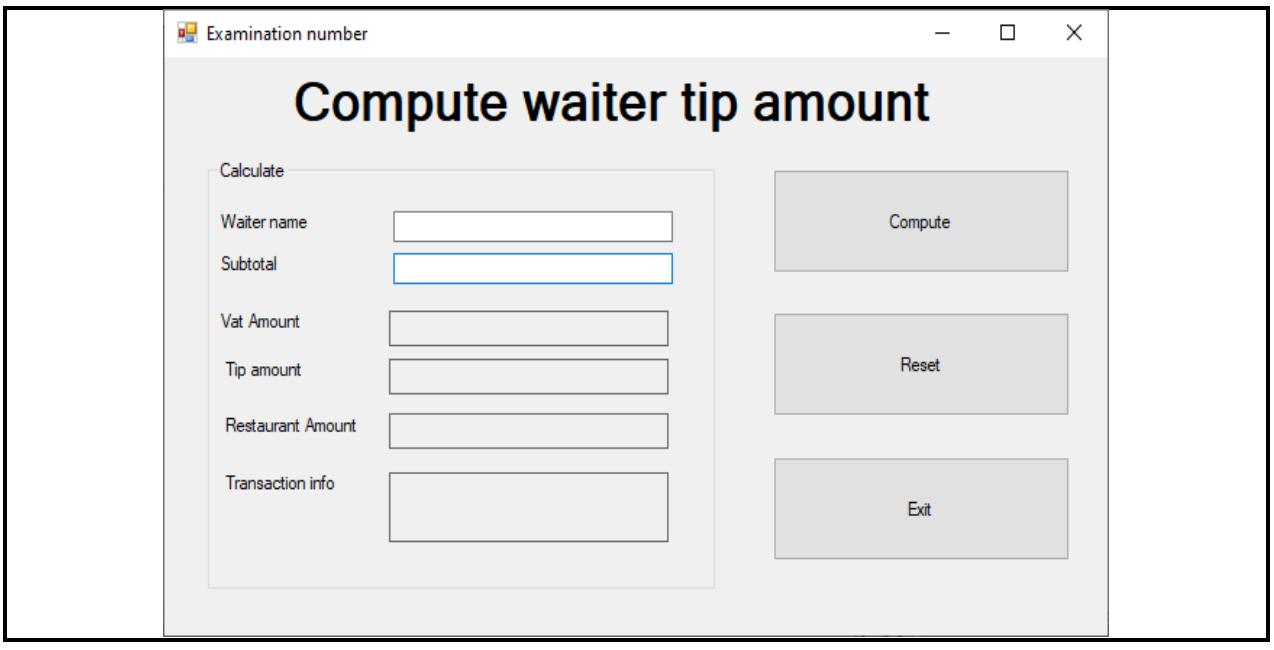
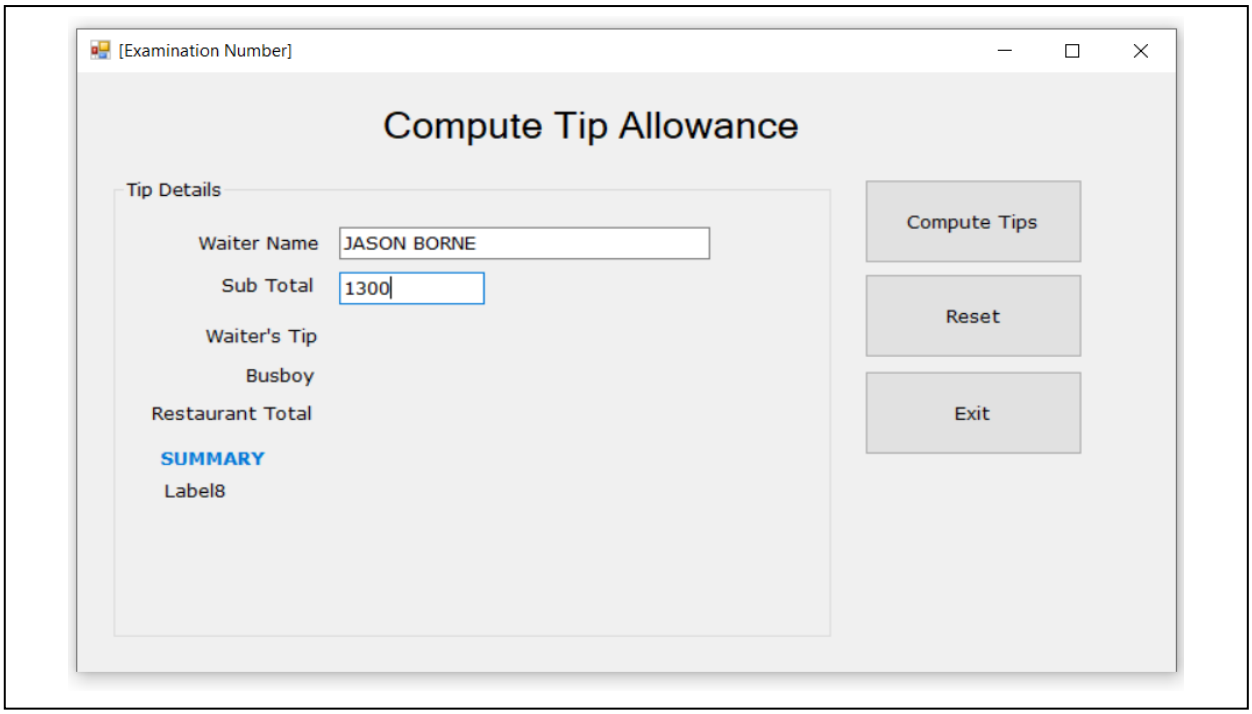


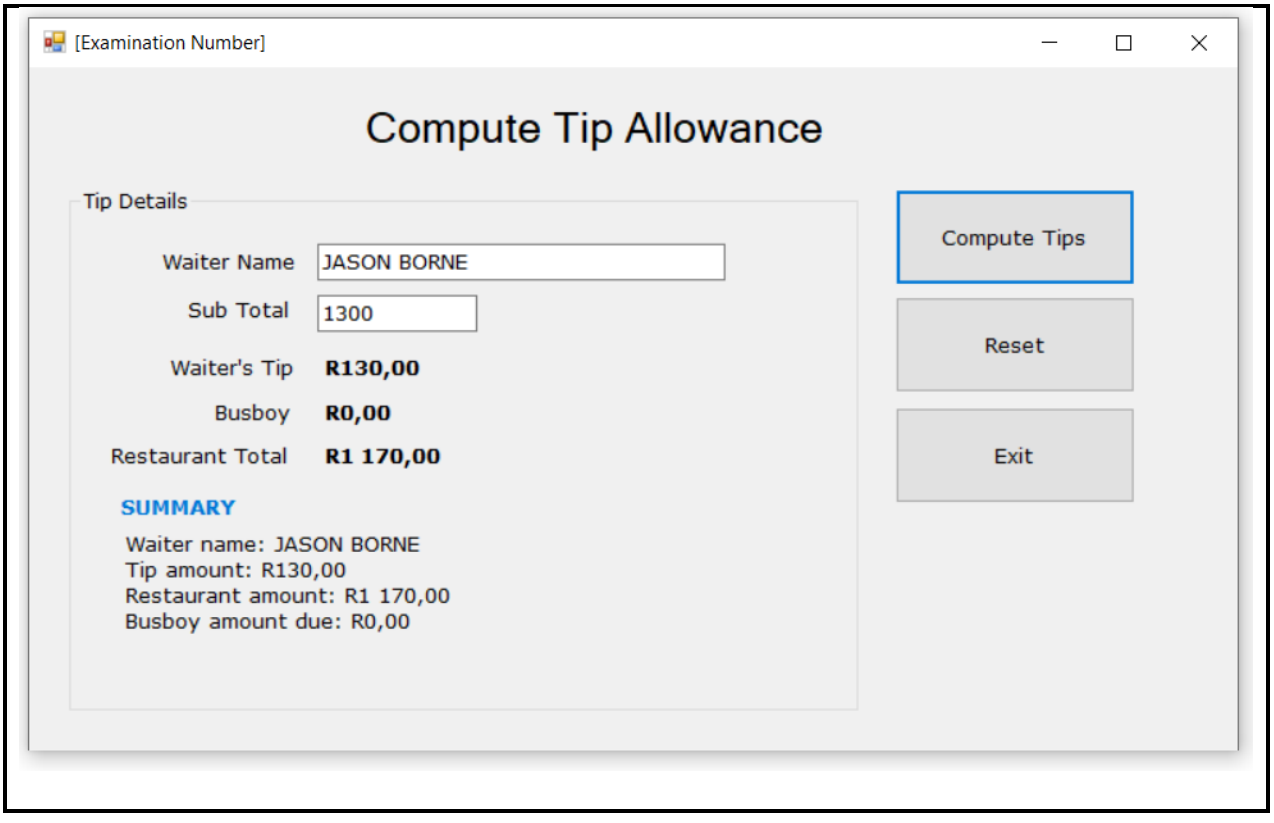
FIGURE 3

The following STEPS explain how to use the program:

STEP 1 Run the program and enter the waiter name and subtotal



STEP 2 Click the *Compute* button to calculate and display the applicable values, including the **summary** as indicated in the screen shot below.



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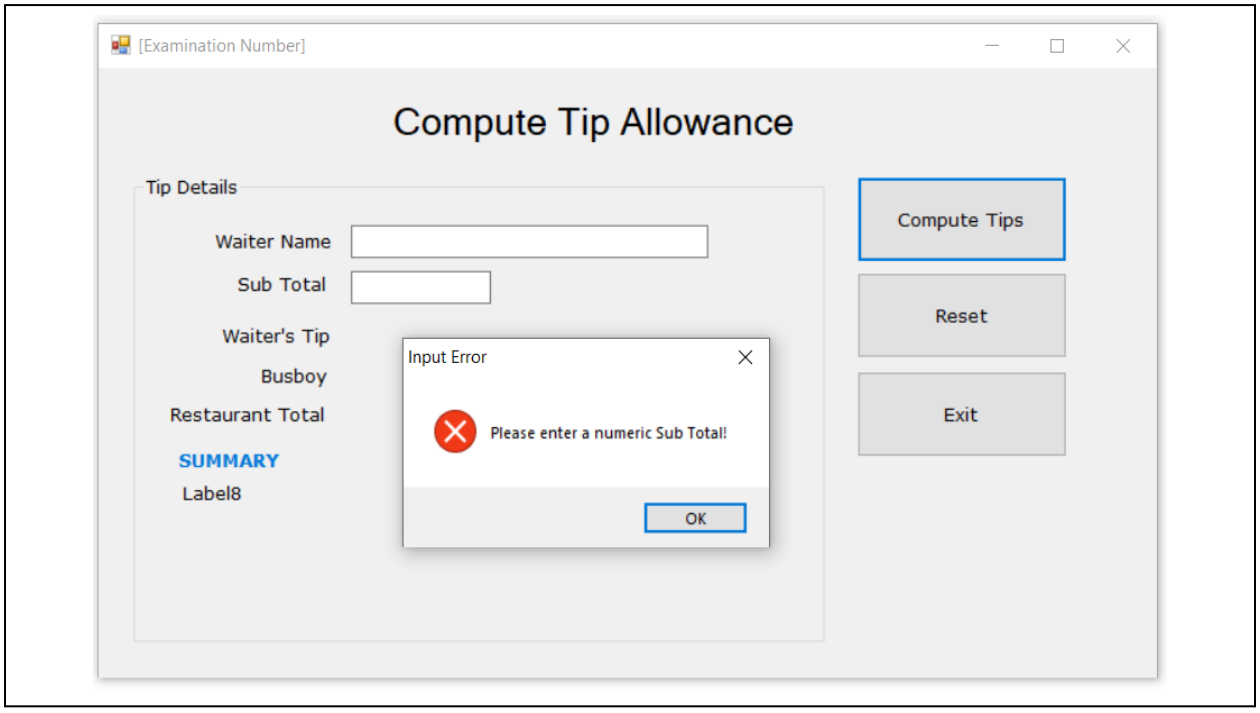
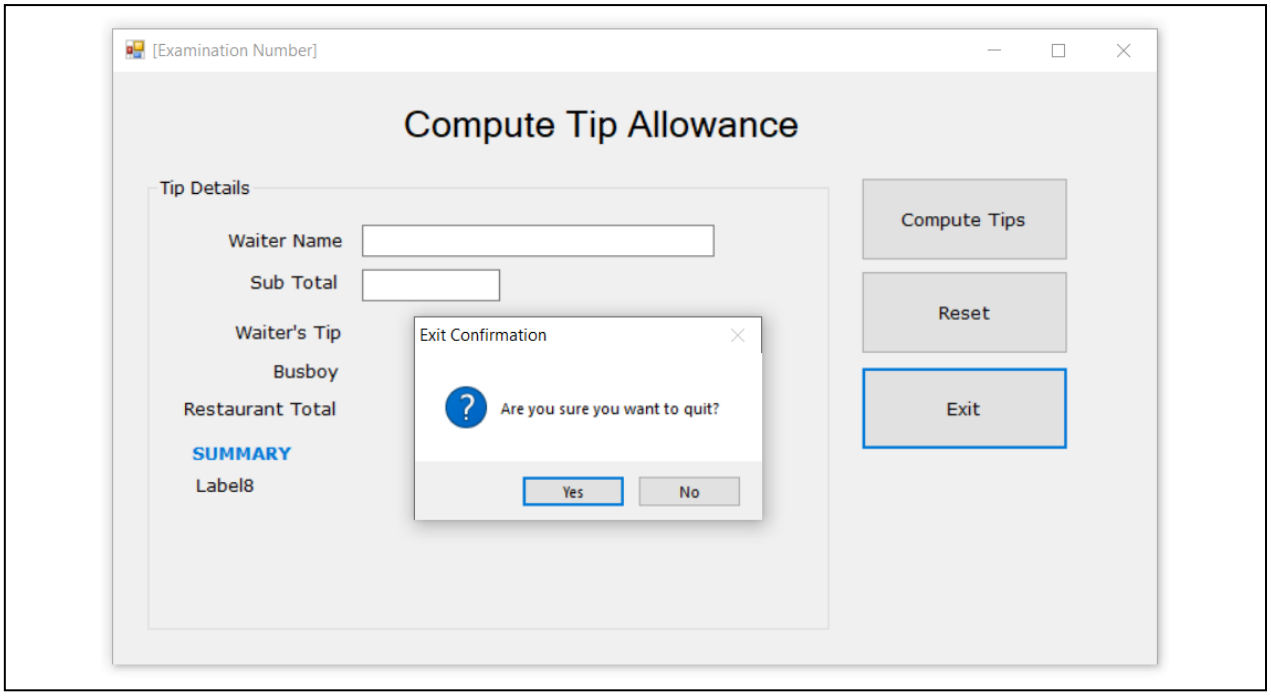
STEP 3: If the user does NOT enter a valid numeric value for the subtotal, the program responds with an appropriate message as shown below.



STEP 4: If the user clicks the EXIT button, the system will confirm the action as shown in the screen shot below.



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The partly completed user interface has been saved on the hard drive in the … \QUESTION3 folder. Open the solution *ComputeTipAmount* and follow the instructions below to complete the program.

NOTE: Do not declare your own variables, use the variables and named controls as indicated in the partly completed solution. Refer to the IPO chart above for the actual values and applicable formulas.

3.1 Add your EXAMINATION NUMBER as a comment to your source code. (1)

3.2 Open the click event of the COMPUTE button and add the following code:

3.2.1 Use a `Try … Catch` statement to determine if the user entered a valid numeric value for the *subtotal.* If not, inform the user as shown in the screenshot above. Before exiting the COMPUTE button event, clear all the input values and set the focus on the subtotal text box control. (7)

3.2.2 Assign the waiter's name to the variable called *waiter.* (1)

3.2.3 Determine whether the *subtotal* value is above or below the R3000 threshold for the tip percentage and then calculate the applicable amounts due i.e., *waiter_tip*, *restaurant* and *busboy* totals. (10)

3.2.4 Assign the calculated values, formatted as currency, to the applicable label controls i.e., assign *waiter_tip* to *lblWaiter*, *restaurant* to lblRestaurant and *busboy* to lblBusboy. (3)

3.2.5 Compose the concatenated message for the summary as indicated in the above screen shots and assign it to the label control called *lblSummary*. (5)

3.3 Open the click event of the reset button and add the code to clear all appropriate controls. Set the focus to the waiter's name text box. (4)

3.4 Open the click event of the exit button and add the code that will allow the user to confirm whether or not they want to quit. (5)

3.5 Change the text in the title bar of the form to your EXAMINATION NUMBER Run your program with the following test data and print a screen shot of the result

Waiter name	Subtotal
MATILDA GATSBY	R3300

(1)

3.6 Print the source code. (1)

[38]

TOTAL: 100

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