education

Department:
Education
PROVINCE OF KWAZULU-NATAL

INFORMATION TECHNOLOGY

PAPER 1

MID YEAR 2018

GRADE 10

MARKS: 120

TIME: 3 HOURS

EXAMINER(S) : P Rampersad (*Northlands Girls' High*)
: C.Andrew (*Danville Park Girls' High*)
MODERATOR : S.Naicker (*Merebank Secondary*)

This question paper consists of 17 pages including this cover page.

INSTRUCTIONS AND INFORMATION:

1 Answer ALL the questions.

2. The duration of this examination is three hours. Because of the nature of this examination it is important to note that you will not be permitted to leave the examination room before the end of the examination session.

3. Make sure that you answer the questions according to the specifications that are given in each question. Marks will only be awarded based on the set requirements.

4. Answer only what is asked in each question.

5. Your programs must be coded in such a way that it will work with any data and not just the sample data supplied or any data extracts that appear in the question paper.

6. Save your work regularly on the disk (CD/flash disk/DVD, et cetera) that you have been given, or on the disk space allocated to you for this examination session.

7. Make sure that your name and surname appears as a comment in the first line of code. Also include the question number as part of the comment.

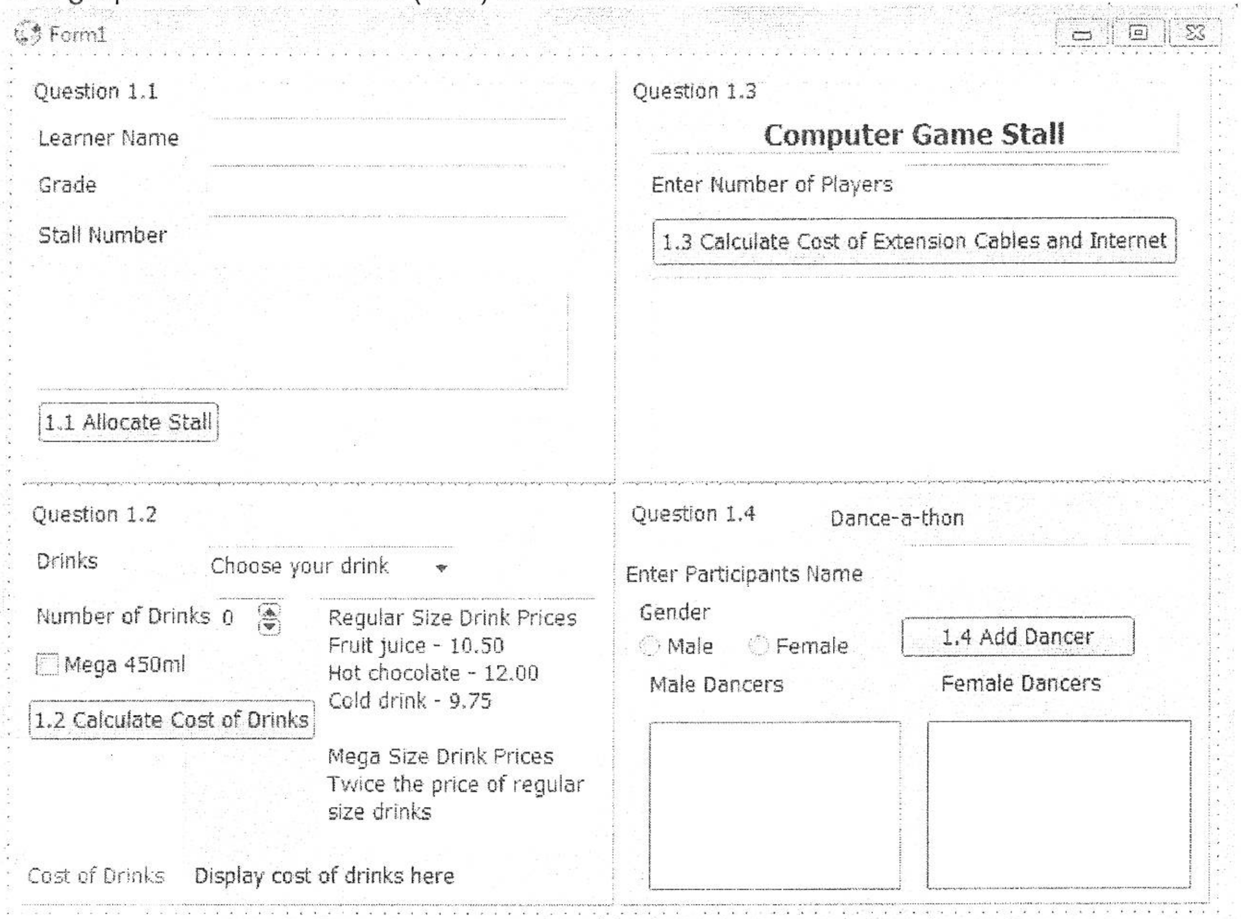
8. Print the programming code of all the programs that you completed. You will be given half an hour printing time after the examination session.

9. At the end of this examination session, you must hand in the disk/CD with all your work saved on it OR you must make sure that all your work has been saved on the disk space allocated to you. Ensure that all files can be read.

10. You have been provided with the Delphi files in the folders Question1, Question2, Question3 and Question4.

QUESTION 1: GENERAL PROGRAMMING SKILLS

Many learners in Grade 9 are eager to study programming. They have asked the Grade 10's to teach them some basic programming skills. After teaching these learners basic skills, you are now required to create an exercise that may be used to test their skills. They are required to complete the following program.
The program is based on a Market Day organised by the school to raise funds. Individuals or class groups may hire a stall to sell items or provide services or play games
Compile and execute the program found in the **Question1** folder. The user interface displays FOUR different sections named Question 1.1 to Question 1.4.
The program has no functionality currently.
The graphical user interface (GUI) is as follows:



Complete the code for each section of QUESTION 1, as described in QUESTION 1.1 to QUESTION 1.4.

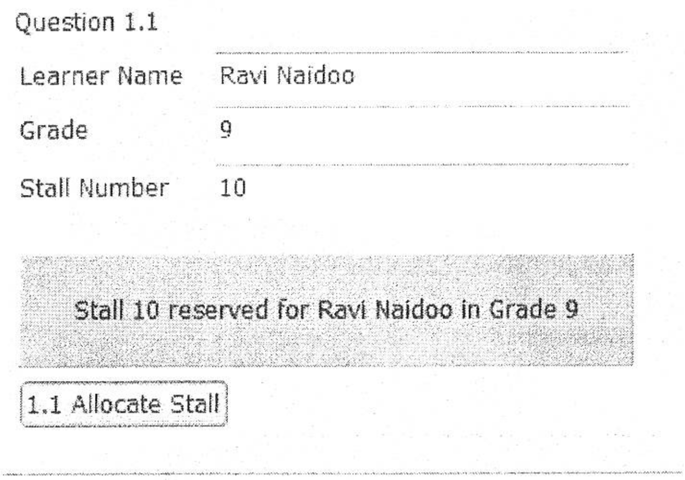
1.1 **Button [1.1 Allocate Stall]**

Write code to use the information entered in the **Learner Name**, **Grade** and **Stall Number** edit boxes to produce a message that a stall has been reserved. Use appropriate variables with meaningful names to store the data extracted from the edit boxes. The message must be created in the following format:

Stall <Stall Number> reserved for <Learner Name> in <Grade>

The message must be displayed in the panel component ***pnlRegistered***.
Change the colour of ***pnlRegistered*** to ***clAqua***. (9)

A sample of the output for Ravi Naidoo in Grade 9 who has booked stall number 10 is:



Question 1.1

Learner Name Ravi Naidoo

Grade 9

Stall Number 10

Stall 10 reserved for Ravi Naidoo in Grade 9

1.2 **Button [1.2 Calculate Cost of Drinks]**
A stall which sells soft drinks requires buyers to select drinks from the combo box ***cmbDrinks***.
The prices of the drinks are displayed in the memo component ***memDrinkPrices***.

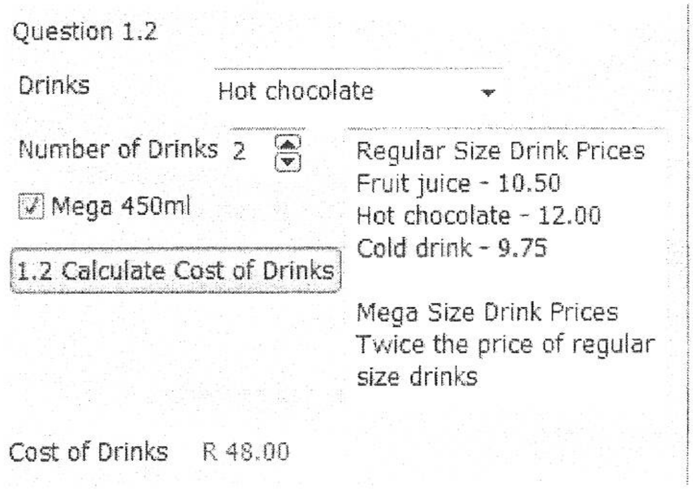
- Fruit juice – R10..50
- Hot Chocolate – R12.00
- Cold drink – R9.75

The user is required to select:

- one of the drinks from the combo box ***cmbDrinks*** and
- to select the number to be ordered from the spin edit box ***sedNumberDrinks***.
- The user also has a choice of selecting the Mega 450 ml option by using the check box component ***chkDrinkSize***.
  If component ***chkDrinkSize*** is selected then the cost is doubled.

Write code to calculate the amount to be paid based on the selected information. Display the calculated amount in the label component ***lblDisplayDrinkCost*** and format the output to currency with TWO decimal places and in red text. (7)

Example of output if 2 Hot Chocolate Mega drinks are selected:



Question 1.2

Drinks Hot chocolate

Number of Drinks 2

☑ Mega 450ml

Regular Size Drink Prices
Fruit juice - 10.50
Hot chocolate - 12.00
Cold drink - 9.75

Mega Size Drink Prices
Twice the price of regular size drinks

Cost of Drinks R 48.00

1.3 **Button [1.3 Calculate cost of Extension Cables and Internet]**

A school hall is setup to play computer games.

Each player is required to bring their own computer equipment.

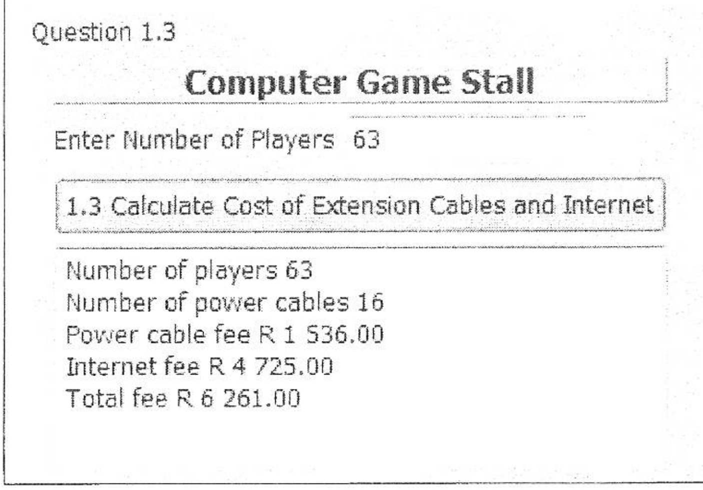
Specially designed extension power cables with multi-adaptors will be provided for a fee of R96. Each of these power cables can be used by four players.

Each player will also be required to pay a fee of R75 to make use of the Internet.

Write code using appropriate variables to:

- Extract the number of players from the edit box ***edtNumberPlayers*** and store the value in an appropriate variable
- Calculate the number of power cables that will be needed and store in an appropriate variable.
  Note that a maximum of FOUR players may use a power cable.
- Calculate the total fee for the required number of cables and store in an appropriate variable.
- Calculate the total fee for use of the Internet and store in an appropriate variable
- Display the calculated values in the memo component ***memQ1_3Display*** as shown in the sample output below. (17)

Example of output if the number of players entered is 63:



Question 1.3

Computer Game Stall

Enter Number of Players 63

```
Number of players 63
Number of power cables 16
Power cable fee R 1 536.00
Internet fee R 4 725.00
Total fee R 6 261.00
```

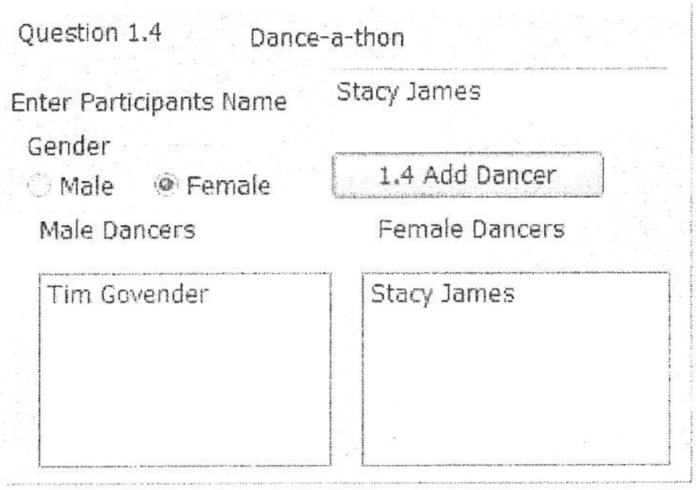
1.4 **Button [1.4 Add Dancer]**

A stall holds a dance-a-thon to see how long partners can stay on their feet. Family and friends pledge support for their teams to encourage their success. The program helps to compile a list of male and female dance participants

Write code to:

- Extract the name of the participant and store in a suitable variable declared locally
- Determine if the participant is male or female from the component ***rgpGender***
- Add the name to the appropriate list box ***lstMales*** or ***lstFemales***. (6)

A sample output of male participant Tim Govender and female participant Stacy James is:



Question 1.4 Dance-a-thon

Enter Participants Name Stacy James

Gender

○ Male ● Female

Male Dancers: Tim Govender

Female Dancers: Stacy James

1.5 Write code for an ***OnActivate*** event for ***frmMain*** that does the following:

- Change the caption of the form ***frmMain*** to 'Market Day'
- Change the colour of the form ***frmMain*** to yellow.
- Change the colour of the edit components: ***edtName***, ***edtGrade*** and ***edtStallNumber*** to Aqua
- Change the width of ***lblMales*** and ***lblFemales*** to 145
- Change the font size of ***lblMales*** and ***lblFemales*** to14

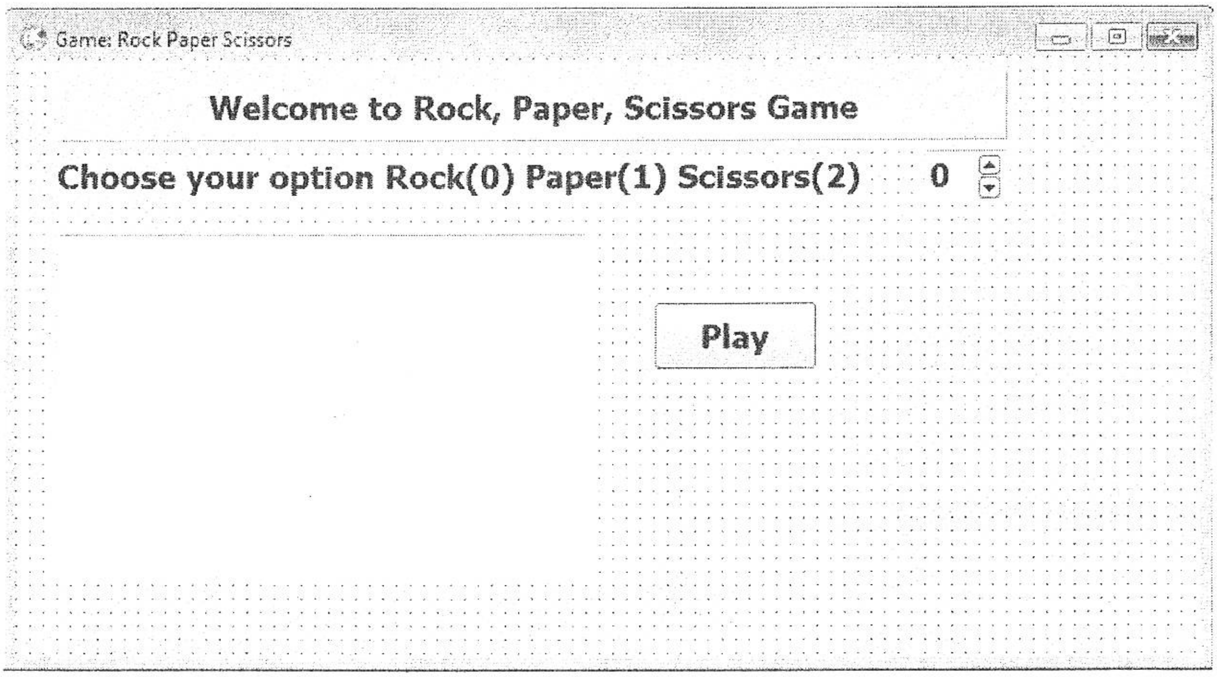
(5)

[51]

QUESTION 2

Write a program that lets a user play "Rock, Paper, Scissors" against the computer. The program should ask the user to choose one of the three choices, and then the computer randomly picks one (without knowing what the user has chosen).
For this problem, the user should be asked to select an integer: 0 for rock, 1 for paper, or 2 for scissors.
Rock beats scissors, scissors beats paper, paper beats rock.
You are required to complete the program found in the **Question2** folder according to the direction given in 2.1.1 to 2.1.9.
The form in the program contains the following GUI components and those components listed are to be used to write required code as described in this question:

- ***sedChoice***
- ***btnPlay***
- ***memDisplay***


Game: Rock Paper Scissors
Welcome to Rock, Paper, Scissors Game
Choose your option Rock(0) Paper(1) Scissors(2)
0
Play

2.1 Write code in the ***onClick*** event handler for ***btnPlay*** to do the following:

2.1.1 Declare all the necessary variables to store the:

- user's choice extracted from ***sedChoice*** provided
- computer's choice stored as an integer
- user's choice stored as a string
- computer's choice stored as a string
- result stored as a string

(2)

2.1.2 Extract the user's choice in ***sedChoice*** and assign the value to the appropriate variable. (1)

2.1.3 Write code to do the following:

- if 0 is selected in ***sedChoice*** then assign the value 'Rock' to your user's choice string variable
- if 1 is selected in ***sedChoice*** then assign the value 'Paper' to your user's choice string variable
- if 2 is selected in ***sedChoice*** then assign the value 'Scissors' to your user's choice string variable (3)

2.1.4 Write code for the computer to generate a random integer in the range 0 to 2 and assign the value to the appropriate variable.

Include in the event handler a procedure that ensures that the random function will generate a different random number every time event handler for ***btnPlay*** is run. (3)

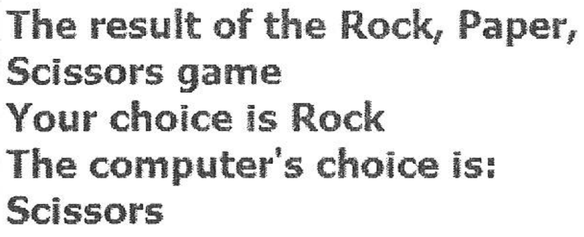
2.1.5 Write code to do the following:

- if the random number generated is 0 then assign the value 'Rock' to your computer's choice string variable
- if the random number generated is 1 then assign the value 'Paper' to your computer's choice string variable
- if the random number generated is 2 then assign the value 'Scissors' to your computer's choice string variable (3)

2.1.6 Write code to display the following output in ***memDisplay*** as shown in the sample output:

- 'The result of the Rock, Paper, Scissors game'
- 'Your choice is ' <followed by the users choice>
- 'The computer's choice is: ' <followed by the computers choice> (3)

Sample Output:

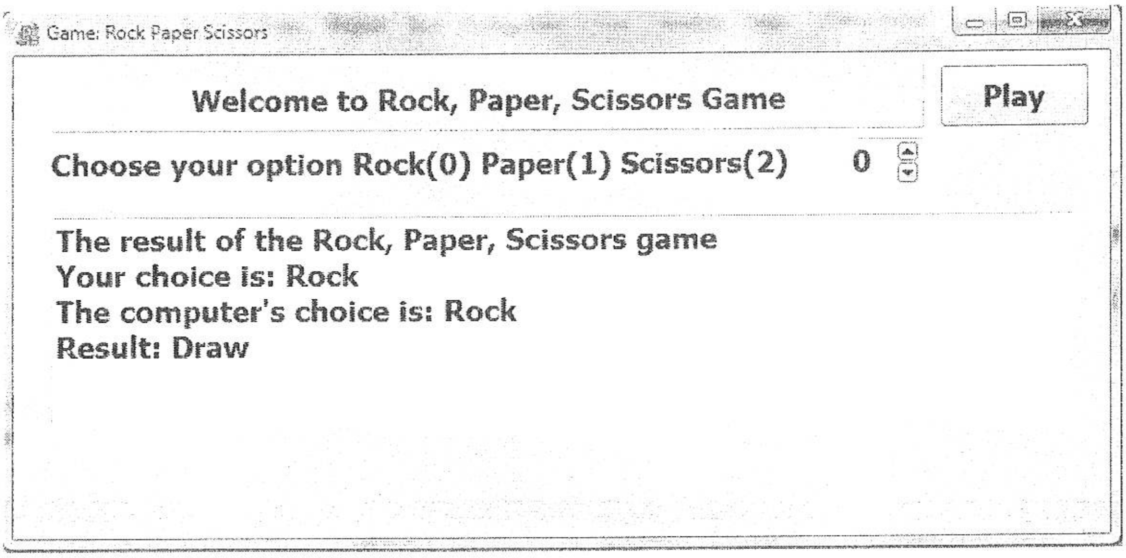


```
The result of the Rock, Paper,
Scissors game
Your choice is Rock
The computer's choice is:
Scissors
```

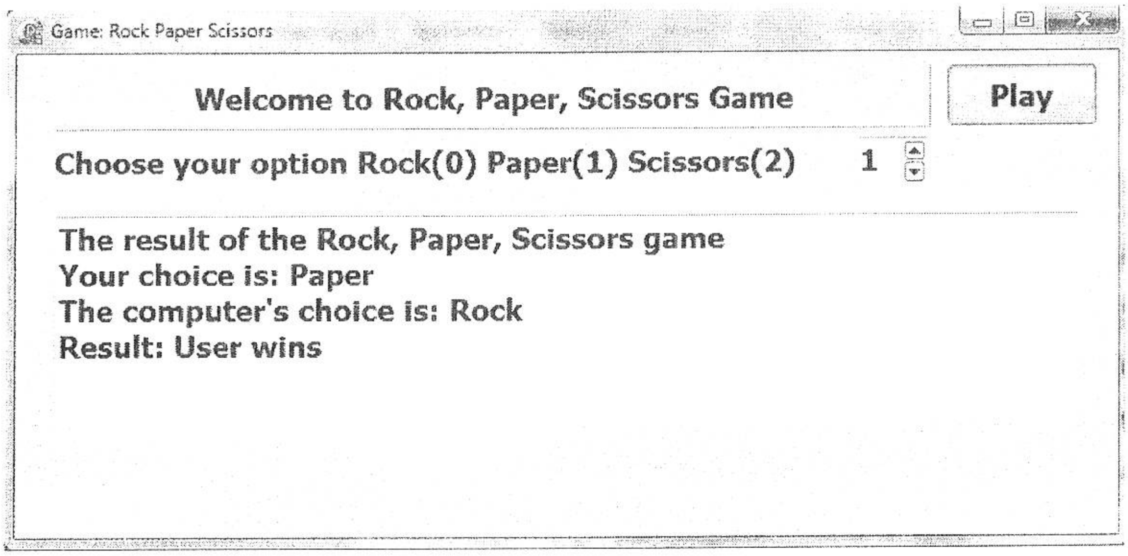
2.1.7 Write code to determine the winner of the game.
The following algorithm may be used to determine the result:

- If the user's choice is the same as the computer's choice then the result is: draw
- If the user's choice is "rock"(0) and the computer's choice is "paper"(1), then the result is: computer wins (paper beats rock)
- If the user's choice is "rock"(0) and the computer's choice is "scissors"(2), then the result is: user wins (rock beats scissors)
- If the user's choice is "paper"(1) and the computer's choice is "rock"(0), then the result is: user wins (paper beats rock)
- If the user's choice is "paper"(1) and the computer's choice is "scissors"(2), then the result is: computer wins (scissors beats paper)
- If the user's choice is "scissors"(2) and the computer's choice is "paper"(1), then the result is: user wins (scissors beats paper)
- If the user's choice is "scissors"(2) and the computer's choice is "rock"(0), then the result is: computer wins (rock beats scissors)
- Assign the result ('user wins' or 'computer wins' to the appropriate variable (7)

2.1.8 Write code to display the result of the game in ***memDisplay*** as shown in the sample output below: (1)


Game: Rock Paper Scissors
Welcome to Rock, Paper, Scissors Game
Play
Choose your option Rock(0) Paper(1) Scissors(2)
0

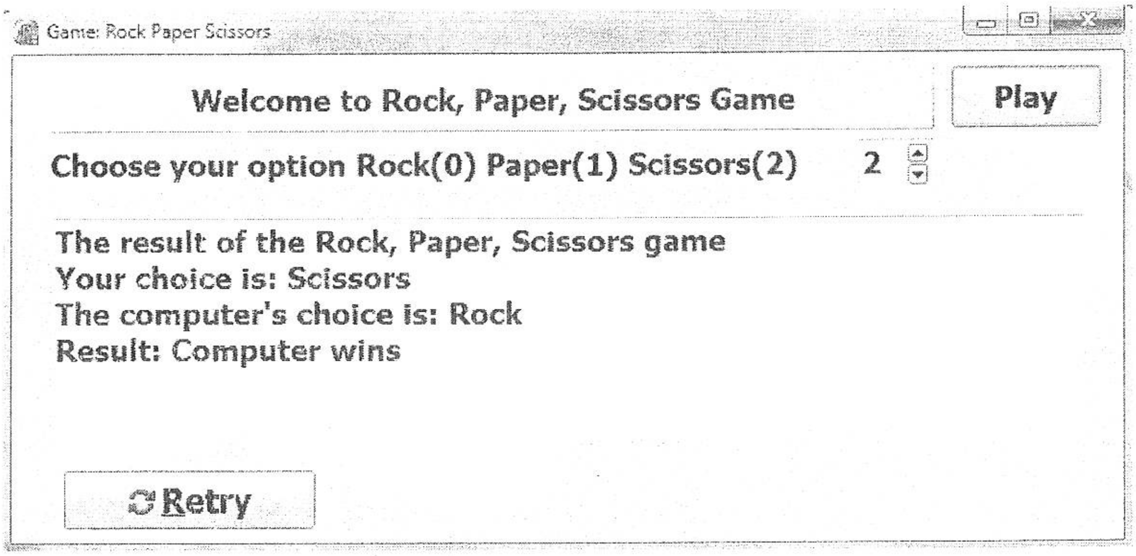
```
The result of the Rock, Paper, Scissors game
Your choice is: Rock
The computer's choice is: Rock
Result: Draw
```



Welcome to Rock, Paper, Scissors Game

Choose your option Rock(0) Paper(1) Scissors(2) 1

```
The result of the Rock, Paper, Scissors game
Your choice is: Paper
The computer's choice is: Rock
Result: User wins
```



Welcome to Rock, Paper, Scissors Game

Choose your option Rock(0) Paper(1) Scissors(2) 2

```
The result of the Rock, Paper, Scissors game
Your choice is: Scissors
The computer's choice is: Rock
Result: Computer wins
```

2.1.9 Code an OnClick event handler for ***bmbRetry*** to clear ***memDisplay*** and set the focus in ***sedChoice***. (1)

[24]

QUESTION 3

A computer stall sells computer related accessories. A program is required to help when customers make purchases.

- When making purchases the code of the item and the price must be entered.
- The total price of items purchased must be calculated each time a new item is entered. Therefore a global variable ***rTotal*** is provided.
- Your program must allow for discounts on purchases exceeding given totals.
- Your program must also determine the change to be given to customers when payment is made.

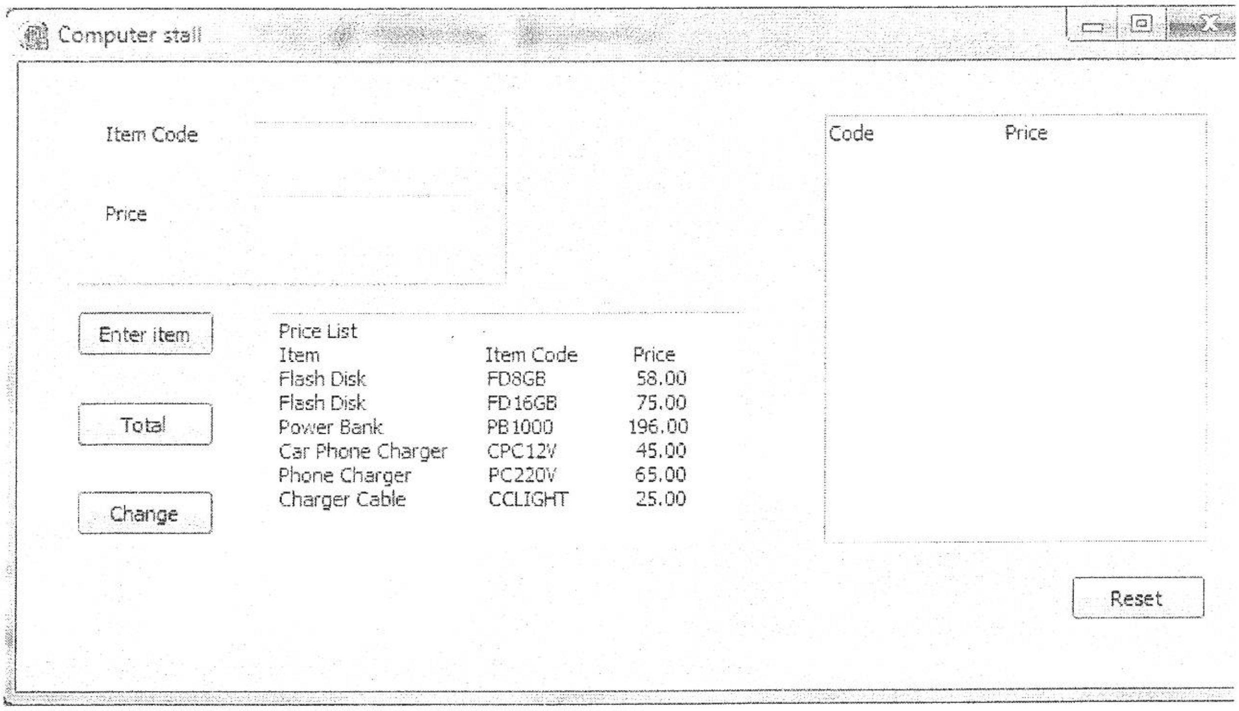
You are required to complete the program found in the **Question3** folder according to the direction given below:.

Code for the ***onActivate*** event for the form is provided. The code is used to display data in two columns in the richedit component. Make use of this when displaying data in the richedit ***redOutput***.

Make use of local variables as required.

Write code for this program as directed in questions 3.1 to 3.4.

The interface for the program with limited functionality is as follows:



Price List

Item	Item Code	Price
Flash Disk	FD8GB	58.00
Flash Disk	FD16GB	75.00
Power Bank	PB1000	196.00
Car Phone Charger	CPC12V	45.00
Phone Charger	PC220V	65.00
Charger Cable	CCLIGHT	25.00

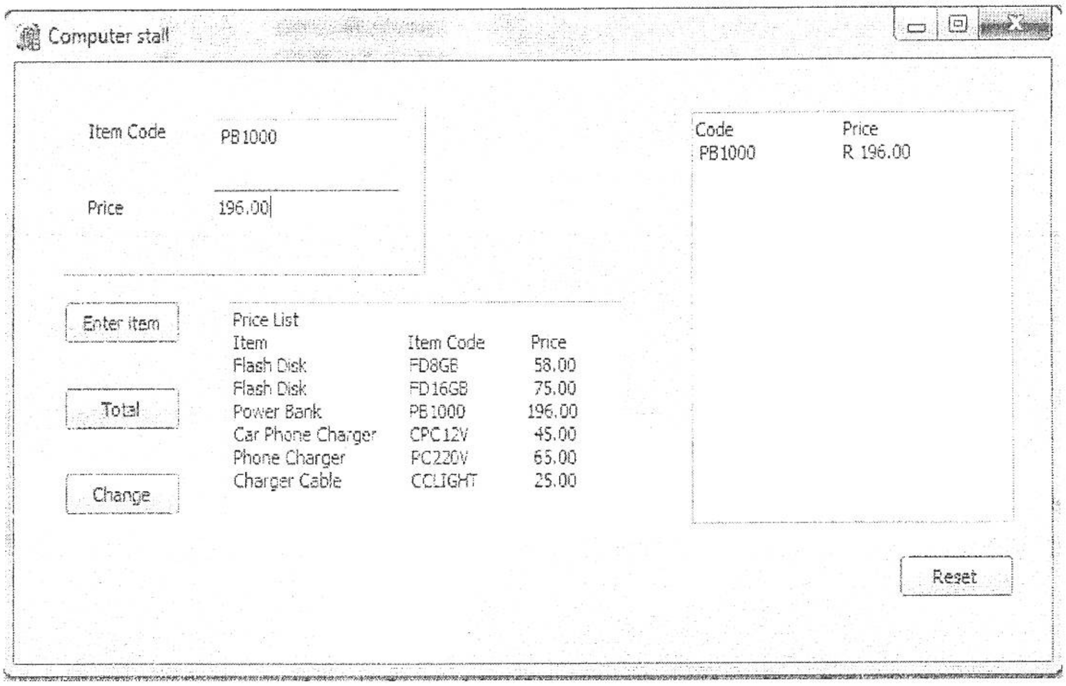
3.1 Write code in the ***onClick*** event handler for ***btnEnter*** to do the following:

3.1.1
- Declare all the necessary variables to store the:
  - Item code extracted from ***edtCode***
  - Price extracted from ***edtPrice***
- Extract the value from ***edtPrice*** and add to the variable ***rTotal***

Display the item code and price of this item in the Rich edit component ***redOutput***.

Display the price formatted as currency to 2 decimal places. (5)

A sample output is as follows:



Item Code PB1000

Price 196.00

```
Price List
Item                Item Code   Price
Flash Disk          FD8GB        58.00
Flash Disk          FD16GB       75.00
Power Bank          PB1000      196.00
Car Phone Charger   CPC12V       45.00
Phone Charger       PC220V       65.00
Charger Cable       CCLIGHT      25.00
```

```
Code        Price
PB1000      R 196.00
```

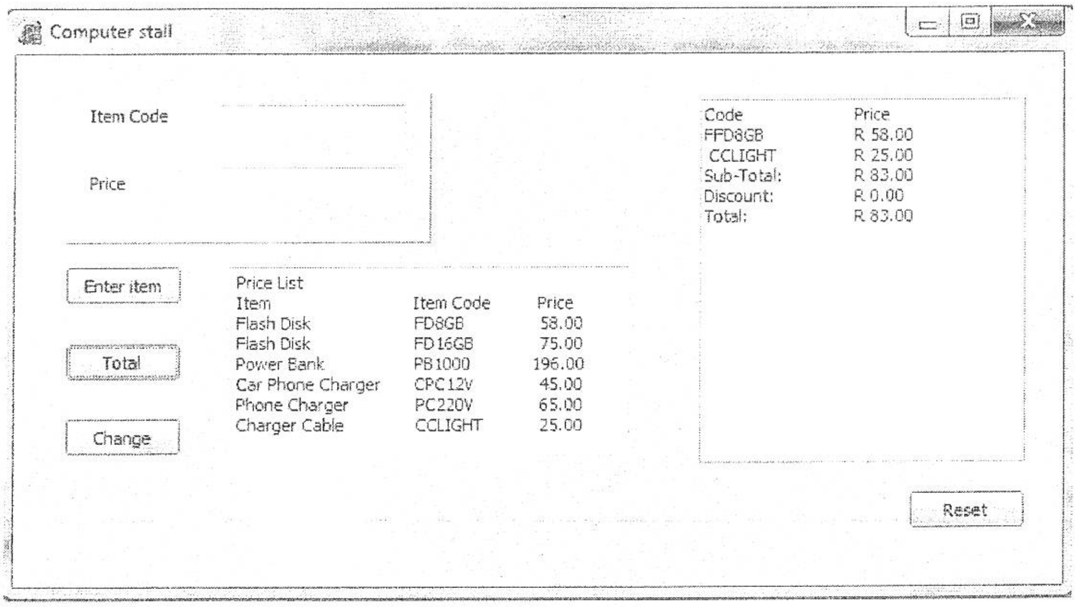
3.1.2
- Write code to clear the edit ***edtCode***
- Write code to clear the edit ***edtPrice***
- Write code to set the focus in the component ***edtCode***

(3)

3.2 A discount is awarded to customers based on the total amount spent. If the customer spends:
>=R150 and <R300, the discount is 5%
>= R300, the discount is 10%

3.2.1 Write code in the ***onClick*** event handler for ***btnTotal*** to do the following
- Declare a variable to store the discount
- Calculate the discount awarded to the customer
- Calculate the new total considering the discount
- Display the sales details as shown in the following sample output. All money values are to be formatted as currency to 2 decimal places (10)

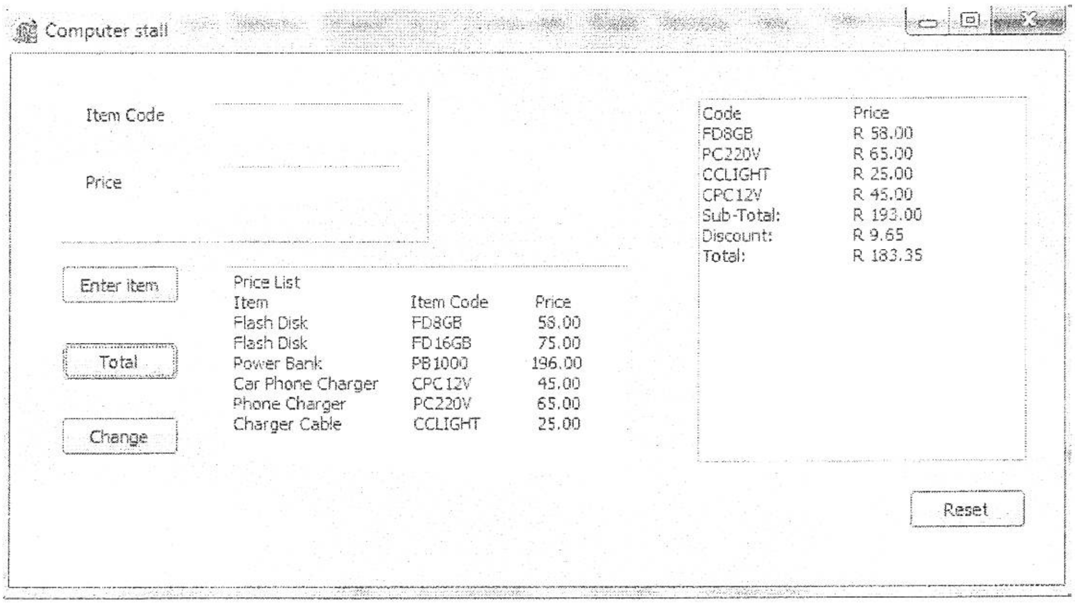
Sample output when the total amount of purchases is < R150:



```
Price List
Item                 Item Code    Price
Flash Disk           FD8GB         58.00
Flash Disk           FD16GB        75.00
Power Bank           PB1000       196.00
Car Phone Charger    CPC12V        45.00
Phone Charger        PC220V        65.00
Charger Cable        CCLIGHT       25.00
```

```
Code            Price
FFD8GB          R 58.00
 CCLIGHT        R 25.00
Sub-Total:      R 83.00
Discount:       R 0.00
Total:          R 83.00
```

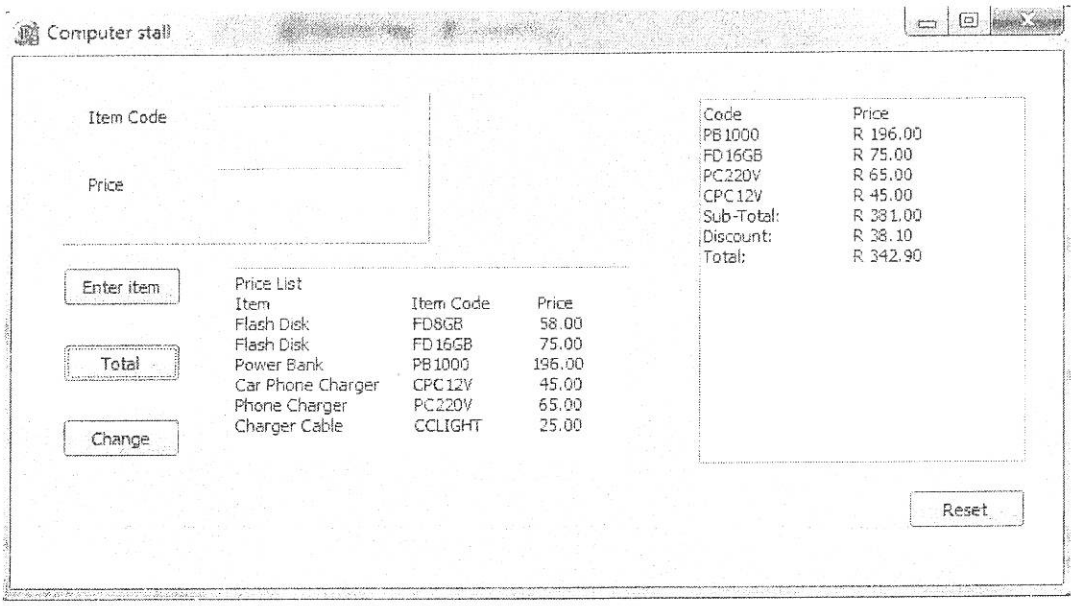
Sample output when the total amount of purchases is >=R150 and <=R300



```
Price List
Item                 Item Code    Price
Flash Disk           FD8GB         58.00
Flash Disk           FD16GB        75.00
Power Bank           PB1000       196.00
Car Phone Charger    CPC12V        45.00
Phone Charger        PC220V        65.00
Charger Cable        CCLIGHT       25.00
```

```
Code            Price
FD8GB           R 58.00
PC220V          R 65.00
CCLIGHT         R 25.00
CPC12V          R 45.00
Sub-Total:      R 193.00
Discount:       R 9.65
Total:          R 183.35
```

Sample output when the total amount of purchases is >R300



Price List

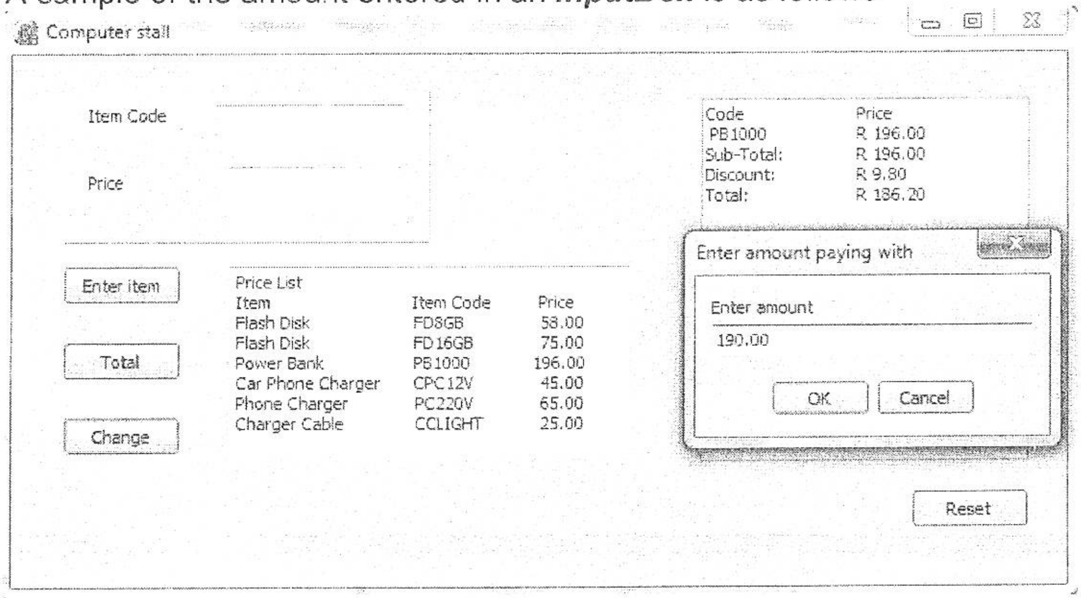
Item	Item Code	Price
Flash Disk	FD8GB	58.00
Flash Disk	FD16GB	75.00
Power Bank	PB1000	196.00
Car Phone Charger	CPC12V	45.00
Phone Charger	PC220V	65.00
Charger Cable	CCLIGHT	25.00

Code	Price
PB1000	R 196.00
FD16GB	R 75.00
PC220V	R 65.00
CPC12V	R 45.00
Sub-Total:	R 381.00
Discount:	R 38.10
Total:	R 342.90

3.3 Use the following instructions to write code in the ***onClick*** event handler for ***btnChange*** to determine the change to be given the customer after payment is made for goods purchased:

3.3.1
- Declare all the necessary variables to store the:
  - The amount paid
  - The change due to the user
- Use an ***InputBox*** to prompt the user to enter the amount tendered to pay for items purchased.: (4)

A sample of the amount entered in an ***InputBox*** is as follows



190.00

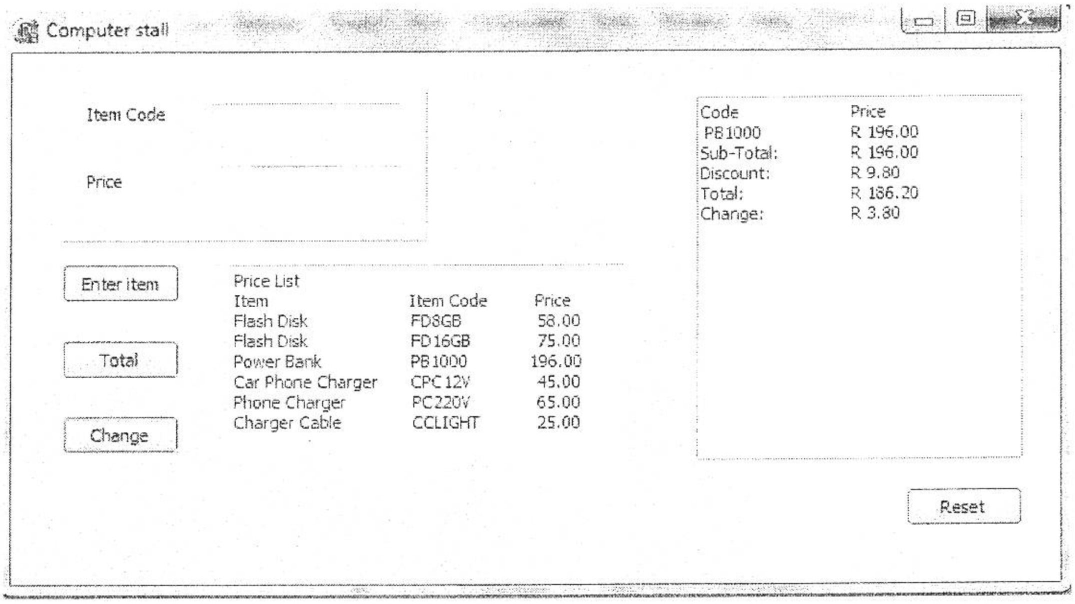
Code	Price
PB1000	R 196.00
Sub-Total:	R 196.00
Discount:	R 9.80
Total:	R 186.20

Price List

Item	Item Code	Price
Flash Disk	FD8GB	58.00
Flash Disk	FD16GB	75.00
Power Bank	PB1000	196.00
Car Phone Charger	CPC12V	45.00
Phone Charger	PC220V	65.00
Charger Cable	CCLIGHT	25.00

3.3.2 Calculate the change that is due to the user and display this amount in ***redOutput*** formatted as currency to 2 decimal places. (2)

A sample of the output is as follows:



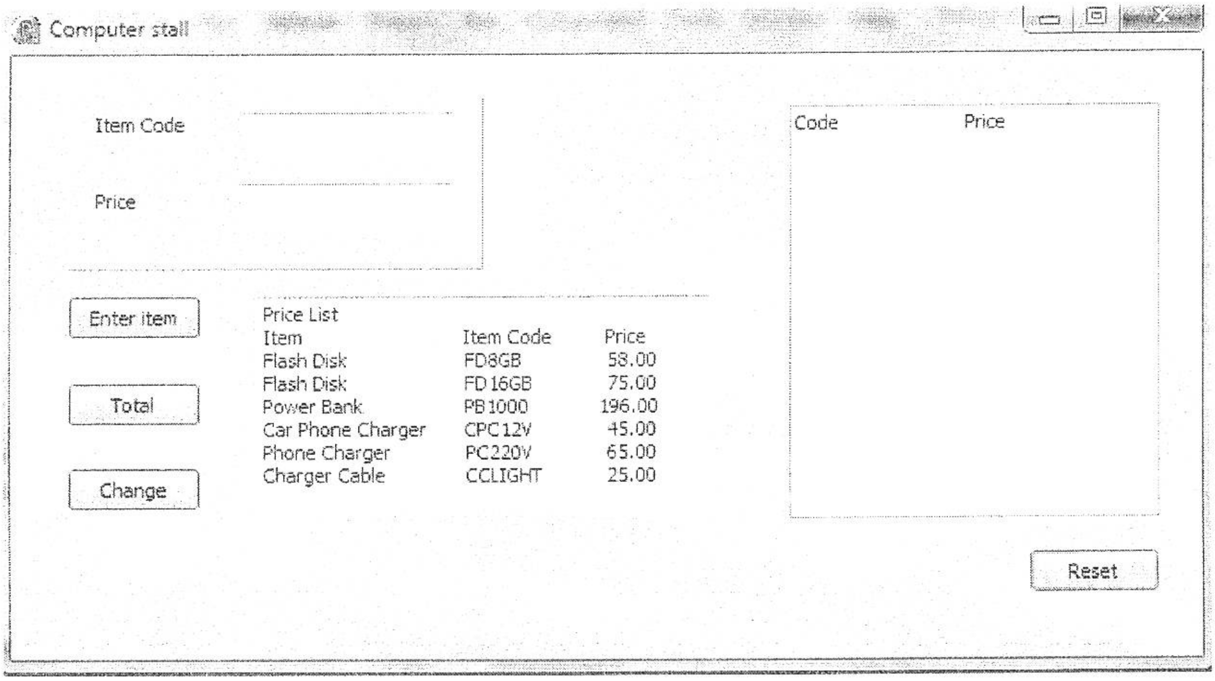
```
Price List
Item                Item Code   Price
Flash Disk          FD8GB        58.00
Flash Disk          FD16GB       75.00
Power Bank          PB1000      196.00
Car Phone Charger   CPC12V       45.00
Phone Charger       PC220V       65.00
Charger Cable       CCLIGHT      25.00
```

```
Code          Price
PB1000        R 196.00
Sub-Total:    R 196.00
Discount:     R 9.80
Total:        R 186.20
Change:       R 3.80
```

3.4 Write code on the ***onClick*** event of the button ***btnReset***, to do the following:

- Clear the richedit ***redOutput***, component,
- Set the variable ***rTotal*** to 0
- Display the headings “Code” and “Price” at the top of ***redOutput*** (3)

A sample of the output is as follows:



```
Price List
Item                Item Code   Price
Flash Disk          FD8GB        58.00
Flash Disk          FD16GB       75.00
Power Bank          PB1000      196.00
Car Phone Charger   CPC12V       45.00
Phone Charger       PC220V       65.00
Charger Cable       CCLIGHT      25.00
```

```
Code          Price
```

[27]

QUESTION 4

A Delphi programming contest requires learners to write programs based on given pseudocode. A maths teacher has written the following pseudocode and contestants are required to write code based on the given pseudocode

```
TASK: Determine if an integer is a prime number
BEGIN
Counter = 0
Ask 'What is the integer number?'
Get Number
For Index = 1 to Number do
        BEGIN
          if Number divisible  by Index then
          increase Counter by 1
        END

If Counter = 2 then
        Display  'Number is prime'
 otherwise
        Display 'Number is not prime'


If Number divisible by 2 then
        Display 'The number is even'
Otherwise
        Display 'The number is odd'
END
```

4.1 The program found in the **Question4** folder has no functionality. You are required to complete the program according to the direction given below:. Make use of local variables as required.

4.2 Write code in the ***onClick*** event handler for ***btnCheck*** based on the pseudocode provided. You will be required to:

- Declare appropriate variables for counter, number and index
- Retrieving the number entered in the edit ***edtNum*** and storing it in the appropriate variable declared.
- Use the pseudocode to write Delphi code to determine if the number entered is prime or not
- Display the appropriate message in the component ***memOutput***
- Use the pseudocode to write Delphi code to determine if the number entered is odd or even
- Display the appropriate message in the component ***memOutput***

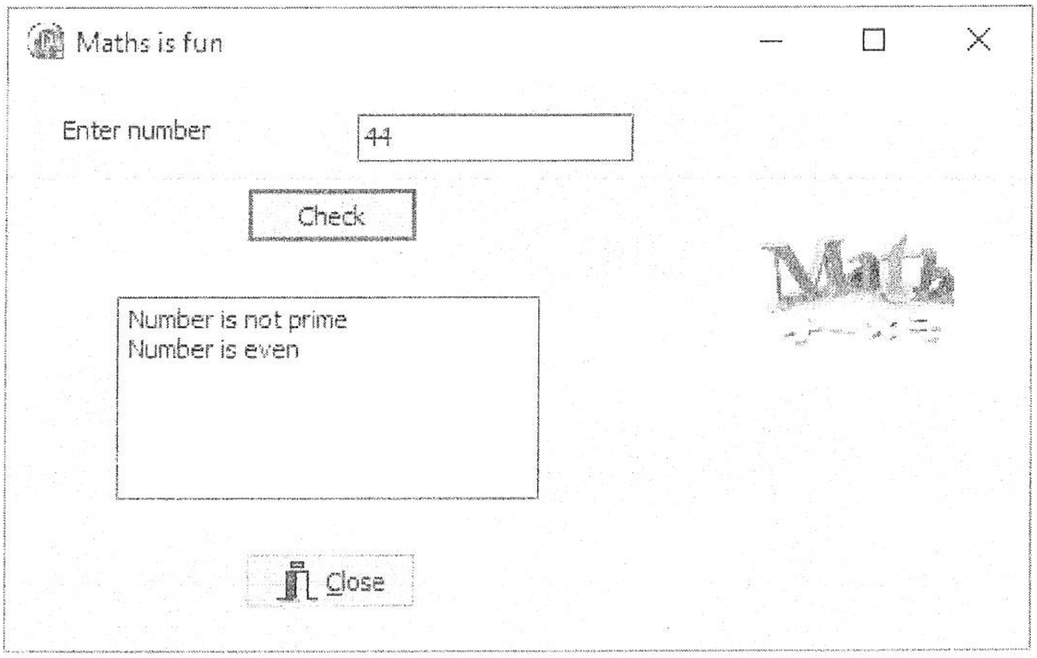
(13)

4.3 The image in the interface provided is hidden. Write code in the ***onActivate*** event of the form to do the following:

- Make the image visible
- Ensure that the image is proportional
- Set the Stretch property of the image to true (3)

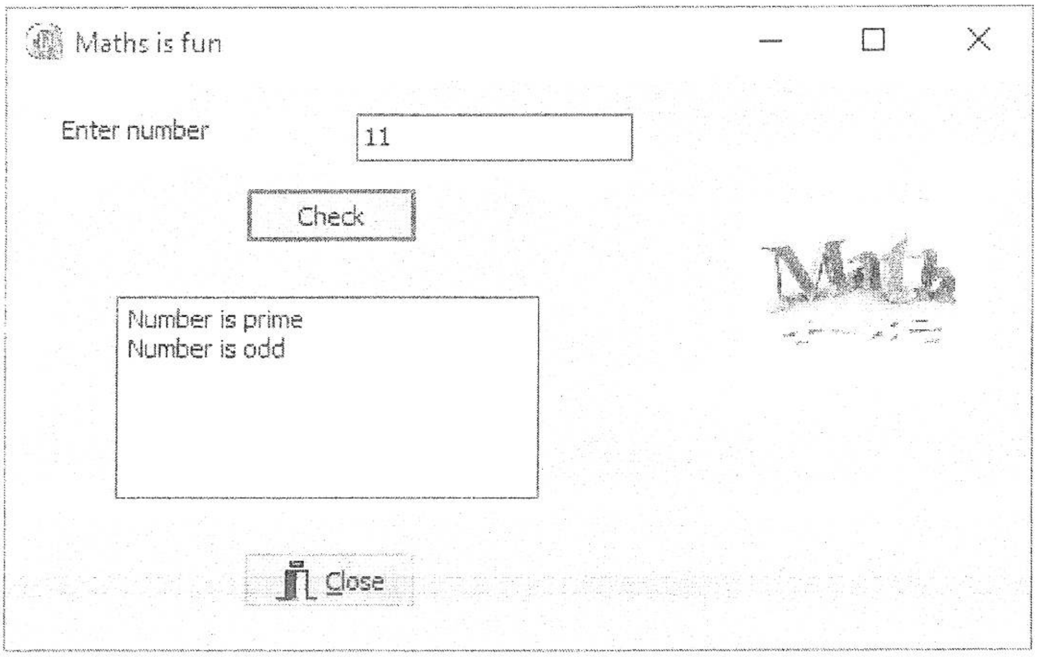
4.4 Insert a Close ***BitButton*** on the form. (1)

Sample outputs:



44

Number is not prime
Number is even



11

Number is prime
Number is odd

[17]

TOTAL MARKS : 120