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# **basic education**

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**INFORMATION TECHNOLOGY P1**

**2019**

**MARKS: 150**

**TIME: 3 hours**

**This question paper consists of 21 pages and 2 data pages.**

**INSTRUCTIONS AND INFORMATION**

1. This question paper is divided into FOUR sections. Candidates must answer ALL the questions in all FOUR sections.
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. This question paper is set with programming terms that are specific to the Delphi programming language.
4. Make sure that you answer the questions according to the specifications that are given in each question. Marks will be awarded according to the set requirements.
5. Answer only what is asked in each question. For example, if the question does not ask for data validation, then no marks will be awarded for data validation.
6. Your programs must be coded in such a way that they will work with any data and not just the sample data supplied or any data extracts that appear in the question paper.
7. Routines, such as search, sort and selection, must be developed from first principles. You may NOT use the built-in features of Delphi for any of these routines.
8. All data structures must be defined by you, the programmer, unless the data structures are supplied.
9. You must save your work regularly on the disk/CD/DVD/flash disk you have been given, or on the disk space allocated to you for this examination session.
10. Make sure that your examination number appears as a comment in every program that you code, as well as on every event indicated.
11. If required, print the programming code of all the programs/classes that you completed. You will be given half an hour printing time after the examination session.
12. At the end of this examination session you must hand in a disk/CD/DVD/flash disk 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 for this examination session. Ensure that all files can be read.

13. The files that you need to complete this question paper have been given to you on the disk/CD/DVD/flash disk or on the disk space allocated to you. The files are provided in the form of password-protected executable files.

**NOTE:** Candidates must use the file **DataENGJun2019.exe**.

Do the following:

- Double click on the password-protected executable file.
- Click on the 'Extract' button.
- Enter the following password: **Plant2BGreen!**

Once extracted, the following list of files will be available in the folder **DataENGJun2019**:

### **SUPPLIED FILES**

#### **Question 1:**

Question1\_P.dpr  
Question1\_P.dproj  
Question1\_P.res  
Question1\_U.dfm  
Question1\_U.pas

#### **Question 2:**

ConnectDB\_U.dcu  
ConnectDB\_U.pas  
NurseryDB.mdb  
NurseryDB\_Backup.mdb  
Question2\_P.dpr  
Question2\_P.dproj  
Question2\_P.res  
Question2\_U.dfm  
Question2\_U.pas

#### **Question 3:**

Logbook.txt  
Question3\_P.dpr  
Question3\_P.dproj  
Question3\_P.res  
Question3\_U.dfm  
Question3\_U.pas  
star.png  
Trainee\_U.pas

#### **Question 4:**

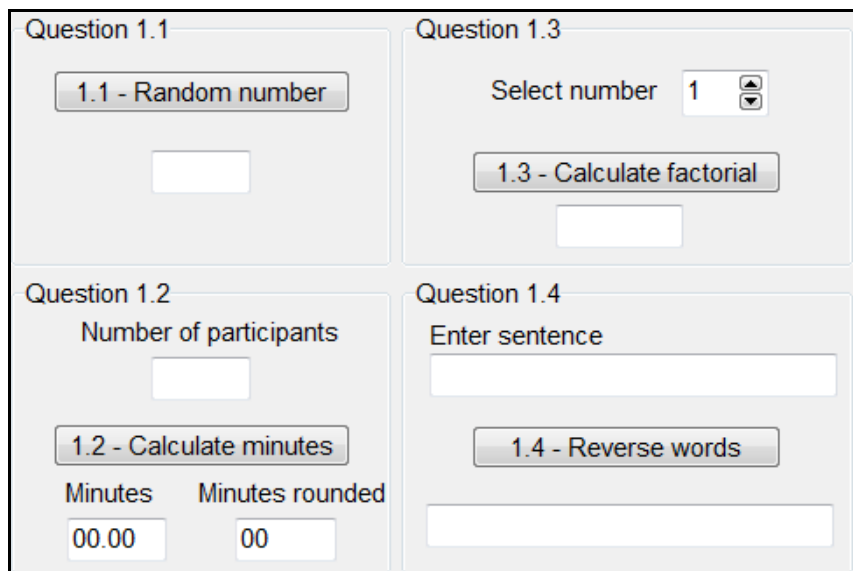
Question4\_P.dpr  
Question4\_P.dproj  
Question4\_P.res  
Question4\_U.dfm  
Question4\_U.pas

**SECTION A****QUESTION 1: GENERAL PROGRAMMING SKILLS**

Do the following:

- Open the incomplete program in the **Question 1** folder.
- Enter your examination number as a comment in the first line of the **Question1\_U.pas** file.
- Compile and execute the program. The user interface displays FOUR sections labelled QUESTION 1.1 to QUESTION 1.4. The program has no functionality currently.

Example of the graphical user interface (GUI):



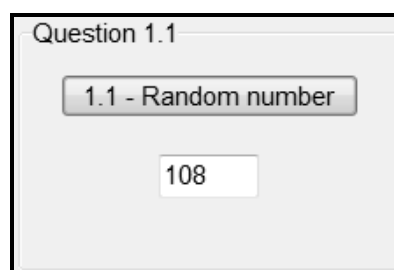
Follow the instructions below to complete the code for EACH section of QUESTION 1, as described in QUESTION 1.1 to QUESTION 1.4.

**1.1 Button [1.1 - Random number]**

Write code to do the following:

- Generate a random number in the range 100–120 (inclusive).
- Display the random number in the **edtRandomNumber** edit box.

Example of output if the random number generated is 108:



(4)

## 1.2 Button [1.2 - Calculate minutes]

A school dance has many learners participating. The organisers need to determine how long it will take to introduce all the participants. The time allocated to introduce each participant will depend on the total number of participants. The following criteria will be used:

Number of participants	Number of minutes per participant
Less than or equal to 20	2.5 minutes
More than 20 and less than or equal to 50	2.3 minutes
More than 50	2.0 minutes

The user must enter the number of participants in the **edtParticipants** edit box. Write code to do the following:

- Extract the number of participants from the **edtParticipants** edit box.
- Calculate the total number of minutes that will be required to introduce ALL the participants. Display the value in the **edtMinutes** edit box to TWO decimal places.
- Round up the calculated number of minutes and display the result in the **edtMinsRounded** edit box.

Use the following test data:

Number of participants	Minutes	Minutes rounded
13	32.50	33
21	48.30	49
50	115.00	115
51	102.00	102

Example of output if the number of participants is 17:

(13)

## 1.3 Button [1.3 - Calculate factorial]

The factorial of a number is the product of multiplying all integers from 1 to the number, e.g.

The factorial of 4 = 1 x 2 x 3 x 4  
= 24

The factorial of  $6 = 1 \times 2 \times 3 \times 4 \times 5 \times 6$   
 $= 720$

The user must select a number from the **spnNumber** spin edit box.

Write code to extract the number from the **spnNumber** spin edit box, calculate the factorial of the number and display the result in the **edtFactorial** edit box.

Example of output if the number 5 is selected:

(7)

#### 1.4 Button [1.4 - Reverse words]

The characters in words in a sentence must be reversed for encryption purposes. The user must enter a sentence in the **edtSentence** edit box.

Write code to do the following:

- Extract the sentence from the **edtSentence** edit box.
- Reverse the characters in EACH word in the sentence.
- Display the result in the **edtReverse** edit box.

Example of input and output:

(16)

- Ensure that your examination number has been entered as a comment in the first line of the program file.
- Save your program.
- Print the code if required.

**TOTAL SECTION A:**

**40**

**SECTION B****QUESTION 2: DATABASE PROGRAMMING**

PJB Wholesale Garden Centre supplies plants to a number of nurseries. When a quotation for an order is given, the requested number of plants is checked for availability.

The database **NurseryDB** for PJB Wholesale Garden Centre contains two tables, namely **tblPlants** and **tblOrders**.

The data pages attached at the end of this question paper provide information on the design of the database and examples of the contents of the tables.

Do the following:

- Open the incomplete project file called **Question2\_P.dpr** in the **Question 2** folder.
- Add your examination number as a comment in the first line of the **Question2\_U.pas** unit file.
- Compile and execute the program. The program currently has no functionality.

**NOTE:** If the compiler shows an error message with regard to the given CurrencyString statement, remove the statement.

The following user interface is displayed:

PlantCode	Description	Category	SizeOfPot	Colour	Price	In Stock
ALS027#L	Alstroemeria Intic Magic White	Shrub	L	White	R 61.90	14
ALS028#L	Alstroemeria Intic Moon Light	Shrub	L	Deep plum	R 61.90	43
AMA004#L	Amaryllis Groot Flower	Flower	L	Red	R 35.50	196
AMA004#M	Amaryllis Groot Flower	Flower	M	Red	R 30.00	31
AMA004#XL	Amaryllis Groot Flower	Flower	XL	Red	R 30.00	28

ItemNum	InvoiceNum	PlantCode	NumberOrdered	NumberDelivered
1	F1	ROS003#XXL	25	25
2	F1	ROS004#XXL	15	15
3	F1	ROS005#XXL	10	0
4	F2	ARM003#S	46	46
5	F2	ARM004#S	26	26

Question 2.1 - SQL

Question 2.2 - Delphi code

Results:

2.1.1 - List of roses

2.1.3 - Average price per category

2.1.5 - Update items delivered

2.1.2 - Pink roses and flowers

2.1.4 - Display information for invoice number F2

Restore database

Close



- Carry out the following instructions to complete the code for each section, as described in QUESTION 2.1 and QUESTION 2.2.
- Use SQL statements to answer QUESTION 2.1 and Delphi code to answer QUESTION 2.2.

**NOTE:**

- The 'Restore database' button is provided to restore the data contained in the database to the original content.
- The content of the database is password protected. You will therefore not be able to gain access to the content of the database with Microsoft Access.
- Code is provided to link the GUI components to the database.
- Do NOT change any of the code provided.
- TWO variables are declared as public variables, as described in the table below.

Variable	Data type	Description
tblPlants	TADOTable	Refers to the table tblPlants
tblOrders	TADOTable	Refers to the table tblOrders

**2.1 Tab sheet [Question 2.1 - SQL]**

In this section you may use **ONLY** SQL statements to answer QUESTION 2.1.1 to QUESTION 2.1.5.

Code to execute the SQL statements and display the results of the queries is provided. The SQL statements are incomplete.

The following GUI is displayed:

Do the following:

Enter the SQL statements for QUESTION 2.1.1 to QUESTION 2.1.5 which is assigned to the variables **sSQL1**, **sSQL2**, **sSQL3**, **sSQL4** and **sSQL5** respectively.

**2.1.1 Button [2.1.1 - List of roses]**

Display all the details of the plants in the Rose category in the **tblPlants** table.

Example of output of the first five records:

PlantCode	Description	Category	SizeOfPot	Colour	Price	InStock
ROS002#XXL	Pernille Poulsen	Rose	XXL	Salmon pink	66.95	175
ROS003#XXL	Lisa	Rose	XXL	Deep pink	66.95	187
ROS004#XXL	Ester Geldenhuys	Rose	XXL	Coral	66.95	176
ROS005#XXL	Just Joey	Rose	XXL	Shades of copper	66.95	67
ROS007#XXL	Andrea Stelzer	Rose	XXL	Clear pink	66.95	150

(3)

**2.1.2 Button [2.1.2 - Pink roses and flowers]**

Display the PlantCode, Category, Colour and SizeOfPot fields from the **tblPlants** table for all the plants in the **Flower** and **Rose** categories that have any type of **pink** colour.

Example of output of the last five records:

PlantCode	Category	Colour	SizeOfPot
LIS001#L	Flower	Pink	L
LIS001#S	Flower	Pink	S
ROS002#XXL	Rose	Salmon pink	XXL
ROS003#XXL	Rose	Deep pink	XXL
ROS007#XXL	Rose	Clear pink	XXL

(6)

**2.1.3 Button [2.1.3 - Average price per category]**

Use data from the **tblPlants** table to determine the average price for plants per category using **AveragePrice** as the new field name for the calculated field. The average price should be displayed in currency format.

Example of output:

Category	AveragePrice
Conifer	R 54.97
Creeper	R 59.33
Flower	R 28.78
Rose	R 69.20
Shrub	R 47.35

(5)

**2.1.4 Button [2.1.4 - Display information for invoice number F2]**

The invoice number will be the same for all items of a specific order.

Display the InvoiceNum, Description and NumberOrdered fields of all items ordered in the **tblOrders** table for invoice number F2.

Example of output:

InvoiceNum	Description	NumberOrdered
F2	Armeria Ballerina	46
F2	Armeria Ballerina	26
F2	Cyrtanthus Mackenii	85
F2	Cyrtanthus Mackenii	44

(5)

**2.1.5 Button [2.1.5 - Update items delivered]**

The number of items delivered differs sometimes from the number of items ordered in the table **tblOrders**.

Once an outstanding delivery has been made, the user must enter the item number (ItemNum) for the delivery that has been made. Write an SQL statement for variable **sSQL5** to modify the **NumDelivered** field to contain the same value as the **NumberOrdered** field.

**NOTE:** Code is provided to request the user to enter the item number.

Example of output for item number 6 before the record was modified:

ItemNum	InvoiceNum	PlantCode	NumberOrdered	NumberDelivered
6	F2	CYR001#S	85	45

Example of output for item number 6 after the record had been modified:

ItemNum	InvoiceNum	PlantCode	NumberOrdered	NumberDelivered
6	F2	CYR001#S	85	85

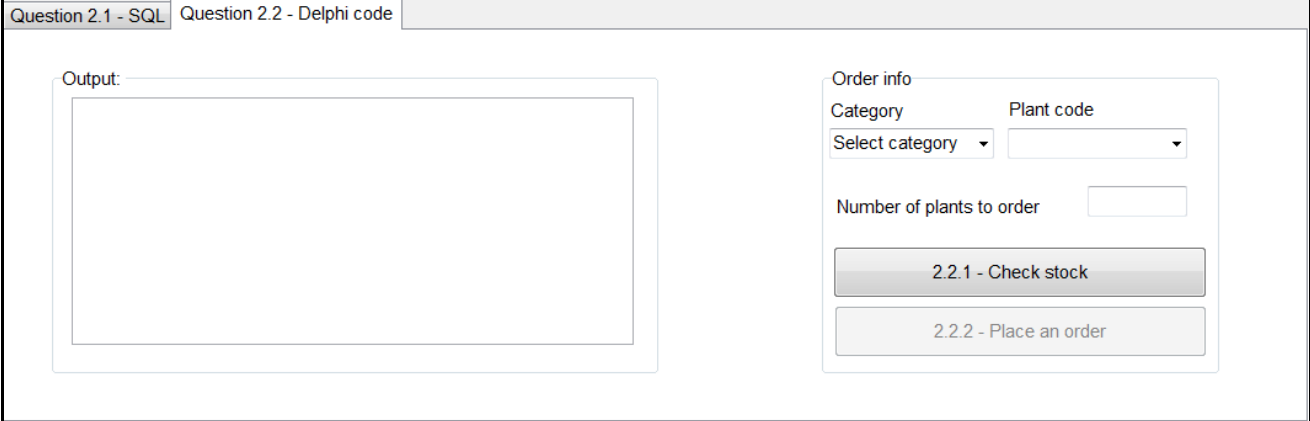
(4)

## 2.2 Tab sheet [Question 2.2 - Delphi code]

Use only programming code in this section to answer QUESTION 2.2.1 to QUESTION 2.2.2.

NO marks will be awarded for SQL statements in QUESTION 2.2.

The GUI for QUESTION 2.2 is shown below.



**NOTE:** The variables **iNumOrdered** and **sPlantCode** are provided as global variables. The content of these variables must be used in QUESTION 2.2.1 to check the availability of stock and in QUESTION 2.2.2 to place the order.

### 2.2.1 Button [2.2.1 - Check stock]

The stock available must be checked before an order can be placed.

The user must do the following:

- Select a category from the **Category** combo box.

Code is provided to populate the combo box (**cmbPlantCode**) containing the plant code associated with the selected category.

- Select a plant code from the **cmbPlantCode** combo box.
- Enter the number of plants to be ordered in the provided edit box.

Code is provided to:

- Extract the plant code selected from the **cmbPlantCode** combo box
- Extract the number of plants entered from the **edtNumPlants** edit box

Write code to determine whether or not there is enough stock available.

- If there is enough stock, display the plant code, colour, number of plants ordered and the price of the selected item in the output area **redDisplay** and enable the **btnQ2\_2\_2** button.
- If there is NOT enough stock available:
  - Display a message showing the number of plants in stock.
  - Ask the user whether he or she wants to continue to place the order for the available stock.
  - If the user wants to place the order:
    - Display the plant code, colour, number of plants ordered and the price of the selected item in the **redDisplay** output area.
    - Enable the **btnQ2\_2\_2** button.
  - If the user does NOT want to place the order:
    - Display the message 'Order cancelled' in the **redDisplay** output area.
    - Disable the **btnQ2\_2\_2** button.

Example of output if a request for 125 plants with code DIP002#M from the Creeper category was entered:

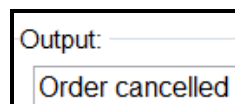
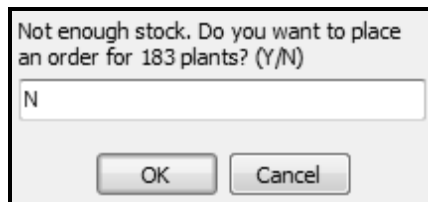
Output:
Plant code: DIP002#M
Colour: Pink
Number ordered: 125
Price per item: R 65.00

Example of output if a request for 225 plants with code DIP002#M from the Creeper category was entered with only 183 plants with this code being available:

Not enough stock. Do you want to place an order for 183 plants? (Y/N)
<input type="text" value="Y"/>
<input type="button" value="OK"/> <input type="button" value="Cancel"/>

Output:
Plant code: DIP002#M
Colour: Pink
Number ordered: 183
Price per item: R 65.00

Example of output if a request for 225 plants with code DIP002#M from the Creeper category was entered and the user does NOT want to place the order:



(11)

### 2.2.2 Button [2.2.2 - Place an order]

An order must be placed in the **tblOrders** table using the following information:

- The invoice number for this order in the **tblOrders** table must be F2.
- The plant code and number of plants ordered must be obtained from the two global variables, which contain information that was specified in QUESTION 2.2.1.
- The **NumberDelivered** field must be set to 0 since the delivery has not been made yet.

Example of output when placing an order for 125 plants with plant code DIP002#M:



(6)

- Ensure that your examination number has been entered as a comment in the first line of the program file.
- Save your program.
- Print the code if required.

**TOTAL SECTION B: 40**

**SECTION C****QUESTION 3: OBJECT-ORIENTATED PROGRAMMING**

Star Nursery invites learners from the local schools to a voluntary training programme as part of a community initiative. Learners who are used as trainees must attend training sessions to enable them to assist customers with enquiries and with the sale of plants.

Do the following:

- Open the incomplete program in the **Question 3** folder.
- Open the incomplete object class **Trainee\_U.pas**.
- Enter your examination number as a comment in the first line of both the **Question3\_U.pas** file and the **Trainee\_U.pas** file.
- Compile and execute the program. The program has no functionality currently.

Example of graphical user interface (GUI) that will be displayed:



The program will use the number of hours of the training and the value of the sales made to determine whether or not the trainee qualifies for a bonus.

Complete the code as specified in QUESTION 3.1 for the **Trainee\_U** object class and QUESTION 3.2 for the **Question3\_U** form class.

3.1 The incomplete object class (**TTrainee**) provided contains code for the following:

- Declarations of four attributes that describe a **Trainee** object
- A constructor **Create** method
- An incomplete **toString** method
- Two accessor methods: **getName** and **getTraineeID**

The attributes for the **Trainee** object have been declared as follows:

Names of attributes	Description
fTraineeID	Unique number to identify the trainee
fName	Name and surname of the trainee
fHours	Number of hours of training the trainee attended
fSales	Amount of the sales the trainee made

3.1.1 The number of hours of training attended by the trainee and the amount of the sales made can be increased.

(a) Write code for a method called **updateHours** that receives a value as a parameter. Increase the hours attribute using the received parameter value. (4)

(b) Write code for a method called **updateSales** that receives a value as a parameter. Increase the sales attribute using the received parameter value. (2)

3.1.2 Write code for a method called **qualifiesForBonus**. The method must return a Boolean value TRUE if the trainee qualifies for a bonus or FALSE if the trainee does not qualify for a bonus.

A trainee qualifies for a bonus if the following conditions are met:

- At least 15 hours of training was attended.
- The amount of the sales is at least R 1 200.00.

(5)

3.1.3 Write code to complete the provided **toString** method to return a string in the following format:

```
<name and surname of the trainee> (<the trainee ID>)
attended <number of hours of training attended> hours
of training and sold plants to the value of <value of the plants
sold formatted to currency and two decimals>.
```

Example of output when the **toString** method is called:

```
Kody Shaw (10) attended 65.66 hours of training and sold
plants to the value of R 1 405.00.
```

(4)

3.2 The incomplete unit **Question3\_U** has been provided which contains code for the object class to be accessible. An object variable called **objTrainee** has been declared.

A text file called **Logbook.txt** contains the log entries of all the training and sales activities of the trainees.



Each log entry contains information of a trainee in the following format:

```
<trainee ID>;<character T or S indicating training or a  
sale that was made>#<numerical value indicating the  
number of hours of training or the value of the sale that  
was made>
```

Example of the first four entries in the text file:

```
12;T#0.98  
15;S#182.00  
13;S#118.00  
10;T#1.96
```

The first two lines of text can be interpreted as follows:

- **12;T#0.98** – Trainee with ID number 12 attended 0.98 hours of training
- **15;S#182.00** – Trainee with ID number 15 made a sale to the value of R 182.00

Follow the instructions below to code the solution:

### 3.2.1 Button [3.2.1 - Click to continue]

The user must select the name of a trainee from the **cmbTrainee** combo box. Code is provided to do the following:

- Extract the name from the combo box.
- Assign an ID to the selected trainee using the variables **sName** and **iTraineeID**.

Write code to do the following:

- Use the provided variables (**sName** and **iTraineeID**) and instantiate the **objTrainee** object.
- Set the **btnQ3\_2\_2** button to be visible.

(4)

Example of the GUI if Kody Shaw is selected as the trainee and the 'Click to continue' button is clicked.



### 3.2.2 Button [3.2.2 – Process logbook data]

Write code to do the following:

- Check whether or not the **Logbook.txt** text file exists. If the file does NOT exist, display a suitable message and close the program.
- If the text file exists, search in each line of text for the selected trainee's ID.

If the trainee's ID is found, do the following:

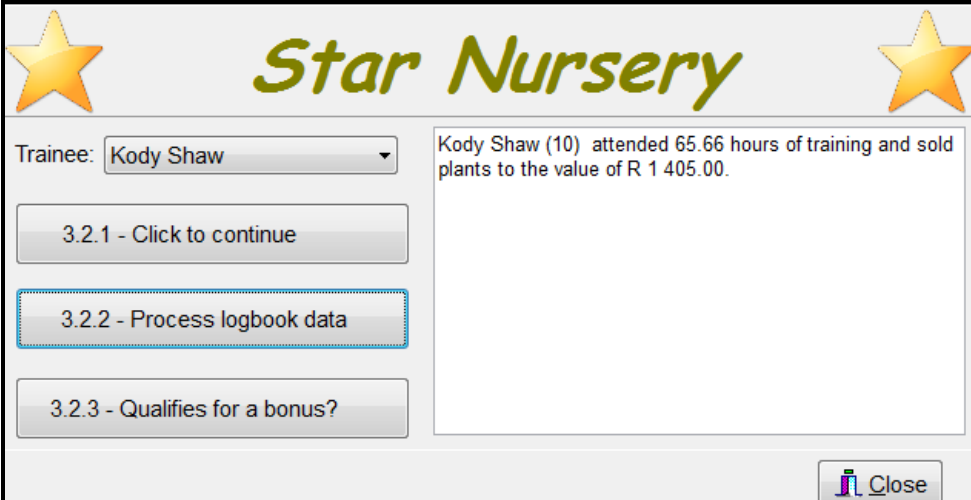
- Extract the entry type (T or S) and the value indicating the number of hours of training or the amount of the sale from the line of text.
- Use the **updateHours** or **updateSales** method to update the trainee's hours or sales amount based on the type of entry (T or S).

Once all the data from the text file has been processed, do the following:

- Clear the output area.
- Display the information of the trainee in the output area using the **toString** method.
- Set the **btnQ3\_2\_3** button to be visible.

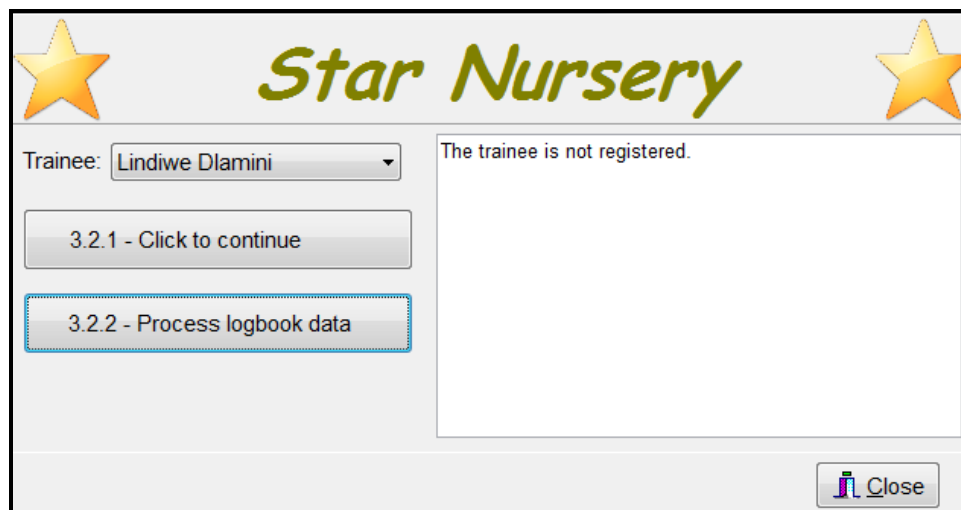
If the trainee's ID number could NOT be found in the text file, display the message 'The trainee is not registered.' in the output area.

Example of output if trainee Kody Shaw is selected and the logbook data is processed:



The screenshot shows a software application window titled "Star Nursery" with a yellow star logo on the left and right. The interface includes a "Trainee:" dropdown menu with "Kody Shaw" selected. Below the dropdown are three buttons: "3.2.1 - Click to continue", "3.2.2 - Process logbook data" (which is highlighted with a blue dashed border), and "3.2.3 - Qualifies for a bonus?". To the right of these buttons is a text area displaying the output: "Kody Shaw (10) attended 65.66 hours of training and sold plants to the value of R 1 405.00." At the bottom right of the window is a "Close" button with a small icon.

Example of output if trainee Lindiwe Dlamini is selected and the logbook data is processed:



(18)

### 3.2.3 Button [3.2.3 - Qualifies for a bonus?]

Write code to do the following:

- Determine if the trainee qualifies for a bonus using the **qualifiesForBonus** method.
- Display a suitable message in the output area indicating whether or not the trainee qualifies for a bonus.

Example of output for trainee Kody Shaw:

```
Kody Shaw (10) attended 65.66 hours of training and
sold plants to the value of R 1 405.00.
The trainee qualifies for a bonus.
```

Example of output for trainee Tyrone Kemsley:

```
Tyrone Kemsley (12) attended 65.66 hours of training
and sold plants to the value of R 1 078.00.
The trainee does NOT qualify for a bonus.
```

(3)

- Ensure that your examination number has been entered as a comment in the first line of the object class and the form class.
- Save all files.
- Print the code of both the object class and the form class if required.

**TOTAL SECTION C: 40**

**SECTION D****QUESTION 4: PROBLEM-SOLVING PROGRAMMING****SCENARIO**

The trees at the nursery are categorised using the types Citrus, Deciduous, Nut and Tropical.

Do the following:

- Open the incomplete program in the **Question 4** folder.
- Enter your examination number as a comment in the first line of the **Question4\_U.pas** file.
- Compile and execute the program. The program has no functionality currently.

The GUI shown below is displayed.



The program contains code of the following for the declaration:

- An array named **arrTypes** that contains the four types of trees at the nursery:

```
arrTypes: array [1..4] of String = (  
    'Citrus',  
    'Deciduous',  
    'Nuts',  
    'Tropical');
```

- A one-dimensional array named **arrList** that contains the list of 24 trees that are available at the nursery.

The format of the code in the array that represents each tree is as follows:

**<tree name>#<first letter of tree type>**

```
arrList: array[1..24] of String = (
    'Orange#C', 'Hazelnut#N', 'Apple#D',
    'Banana#T', 'Pecan#N', 'Pear#D',
    'Lemon#C', 'Papaya#T', 'Kiwi#T',
    'Apricot#D', 'Grapefruit#C', 'Walnut#N',
    'Lime#C', 'Mango#T', 'Peach#D',
    'Cashew#N', 'Almond#N', 'Tangerine#C',
    'Avocado#T', 'Cherry#D', 'Plum#D',
    'Macadamia#N', 'Kumquat#C', 'Guava#T');
```

The first two entries in **arrList** array can be explained as follows:

Orange#C means the tree name is Orange and the tree type is Citrus.

Hazelnut#N means the tree name is Hazelnut and the tree type is Nuts.

- A two-dimensional array called **arrTrees** and two integer variables that contains the number of rows and columns of the **arrTrees** array:

```
arrTrees: array [1..4, 1..6] of String;
iTypes: integer = 4;
iNum: integer = 6;
```

#### NOTE:

- Do NOT change the code provided.
- The use of good programming techniques and modular design must be applied in your solution.

Complete the code for EACH section of QUESTION 4, as described in QUESTION 4.1 to QUESTION 4.3 below.

#### 4.1 Button [4.1 - Separate by type]

The data in the **arrList** array must be stored in the two-dimensional array **arrTrees** by row according to the types of trees, e.g. the data of the citrus trees must be stored in row 1, the deciduous trees in row 2, the nut trees in row 3 and the tropical trees in row 4.

Use the **arrTypes** array to determine the row value where the data of the tree must be stored in the **arrTrees** array, e.g. if the data string is 'Orange#C', then the tree is of type 'Citrus' and the data string 'Orange#C' must be stored in row 1. If the data string is 'Hazelnut#N', then the tree is of type 'Nuts' and the data string must be stored in row 3, and so on.

Write code to do the following:

- Store the data of each tree in the **arrList** array in the correct position in the two-dimensional array **arrTrees**.
- Enable buttons **btnQ4\_2** and **btnQ4\_3**.

(11)

#### 4.2 Button [4.2 - Display]

Write code to display the types of trees contained in the **arrTypes** array and the trees corresponding with the types of trees from the **arrTrees** array.

Example of output:

Citrus:	Orange#C	Lemon#C	Grapefruit#C	Lime#C	Tangerine#C	Kumquat#C
Deciduous:	Apple#D	Pear#D	Apricot#D	Peach#D	Cherry#D	Plum#D
Nuts:	Hazelnut#N	Pecan#N	Walnut#N	Cashew#N	Almond#N	Macadamia#N
Tropical:	Banana#T	Papaya#T	Kiwi#T	Mango#T	Avocado#T	Guava#T

(7)

#### 4.3 Button [4.3 - Sort alphabetically]

The trees in the **arrTrees** array must be sorted alphabetically as per tree type, e.g. citrus trees will appear as follows in row 1 of the **arrTrees** array:

Grapefruit Kumquat Lemon Lime Orange Tangerine

Write code to do the following:

- Delete the last two characters of each element in the **arrTrees** array.
- Sort the **arrTrees** array alphabetical per tree type.
- Execute the code in the button **btnQ4\_2** to display the list of trees after it has been sorted.

Example of output:

Citrus:	Grapefruit	Kumquat	Lemon	Lime	Orange	Tangerine
Deciduous:	Apple	Apricot	Cherry	Peach	Pear	Plum
Nuts:	Almond	Cashew	Hazelnut	Macadamia	Pecan	Walnut
Tropical:	Avocado	Banana	Guava	Kiwi	Mango	Papaya

(12)

- Ensure that your examination number has been entered as a comment in the first line of the program file.
- Save your program.
- Print the code if required.

**TOTAL SECTION D: 30**  
**GRAND TOTAL: 150**

**INFORMATION TECHNOLOGY****DATABASE INFORMATION FOR QUESTION 2:**

The design of the database tables is as follows:

Table: **tblPlants**

This table contains a price list of all the stock in PJB Wholesale Garden Centre.

Field name	Data type	Description
PlantCode	Text (13)	A unique code assigned to each plant item
Description	Text (35)	The description of each plant item
Category	Text (12)	Category of the plant item
SizeOfPot	Text (4)	The pot size of the plant indicated with S, M, L, XL, XXL and XXXL
Colour	Text (20)	Colour of the flowers
Price	Currency	Selling price of the plant
InStock	Integer	Number of plants in stock

Example of data of the first ten records:

PlantCode	Description	Category	SizeOfPot	Colour	Price	InStock
ALS027#L	Alstroemeria Intic Magic White	Shrub	L	White	R 61.90	14
ALS028#L	Alstroemeria Intic Moon Light	Shrub	L	Deep plum	R 61.90	43
AMA004#L	Amaryllis Groot Flower	Flower	L	Red	R 35.50	196
AMA004#M	Amaryllis Groot Flower	Flower	M	Red	R 30.00	31
AMA004#XL	Amaryllis Groot Flower	Flower	XL	Red	R 30.00	28
AMA004#XXL	Amaryllis Groot Flower	Flower	XXL	Red	R 49.00	95
AMA005#L	Amaryllis Belladonna Lily	Flower	L	Pink	R 41.85	12
AMA005#M	Amaryllis Belladonna Lily	Flower	M	Pink	R 30.00	34
AMA005#S	Amaryllis Belladonna Lily	Flower	S	Pink	R 25.00	93
AMA005#XL	Amaryllis Belladonna Lily	Flower	XL	Pink	R 30.00	158

Table: **tblOrders**

This table contains the records of orders that were placed.

Field name	Data type	Description
ItemNum	AutoNumber	A unique number assigned to an item in an order
InvoiceNum	Text (3)	Every order receives an invoice number. An order may contain multiple items.
PlantCode	Text (13)	The code of the plant ordered – foreign key
NumberOrdered	Integer	Number of plants of a specific item ordered
NumberDelivered	Integer	Number of plants of a specific item delivered

Example of data of the first ten records:

ItemNum	InvoiceNum	PlantCode	NumberOrdered	NumberDelivered
1	F1	ROS003#XXL	25	25
2	F1	ROS004#XXL	15	15
3	F1	ROS005#XXL	10	0
4	F2	ARM003#S	46	46
5	F2	ARM004#S	26	26
6	F2	CYR001#S	85	45
7	F2	CYR001#XL	44	44
8	D2	ARG006#S	70	70
9	D2	CUP001#XL	36	36
10	D2	CUP001#M	25	25

The following one-to-many relationship with referential integrity exists between the two tables in the database:

