education

Department:
Education
PROVINCE OF KWAZULU-NATAL

TRIAL EXAMINATION

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INFORMATION TECHNOLOGY P1

MARKS: 150

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TIME: 3 hours

MODERATOR: Ms EC Moodley

This question paper consists of 18 pages.

INSTRUCTIONS AND INFORMATION

1.	This paper is divided into FOUR sections. Candidates must answer 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 paper is set in 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 only.

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 a programming language for any of these routines.

8.	You must save your work regularly on the disk you have been given, or the disk space allocated to you for this examination session.

9.	Make sure that your name appears as a comment in every program that you code.

10.	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.

11.	At the end of this examination session you must hand in a disk/CD/DVD/flash disc 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.

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

   NOTE:

   - Delphi programmers must use the file **KZN Trials P1 2020.exe**.
     .

   Do the following:

   - Double click on the password-protected executable file.
   - Click on the extract button.
   - Enter the following password: **TriAl$P12020**

   List of files provided in the folder **KZN Trials P1 2020** (once extracted):

   Delphi files

Question1:	*Question1_p* *Question1_u*
Question2:	*Question2_p* *Question2_u*
Question3:	*clsTravel_u* *DestQ3_u* *DestQ3_p* *Destinations.txt*
Question4	*Ques4_p* *Flights_u*

> **SCENARIO:**
> South Africa has the prestigious reputation of being one of the most beautiful countries in the world. Our diversity is unequalled by any other country. Hence, tourism is an important industry in South Africa.

SECTION A

QUESTION 1: GENERAL PROGRAMMING SKILLS

Software applications can be useful in assisting with activities within the tourism industry. *Rainbow Tours* is a travel agency that organises specialised and customised tours to many of the most popular tourist destinations.

Do the following:
- Open the incomplete program in the Question 1 folder.
- Enter your **full name** as a comment in the first line of the program.
- The program has 4 tab sheets with different interfaces.
- 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 **Tab sheet [Qu1.1]**
   Provide code in the **OnCreate** event handler of the form to do the following:
   - Display the caption 'Welcome to Rainbow Tours' on the panel **pnlQu1_1**.
   - Set the background colour of the panel **pnlQu1_1** to Yellow.
   - Boldface the caption '*Welcome To Rainbow Tours'* and set the font size of the caption to 16.
   - The image file **rainbow.jpg** has been provided in the Question1 folder. Provide code to load the image such that it fits into the image component called **imgPic.**

   (7)

EXAMPLE OF OUTPUT WHEN THE ABOVE CODE IS EXECUTED

1.2   Tab sheet [Qu1.2]

Rainbow Tours has attracted clients from around the world. They are in need of software to convert foreign currencies into SA Rand.
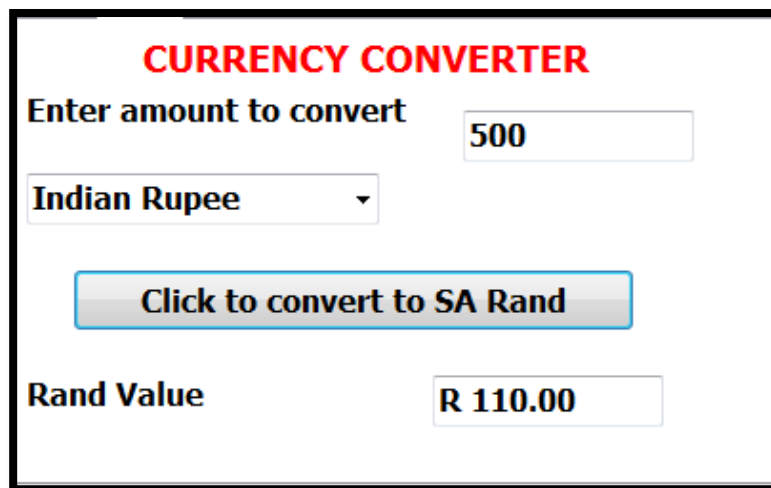

The current foreign currency rates for the four most popular destinations are as follows:

1 Unit of foreign currency	Cost in SA Rand
US Dollar	R16.46
British Pound	R21.16
Euro	R19.27
Indian Rupee	R0.22

The amount to be converted must be entered in the edit box **edtAmount** and the foreign currency must be selected from the combo box, **cmbCurrency**. When the button **btnQu1_2** is clicked, the rand value must be calculated and output in currency format in the edit box, **edtRandValue**.   (7)

Example of output   for 1000 British Pounds

Example of output for 500 Indian Rupees
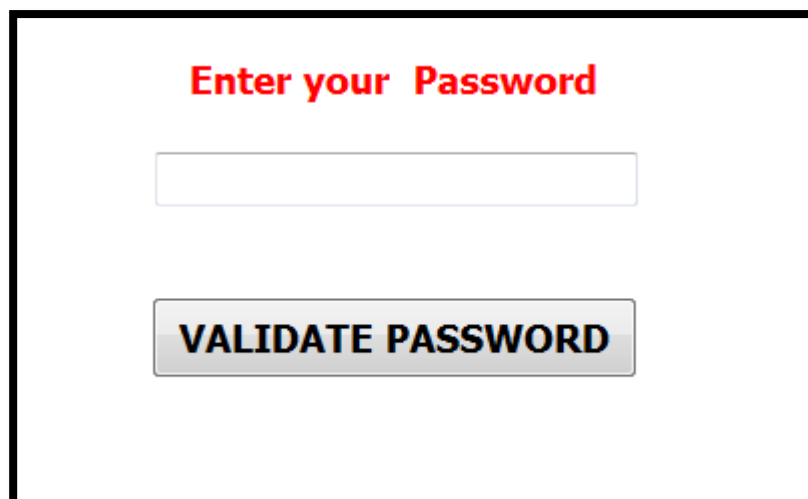
CURRENCY CONVERTER

Enter amount to convert

`500`

Indian Rupee ▾

[Click to convert to SA Rand]

Rand Value   R 110.00

1.3 Tab sheet [Qu1.3]

Rainbow Tours has an online booking and payment system. Each customer needs to provide a unique password to log into the system in order to keep their transactions and data secure.

Enter your Password

[   ]

[**VALIDATE PASSWORD**]

The password entered must have:
- At least 3 characters from the following list **(*,?, #, %**), AND
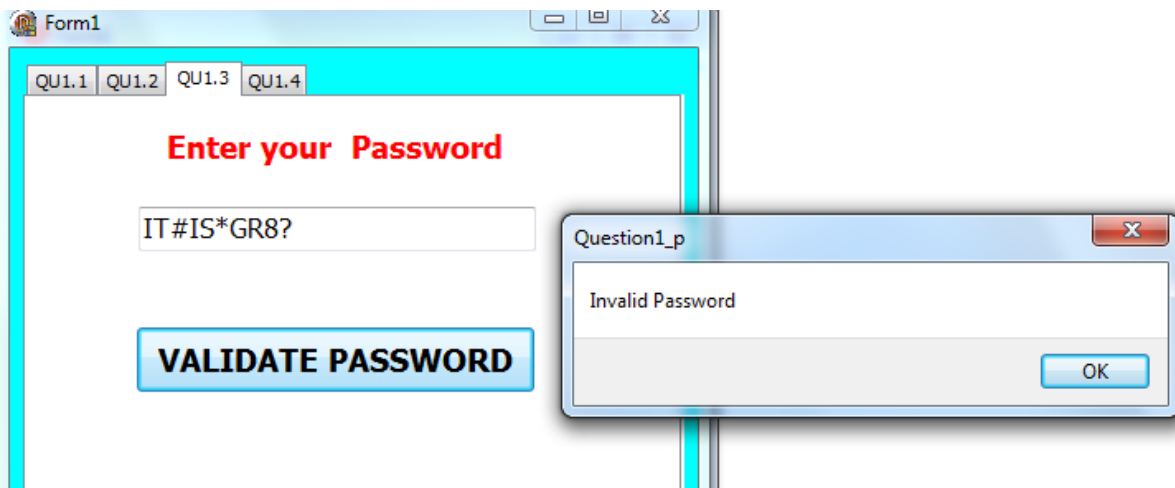- At least 3 numeric digits AND
- A total of 10 characters

The user is required to enter his unique password in the edit box. Provide code behind the button **btnQu1_3** that validates the password and outputs a corresponding message to indicate whether the password is valid or not.

(14)

Example of output for valid password
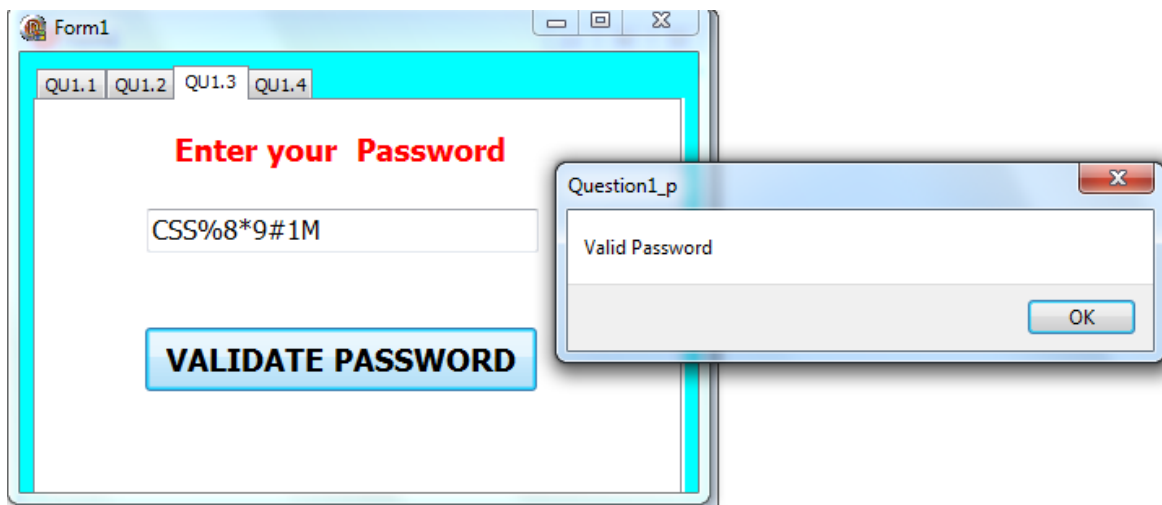
Example of output for an invalid password

‘

1.4   Tab sheet [Qu1.4]

Organising a holiday can be a very time consuming task. *Rainbow Tours* also provides online facilities to book hotels.

- The number of nights that a double room has been booked is randomly generated, for each month for the past 12 months.
- The maximum number of nights that the room could be booked for, is 20 nights per month.
- When the button **btnQu1_4** is clicked, a graph is generated in the output area showing the randomly generated nights it has been booked.
- The total nights booked for the year as well as the total income generated by the double rooms is also displayed.

<u>Use the following algorithm:</u>
- *Initialise all variables*
- *Start outer loop bound by the number of months*
- *Randomly generate the number*
- *Initialise the string variable*
  - *Start inner loop bound by the randomly generated value*
  - *Generate stars and create a new string*
  - *Close inner Loop*
- *Display month number, stars as well as how many stars*
- *Calculate Total Nights booked for the year*
- *Close outer loop*
- *Display Total Nights*
- *Display Total Cost (if Double Room's rate is R450 per night)*

(13)

SAMPLE OUTPUT

```
GENERATE GRAPH

Month     No of Nights
1         ********************20
2         *************13
3         ***********11
4         ********************20
5         ********8
6         ******6
7         ********8
8         **************14
9         ****4
10        *******************19
11        *********9
12        ********8
Total No of Nights booked: 140
Total Income for the year: R63 000.00
```

NOTE : Output may differ from sample run, because of randomly generated
values !

TOTAL SECTION A :   41

SECTION B

QUESTION 2: DATABASE PROGRAMMING

The travel agency has a database called **TravelTourDB.mdb** containing details of local accommodation venues, to be used to book tourists into when visiting different parts of the country. The database consists of two related tables as described below.

Do the following:
- Open the incomplete project file called **Question2_p.dpr** in the **Question 2** folder.
- Enter your name as a comment in the first line of the **Question2_U.pas** unit file.
- Compile and execute the program. The program has no functionality currently. The content of the tables is displayed as shown on the selection of **Tabsheet Question 2.2-Delphi Code.**

- Follow the instructions to complete the code for each section, as described in QUESTION 2.1 and QUESTION 2.2 that follow.
- 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.
- Code is provided to link the GUI components to the database. Do NOT change any of the code provided.
- TWO variables are declared as global variables as described in the table below

Variable	Data Type	Description
tblRates	TADOTable	Refers to the table **tblRates** in the database
tblAccom	TADOTable	Refers to the **tblAccom** in the database

DATABASE DESIGN

tblAccom

Field Name	Data Type
GuestNo	Number
GuestName	Short Text
GuestSurname	Short Text
GuestIDNo	Short Text
DateIn	Date/Time
DateOut	Date/Time
DepositPaid	Yes/No
DepositAmount	Currency
AccomID	Short Text

tblRates

Field Name	Data Type
AccomID	Short Text
AccomName	Short Text
AccomType	Short Text
RatePerNight	Number
StarRating	Short Text

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Table View of **tblAccom**

GuestNo	GuestName	GuestSurnar	GuestIDNo	DateIn	DateOut	DepositPaic	DepositAmou	AccomID
178	Elmarie	Raymond	8102182331145	2019/11/18	2019/11/23	☑	R2 500.00	C654
179	Brittany	Rich	9109112247131	2019/11/18	2019/11/23	☑	R1 800.00	H220
180	Oprah	Hadebe	6501023193132	2019/11/18	2019/11/24	☑	R2 150.00	H213
181	Sacha	Vinson	8103206836027	2019/11/18	2019/11/26	☑	R2 600.00	H218
182	Cody	Schwartz	8709067433095	2019/11/19	2019/11/24	☑	R2 250.00	G152
183	Hilel	Maharaj	9103052073160	2019/11/19	2019/11/23	☑	R2 000.00	G156

Table View of **tblRates**

	AccomID	AccomName	AccomType	RatePerNight	StarRating
⊞	G152	Alverie Guest House	Guest House	450	**
⊞	C651	Avenir Country Lodge	Country House	650	***
⊞	S140	Eenheid Self Catering	Self Catering	600	***
⊞	C652	Everyellow Lodge	Country Inn	850	****
⊞	H213	Everyellow Manor and Spa	Hotel	610	***
⊞	G153	Groen Guest Farm	Guest House	400	**
⊞	C653	Hazyview Country House	Country House	620	****
⊞	H214	Heaven Valley Hotel	Hotel	520	***

2.1   Tab sheet [Question 2.1 – SQL]
        Example of the GUI for QUESTION 2.1

NOTE :
   - Use ONLY SQL statements to answer QUESTION 2.1.1 to QUESTION 2.1.4.
   - Code is provided to execute the SQL statements and display the results of the queries. The SQL statements assigned to the variables *sSQL* are incomplete !

   Complete the SQL statements to perform the tasks described in QUESTION 2.1.1 to QUESTION 2.1.4 that follow.

2.1.1 **Button [2.1.1 – Guests Deposit]**
Display the guests name, surname and deposit amount paid for guests whose
deposit amount range from R2000 to R3000 (inclusive) (4)

SAMPLE OUTPUT

GuestName	Guestsurname	depositAmount
Elmarie	Raymond	2500
Oprah	Hadebe	2150
Sacha	Vinson	2600
Cody	Schwartz	2250
Hilel	Maharaj	2000
Rina	Erasmus	3000
Vay	Naidoo	2800
Joyce	Mannik	2000
Ivan	Carroll	2000

2.1.2 **Button[2.1.2 – Star Rating]**
All accommodation venues are given a star rating based on the quality of service
they provide. Display the accommodation name, accommodation type and star
rating for all accommodation venues which have received 3 or more stars

(4)

SAMPLE OUTPUT

AccomName	AccomType	StarRating
Avenir Country Lodge	Country House	***
Everyellow Lodge	Country Inn	****
Hazyview Country House	Country House	****
Klein Stel Lodge	Country House	***
Vreden Estate	Country Inn	****
Rosenview Guest House	Guest House	****
Roseview Guest House	Guest House	***
Sun Guest House	Guest House	***
Everyellow Manor and Spa	Hotel	***

2.1.3 **Button [2.1.3 – No Deposit- Guests]**
Determine and display the number of guests who booked in 2019 but who have
not paid a deposit. Display the answer using the caption " Number of Guests with
NO Deposit 2019". (5)

SAMPLE OUTPUT

Number of Guests with NO deposit 2019
8

2.1.4 **Button [2.1.4 – Total Days Booked]**
Display the name of the accommodation, and the total number of days booked for each accommodation. Use the caption "Total Days Booked" for the calculated field values.

(7)

SAMPLE OUTPUT

AccomName	Total Days Booked
Alverie Guest House	8
Avenir Country Lodge	10
Eenheid Self Catering	18
Everyellow Lodge	1
Everyellow Manor and Spa	14
Groen Guest Farm	19
Hazyview Country House	13
Heaven Valley Hotel	11
Klein Stel Lodge	5

2.2 **Tab sheet [Question 2.2 – Delphi Code]**

Example of GUI for Question 2.2

Question 2.1- SQL	Question 2.2 - Code	

| | 2.2.1 - Age of Guests |
| | 2.2.2 - Update Rates |

Accom Tbl

GuestNo	GuestName	GuestSurname	GuestIDNo	DateIn	DateOut	DepositPaid	DepositAmount	Accom
178	Elmarie	Raymond	8102182331145	2019/11/18	2019/11/23	True	2500	C654
179	Brittany	Rich	9109112247131	2019/11/18	2019/11/23	True	1800	H220
180	Oprah	Hadebe	6501023193132	2019/11/18	2019/11/24	True	2150	H213

Rates Tbl

AccomID	AccomName	AccomType	RatePerNight	StarRating
C651	Avenir Country Lodge	Country House	650	***
C652	Everyellow Lodge	Country Inn	850	****
C653	Hazyview Country House	Country House	620	****

NOTE :
- Use ONLY Delphi Code to answer QUESTION 2.2.1 to QUESTION 2.2.
- NO marks will be awarded for SQL statements in Question 2.2.

2.2.1 **Button [2.2.1 – Age of Guests]**
Write code that will determine and output the age of all the guests. Display the details in tabular format, together with the guest's name and surname.

NOTE :
- The first six digits of the SA ID number represents the date of birth of a person, with the first two digits representing their year of birth.
- You may assume that all guests are older than 20 years!

SAMPLE OUTPUT

| Name	Surname	Age
Elmarie	Raymond	39
Brittany	Richards	29
Oprah	Hadebe	55
Sacha	Vinson	39
Cody	Schwartz	33
Hilel	Maharaj	29
Nasim	Hunter	36
Jena	Simmons	43
Kelsey	Hodges	28

(8)

2.2.2   **Button [2.2.2- Update Rates]**

Due to the current economic situation, there will be a need to make an adjustment to the hiring costs. The cost of hiring all country inns and houses as well as guest houses, needs to be increased by 5%. Write code that will effect this change in the *tblRates* table, and display a suitable message in a dialogue box indicating that the update was successful.

(10)

SAMPLE DISPLAY AFTER ADJUSTMENT

AccomID	AccomName	AccomType	RatePerNight	StarRating
C651	Avenir Country Lodge	Country House	682.5	***
C652	Everyellow Lodge	Country Inn	892.5	****
C653	Hazyview Country House	Country House	651	****

Question2_p   ✕

Update Completed!

OK
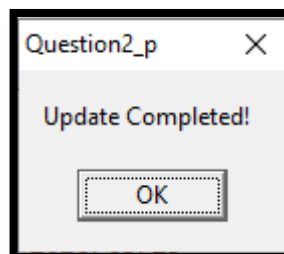
TOTAL SECTION B: 38

SECTION C

QUESTION 3 : OBJECT- ORIENTATED PROGRAMMING

A quotation system for reservations to various local destinations needs to be developed.

3.1   Open the **Question 3** folder.
        Open the class unit called **clsTravel_u** and complete the code.
        The following private fields with the appropriate data types have already been declared.

NAME OF ATTRIBUTE	DESCRIPTION
fBooking	The booking number of the reservation
fDestination	The destination to be visited
fDate	The date of the visit (dd/mm/yyyy)
fPeople	The number of people
fDiscount	Amount of discount they qualify for
fTotal	Total amount in Rands for the booking

3.1.1   Write a **constructor** which will receive the booking number, destination, date, number of people and rate per person as parameters.
        Use the rate per person parameter value to determine the total amount attribute value and also initialise the *fDiscount* attribute to 0.
        The other parameters must be used to initialise the remaining attributes of the class.   (5)

3.1.2   Write a method, **CalcDiscount,** which will determine a value for the *fDiscount* attribute by calculating the amount of discount a client qualifies for. Discount is calculated as follows:

        A client will receive 5% discount off the total cost if the reservation was made for any time in February, May, August or November

                                                                                                        (9)

3.1.3   Write a method called **calcTotal**, which will update the total amount by subtracting the discount   (3)

3.1.4   Write an accessor method which will return the discount   (2)

3.1.5   Write a **toString** method to construct a string which outputs all the attributes in the following format :

        Booking No : < Booking No >
        Destination : < Destination>
        Date of Booking : < Date of Booking >
        No in Group : < No in group>
        Discount : < Discount Amount >
        Final Amount : < Final Amount >   (5)

3.2   Open the **Quest3_p** project, which contains the following GUI :
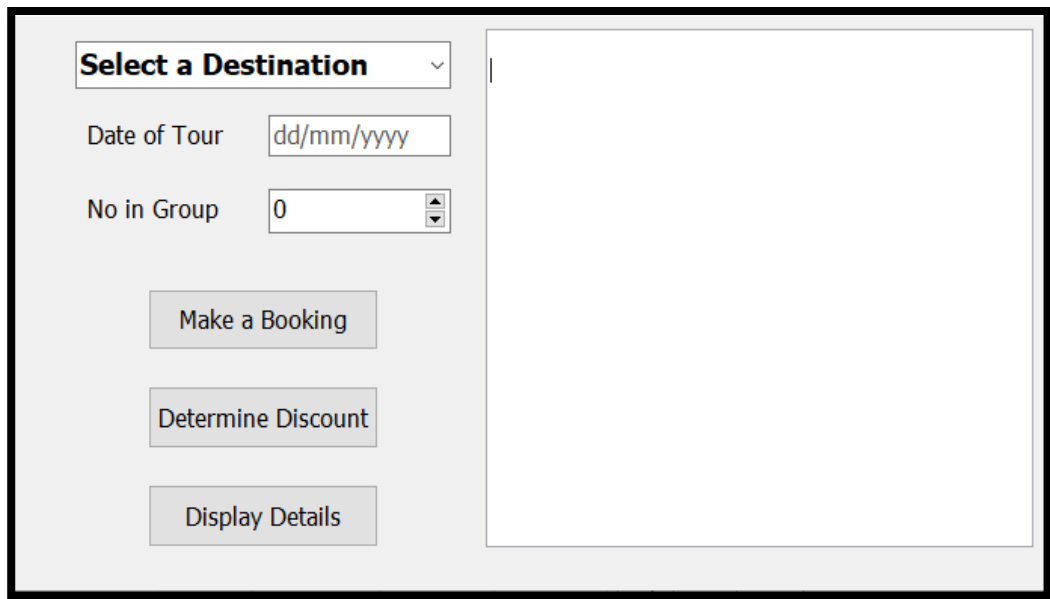
The text-file *Destinations.txt*, contains the data needed to allow a client to make a booking for a tour.
The layout of the text file is as follows:

<Booking No> ;< Destination> ;< Rate per Person >

Code the following buttons, using the relevant methods from the **TTravel** class

3.2.1   Button [Make Booking]
Read the destination of the tour from the combo-box *cmbDest* as well as the date of the tour and the number of tourists in the group from the relevant components.
Use the text file, *Destinations.txt*, to obtain further information about the booking. Use the following process :
  o   Check whether the text file exists. If it does not exist, display a suitable message and exit the program.
  o   Otherwise, provide the necessary code to be able to read from the text file
  o   Make use of a conditional loop to search through the text file, and extract the booking code and the rate per person, for the selected destination
Then use the extracted data to instantiate the *ObjTravel* object (declared).
Display a suitable message indicating that the reservation was made.   (15)
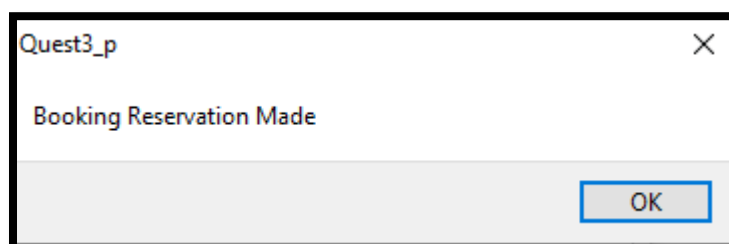
3.2.2   Button [Determine Discount]
Call the relevant methods that will determine the amount of discount the
client qualifies for. Display the discount amount in the rich-edit   (2)
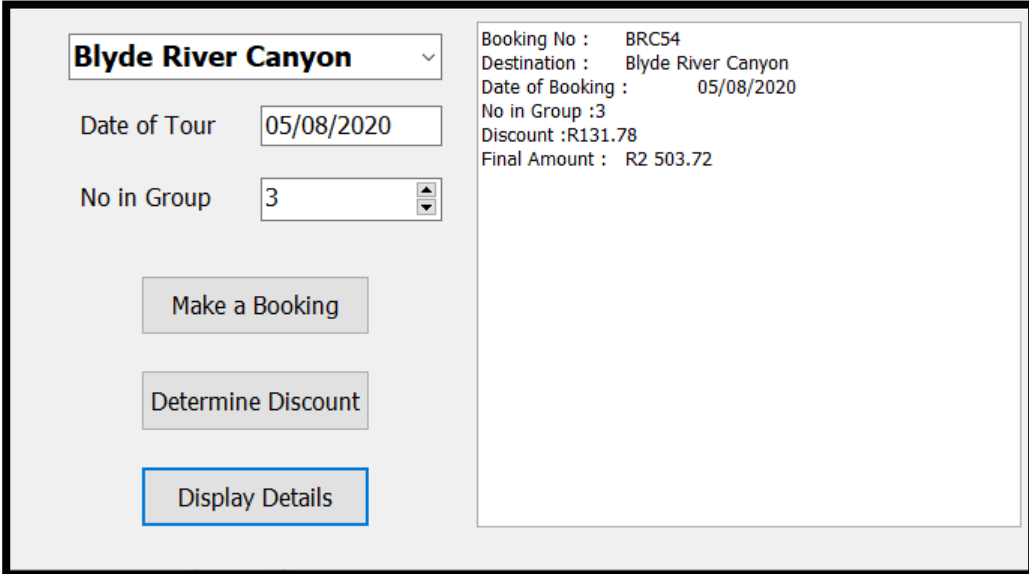
SAMPLE OUTPUT

Discount :R131.78

3.2.3   Button [Display Details]
Call the relevant methods to calculate the final cost, and then display the
details of the booking in the rich-edit   (2)

SAMPLE OUTPUT

Blyde River Canyon

Date of Tour   05/08/2020

No in Group   3

Make a Booking

Determine Discount

Display Details

Booking No :   BRC54
Destination :   Blyde River Canyon
Date of Booking :   05/08/2020
No in Group :3
Discount :R131.78
Final Amount :   R2 503.72

TOTAL SECTION C: 43

SECTION D

**QUESTION 4 : PROBLEM SOLVING**

A local airport keeps details of the number of passengers booked on flights to various local destinations, at hourly intervals. These details may be required by the travel agency when making bookings for passengers

Details of the flights are stored in a pre-defined array called **arrFlights**
The 2-D Array called **arrPass** has been declared and assigned values representing the number of passengers per flight.

Array declarations :
arrFlights : array[1..10] of string = ('SA 145','MN 783','BA 367','SA 832', 'KL 432','BA 993', '
'SE 476','BA 165','SA 764', 'MN 754');
arrPass : array [1..10,1..6] of integer = ((109,16,203,115,48,201),(153,210,137,113,211,61) ,
(55,16,18,174,87,219), (155,57,157,144,51,194),
(113,51,126,81,182,11), (40,218,124,20,169,200),
(141,171,183,38,56,48),(61,127,131,146,36,148),
(154,145,69,215,46,144),(108,32,214,192,118,98));
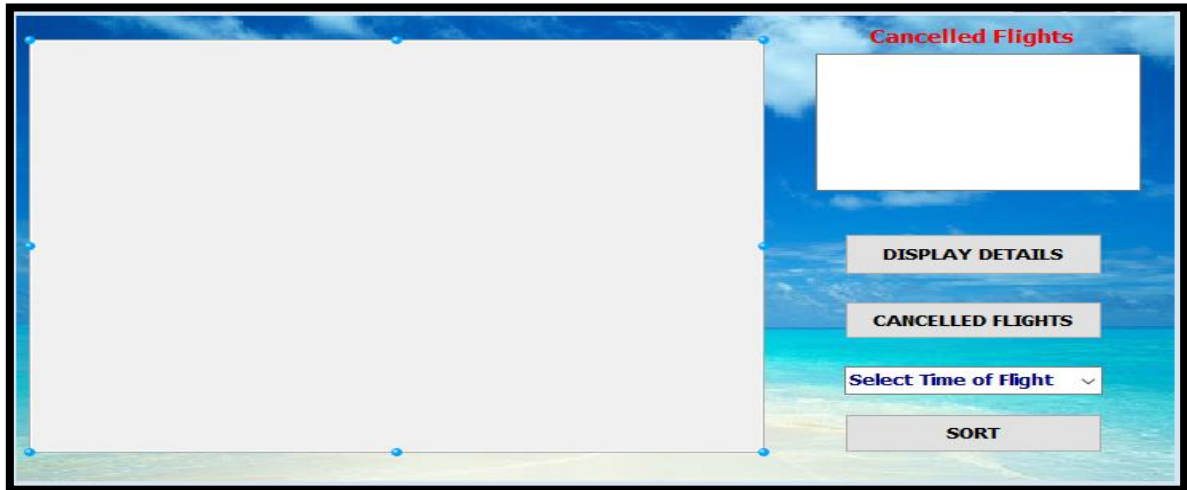
4.1   Button [Display Details]
Write a ***method*** which would display the details of the passengers (**arrPass**) in tabular form, together with the names of the respective flights (**arrFlights**) with suitable captions as shown below. Call this method in the relevant button.
SAMPLE OUTPUT

FLIGHTS	12:00	13:00	14:00	15:00	16:00	17:00
SA 145	109	16	203	115	48	201
MN 783	153	210	137	113	211	61
BA 367	55	16	18	174	87	219
SA 832	155	57	157	144	51	194
KL 432	113	51	126	81	182	11
BA 993	40	218	124	20	169	200
SE 476	141	171	183	38	56	48
BA 165	61	127	131	146	36	148
SA 764	154	145	69	215	46	144
MN 754	108	32	214	192	118	98

(7)

4.2   **Button [Cancelled Flights]**
Any flight that has less than 70 passengers will be cancelled. Write code that will determine details of all possible cancelled flights.
- Determine the name of the flight and the scheduled time of the flight.
- Write these details to a new text-file called *cancFlights.txt.*
- Display a suitable message in a dialogue box.
- Display the contents of the text-file in the memo *memOut*   (9)
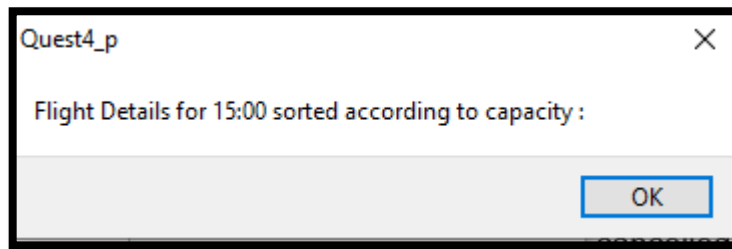
SAMPLE OUTPUT

```
SA 145    13:00
SA 145    16:00
MN 783    17:00
BA 367    12:00
BA 367    13:00
BA 367    14:00
SA 832    13:00
```

4.3   **Button [Sort]**
Allow the user to select a time from the combo-box *cmbFlight*, then sort the details of the flights for that particular time (column) from most available seats to least available seats. All other details should remain correlated / related after the sort. Display output as per sample below.

SAMPLE OUTPUT

Quest4_p   ×

Flight Details for 15:00 sorted according to capacity :

                                                              OK

FLIGHTS	12:00	13:00	14:00	15:00	16:00	17:00
BA 993	40	218	124	20	169	200
SE 476	141	171	183	38	56	48
KL 432	113	51	126	81	182	11
MN 783	153	210	137	113	211	61
SA 145	109	16	203	115	48	201
SA 832	155	57	157	144	51	194
BA 165	61	127	131	146	36	148
BA 367	55	16	18	174	87	219
MN 754	108	32	214	192	118	98
SA 764	154	145	69	215	46	144

(12)

TOTAL SECTION D :   28

TOTAL = 150