Western Cape Government

Western Cape Education Department
Directorate: Curriculum FET

INFORMATION TECHNOLOGY

REVISION BOOKLET

TERM 2

Grade 11

This revision program is designed to assist you in revising the critical content and skills that you have covered during the 2nd term. The purpose is to prepare you to understand the key concepts and to provide you with an opportunity to establish the required standard and the application of the knowledge necessary to succeed in the examination.

The revision program covers the following topics:

- **Theory:**
  Electronic communications, Social implications, Database management, Database design
- **Practical:**
  Text Files, Arrays, String manipulation

Link to the datafiles: https://wcedeportal.co.za/eresource/198196

Theory content

1. Electronic communications
   1.1. Mobile/wireless e-communication.
   1.2. Use of mobile technology.
   1.3. Use of wireless technologies.
   1.4. Data security.
2. Social implications
   2.1. Effects of digitalisation
   2.2. Protecting your online identity
3. Database management
   3.1. Database software
   3.2. Database types
   3.3. Database careers
4. Database design
   4.1. Characteristics of quality data
   4.2. Creating a simple database
   4.3. Working with data
   4.4. Setting up relationships

Practical content

1. Text files
   1.1. Introduction to text files
   1.2. Reading from a text files
   1.3. Writing to a text files
   1.4. Creating reports
2. Arrays
   2.1. Introduction to Arrays
   2.2. Searching and sorting arrays
   2.3. Parallel arrays
3. String and date manipulation
   3.1. Built-in string methods
   3.2. Delimited strings

Theory content

1. Electronic communications

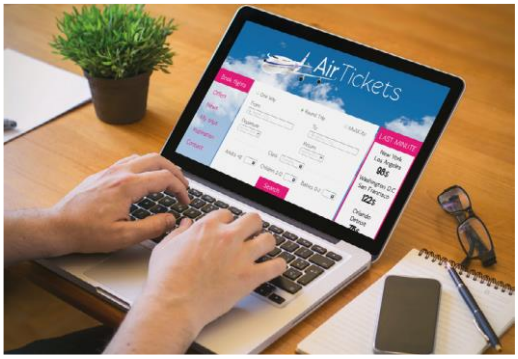
1. Choose the correct answer.
   a. Which one of the following best describes a blog?
      A. A website creator posts short, informal stories or articles on their website.
      B. A website where the creator posts informal video stories on their website.
      C. A website where the creator posts photos on their website
      D. None of the above
   b. Which one of the following is NOT an advantage of a podcast?
      A. Can be very informative.
      B. Conversation is synchronous, which means a direct conversation can take place.
      C. Can be professional or relaxed.
      D. Good way to get a daily update.

2. Match COLUMN A with the correct answer in COLUMN B. Write down only the question number (1.1 – 1.10) and the matching letter (A – L) in COLUMN B, for example 1.11 K.

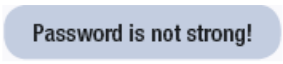
COLUMN A	COLUMN B
2.1. SMTP	A. Skype
2.2. Social Networking	B. Audio only broadcast released on the internet.
2.3. VOIP	C. Instant messaging
2.4. Asynchronous communication	D. Very weak processor, low quality screen and poor camera
2.5. Cell phone	E. Installed on a server or router that protects all the computers on the network.
2.6. Podcast	F. Virtual community that communicates and interacts via the internet
2.7. Feature phone	G. Like Wi-Fi, but has a much bigger range of up to 50 km
2.8. POP3	H. Protocol responsible for delivery of email
2.9. HTTP	I. These phones were designed specifically to make calls and send SMSs
2.10. WiMAX	J. One of the protocols that is used to retrieve emails from your mail server.
2.11. Software firewall	K. Determines how web pages are viewed.

3. Define electronic communication.
4. What is email used for?
5. List TWO netiquette rules that you should apply when sending an email.
6. What is blogging? List TWO disadvantages of blogging.
7. Give TWO differences between a smartphone and a feature phone.
8. An important part of a network is a firewall.
   8.1. What is a firewall?
   8.2. Name TWO ways that a firewall protects your computer.
   8.3. Brie y explain how a firewall works.
9. Your uncle is considering publicising his business on the internet and has heard that he can use either a microblog or a vlog service.
   9.1. Differentiate between a microblog AND a vlog service
   9.2. Provide an example of a microblog AND a vlog service.

10. Briefly explain what encryption is.
11. Give an example of how a bank uses encryption.
12. List TWO advantages of vlogging.
13. List TWO disadvantages of video conferencing.
14. To be able to buy tickets for transport online, a user must complete the online form shown below. When purchasing tickets online, users need to provide personal information.



    14.1. State TWO precautions to prevent identity theft, which could take place during this process. The following error message appears when the 'Confirm Registration' button is clicked:



    14.2. Suggest TWO ways to ensure that a password is strong.

15. Your brother knows that one of the biggest advantages of smartphones is that they provide access to high speed internet and the world-wide web.

    15.1. List TWO disadvantages of smartphones.
    15.2. Give TWO threats your brother's phone can be exposed to.
    15.3. Discuss THREE ways mobile web pages differ from their desktop pages.

2. Social implications

1. Explain how digitalisation is reducing the number of staff needed for the below careers.

FARMER	
SECRETARY	
MECHANIC	
MEDICAL FIELD	

2. Provide the job description for the below careers. Explain if you would you like to work in this career.

CAREER	JOB DESCRIPTION	EXPLAIN IF YOU WOULD YOU LIKE TO WORK IN THIS CAREER
3D architect		
Privacy consultant		
Medical nanobot technician		

3. List five ways to protect your online identity.
4. Do you think companies need to protect the identities of their staff? Explain.

3. Database management

1. Match COLUMN A with the correct answer in COLUMN B. Write down only the question number (1.1–1.6) and the matching letter (A–F) in COLUMN B, for example 1.6–F.

COLUMN A	COLUMN B
1.1. Size	A. Powerful since they can be expanded easily and make use of the power and bandwidth provided by multiple computers
1.2. Desktop software	B. Amount of data that will be stored on the database.
1.3. Distributed database	D. Designed to work on a user's personal computer.
1.4. Database programmer	E. Working with companies to identify opportunities to set up and improve their data systems.
1.5. Database analyst	F. Creates database and database structures

2. The database will be designed on one computer and will run on one standalone computer.
   2.1. What is the name given to this type of database?
   2.2. Give an example of a program that can be used to design the database mentioned in the previous question.
   2.3. What is the name given to a database that is shared on the internet?
   2.4. Give TWO examples of programs that can be used to design the database described in the previous question.
3. While discussing the database, it is suggested that you set up a distributed database for your small office.
   3.1. What is a distributed database?
   3.2. Justify why this may not be a good idea.
   3.3. Suggest a more appropriate type of database for your office.
   3.4. Give an example of a program that can be used to design a distributed database.
   3.5. Will it be possible for many staff members to work on the distributed database at the same time? Please justify your answer.
   3.6. You realise you might need the help of a database programmer. List THREE responsibilities a database programmer has.
4. Choose the correct answer.
   4.1. Which one is NOT a function or duty of a database administrator?
      A. Managing and maintaining the database via a DBMS.
      B. Capturing and entering data in a database.
      C. Setting up and maintaining users of the database and their access rights.
      D. Performing routine maintenance on the database.
   4.2. Which one of the following is an example of a distributed database?
      A. Amazon web services
      B. Google
      C. Wikipedia
      D. Superbalist

5. Match COLUMN A with the correct answer in COLUMN B. Write down only thequestion number (1.1–1.6) and the matching letter (A–F) in COLUMN B, forexample 1.2–A.

COLUMN A	COLUMN B
5.1. Distributed database	A. Create database tables
5.2. Spotify	B. An example of a typical desktop database
5.3. Database	C. One example of how a DBMS is used
5.4. DBMS software	D. Responsible with working with companies to identify opportunities to set up and improve their data systems
5.5. Database analyst	E. Databases that are not stored and run from a single computer (or server), but instead are stored on multiple computers at the same time
5.6. Microsoft Access	F. Used to store data

6. What is a database used for?
7. List TWO factors that determine how databases are used.
8. Give ONE difference between a database on a desktop and database on a server.
9. Give THREE factors to consider when choosing a DBMS to use for the database.
10. List TWO open-source DBMS applications.
11. Give a description of a Microsoft SQL Server.
12. Look at the following DBMS systems. Indicate which type of DBMS you would use for the following situations. Motivate your answer.
    12.1. Sign-in and sign-out information of a company of 100 employees.
    12.2. An online programming course website.
    12.3. An online hotel booking service.
13. Discuss TWO reasons why businesses make use of the distributed database.
14. You have been appointed as a Database Analyst for the planned database of your brother's Primary School. More than 1 000 learners attend the school, you must make several presentations to the school management, teachers and governing body.
    14.1. One of the governing body members has suggested that you plan for a distributed DBMS instead of a server DBMS.
    14.1.1. What is a DBMS?
    14.1.2. List THREE activities that a DBMS allows you to do.
    14.1.3. Give TWO reasons when it becomes necessary for an organisation to have a distributed database.
    14.2. A Database Administrator will have to be appointed. List TWO tasks of a database administrator.
15. You want to create a database for a new online messaging app to store both the users' settings and the messages sent between users. It is difficult to say how much data will be used. Since it is a new application, you do not expect there to be millions of messages sent. However, even with just a few thousand users, you can easily see a hundred thousand messages being sent a day. The database should therefore be designed to handle large amounts of data.
    15.1. Describe the difference between a local database and an online database.
    15.2. Based on this scenario, which database would you use. Motivate your answer.
16. You need to create a database used to store the text and images for a large website. The website will need to be very reliable and be able to expand quickly as it becomes more popular. Which type of database would you choose for this scenario? Motivate your answer.
17. The following screenshot is an example of a possible database that can be used. It is created in Microsoft Access. A database analyst was asked to help with this.

17.1. List TWO tasks of a database analyst.

Name	Surname	Age	M/F	Team	Free50m	Breast 50m	Back 50m	Fly 50m
ADRIAAN	VAN NIEKERK	19	M	Sticks	☑	☑	☐	☑
BAREND	TAUTE	19	M	Sticks	☑	☐	☐	☐
RUAAN	VD BERG	19	M	Sticks	☑	☑	☑	☑
Frederik	Engelbrecht	16	M	Anchors	☑	☑	☑	☑
ELOUISE	ROUSSEAU	16	F	Sticks	☑	☐	☑	☐
LIZ-ANGELA	ROMYLOS	16	F	Sticks	☑	☑	☑	☑
JOHAN	VISAGIE	19	M	Sticks	☑	☐	☐	☐
ELBE	VD WALT	19	F	Sticks	☑	☑	☑	☑
ANIKA	PRETORIUS	15	F	Shovels	☑	☑	☑	☑
Marco	Grond	16	M	Anchors	☑	☑	☑	☑
KRISTEN	RAUTENBACH	16	F	Sticks	☑	☑	☑	☑
CHRISTINE	ROMYLOS	14	F	Sticks	☑	☑	☑	☑

17.2. Under which Database Management System (DBMS) software does Microsoft Access fall?

17.3. Give ONE advantage of the database described in above).

4. Database design

1. Your local library has asked you to write a program that will help them to keep track of which member has taken out which book. The following database tables have been designed to store data for the library.

TABLE: tblBooks

FieldName	Example of Data
BookID	001
BookName	Double Dexter
Author	Jeff Lindsay
Genre	Crime
BookReplacementCost	199.99
Available	Yes

TABLE: tblMembers

FieldName	Example of Data
MemberID	001
Name	Annie Black
Address	101 Wisteria Road, Durbanville
ContactNumber	082 121 5687
Blacklisted	No

Give the name of ONE field in each of the tables that can could be used as an acceptable primary key field.

1.1. There is currently no relationship between the two tables. Which fields will you use from each table to create a one to many relationship? Draw the relationship with the two tables in your workbook.

1.2. Describe a sensible way of relating the data in the two tables. You may add any fields or tables that you feel are necessary to achieve the goal.

1.3. The tblMembers table displays sample data, but the field data types have not been given. Suggest data types for each of the fields listed in the tblMembers table.

1.4. Differentiate between data validation and data verification, providing an example in each case to illustrate your answer.

1.5. Should the tables be renamed to Table 1 and Table 2? Justify the response to your answer with a suitable explanation.

2. The Water Department has designed a database to store information relating to South African Dams and the Towns that are fed by these Dams. Examine the layout of the database and answer the questions that follow:

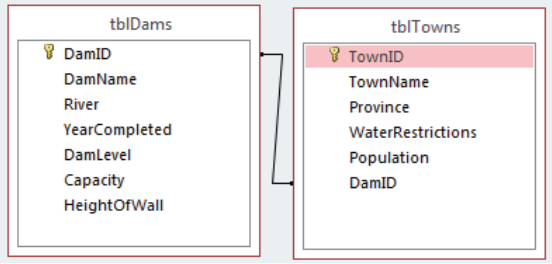
tblDams | tblTowns

DamID	DamName	River	YearComplete	DamLevel	Capacity
1	Albasini Dam	Levubu River	05/05/1976	20053	28200
2	Albert Falls Dam	Umgeni River	29/05/1905	142339	288100
3	Allemanskraal Dam	Sand River	13/05/1969	128666	174500
4	Alphen Dam	Bonte River	12/06/1905	237	700
5	Armenia Dam	Leeu River	07/05/1976	7056	13000

tblTowns

TownID	TownName	Province	WaterRestrictions	Population	DamID
1	Willowmore	Eastern Cape	False	7100	6
2	Queenstown	Eastern Cape	False	55800	14
3	East London	Eastern Cape	False	423500	18
4	Kareedouw	Eastern Cape	False	3400	23
5	Tsomo	Eastern Cape	False	10600	107

3. Relationship between tblDams and tblTowns



3.1. In the tblDams table, the DamID field has been created as a primary key field.

A. What is a primary key field?

B. If this DamID field did not exist, suggest another possibility for having a primary key using only the existing data.

3.2. The database shown is a relational database.

A. Give TWO characteristics of a relational database.

B. Suggest another database model that can be used to store data.

Practical content

1. Question 1

Before we try our hand at text files and arrays lets quickly run through built-in methods for string manipulation as this will be applied many times when prosessing texts files and arrays:
Can you remember the methods, what they are used for and how to use them?

1.1. String methods: Complete the table below:

Method	What is it used for?	State function or procedure and how it is used?
	Determines the position str1 in str2. If found it returns the position in str2 of the first character of str1 else if not found returns -1	Function: str1 the string to look for str2 the string to look in for str1 Assign the return value to an integer variable
Copy (s, n, m) Copy (s, n)	Returns a string m characters long starting at position n in string s. Returns a string from position n to the end of s	
	Returns the number of charaters in string s	Function: s the string whose length is needed Assign the return value to an integer variable
Concat (s1, s2, ..., sN)		Function: s1 the first part of new string s2 the second part sN the nth part or in this case the last part of the new string. Assign the return value to a String variable
SetLength (s, n)	Let m = Length(s). Sets the length of string s to n characters. Truncates if n < m. Adds unintialised characters if n > m	
Insert (s1, s2, p)		Procedure: s1 string to insert s2 string in which s1 is inserted n position in s2 where s1 is inserted Call the procedure
	Deletes n characters from s starting at position p	Procedure: s string to delete characters from p position to start deleting from n number of characters to delete
Uppercase (s)		Function: s the string needed in uppercase Assign the return value to a string variable.

Lowercase (s)	Converts uppercase characters in s to lowercase	
	Compares s1 to s2 ignoring case Returns 0 if s1 = s2 Integer > 0 if s1 > s2 Integer < 0 if s1 < s2	Function: s1 and s2 are string to be compared to each other Assign return value to an integer variable

1.2. Character methods: Complete the table below:

Method	**What is it used for:**	**How is it used:**
chr(ch)		Function: chr is the character whose ASCII code value is required. Assign the return value to an integer variable
ord (n)	To find the character given the ASCII code value	
	To convert a character to uppercase	Function: ch the character to convert to uppercase Assign the return value to a char variable

1.3. Open the **Wildlife_p** project in the Wildlife Folder. The ListBox lstEnclosures stores information about the details of each enclosure in the Wildlife Park in the following format:

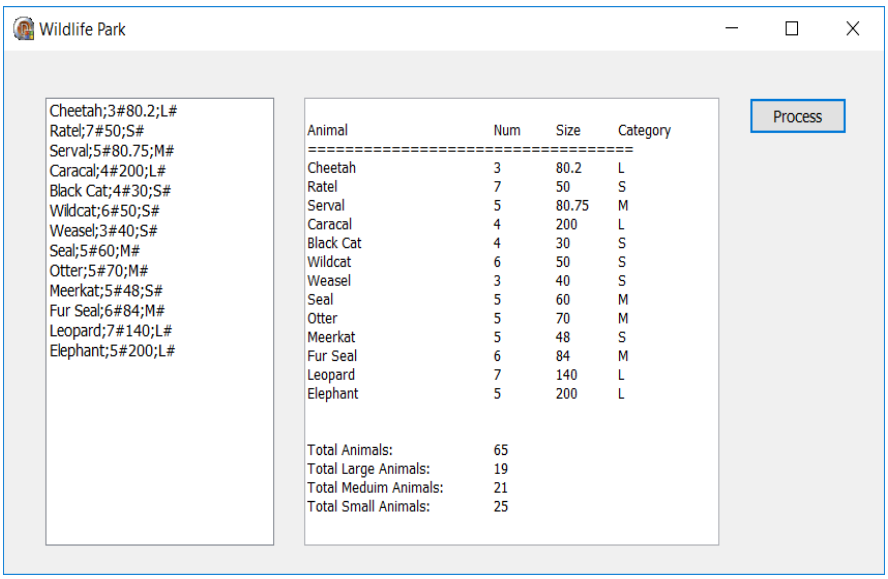
<Type of animal>;<Number of animals currently in the enclosure>#<Size of the enclosure in square metres>;<Category of animals based on size>#

Example of the data for the first five enclosures in the ListBox lstEnclosures:

- Cheetah;3#80.2;L#
- Ratel;7#50;S#
- Serval;5#80.75;M#
- Caracal;4#200;L#
- Black-footed Cat;4#30;S#

Write code for the **[Process**] button to do the following:

a. Read each line of text from the ListBox lstEnclosures and display the text in the format shown in the sample run below.
b. Display the total number of animals found at the Wildlife Park.
c. Determine and display the number of animals in each category ‘L’, ‘M’ and ‘S’.



2. Question 2: Text Files (Chapter 5: DBE Textbook)

2. Can you write code to?
   - 2.1. link a physical file on the storage device to a logical file in primary memory?
   - 2.2. test if a file exists?
   - 2.3. set a text file in read mode?
   - 2.4. set a text file in write mode?
   - 2.5. set a text file in append mode?
   - 2.6. read from a text file?
   - 2.7. write to a text file?
   - 2.8. append text to an existing file?
   - 2.9. close a text file?

Provide Delphi code statements for each of the above given the following variable declarations:

```
var
  line: String;
  infile: Textfile;      //file to read from
  outfile: Textfile;     //file to write to
  filename: String;
```

3. Question 3: Text Files (Chapter 5: DBE Textbook)

3. Open the project **GamingWebsite_p** from the Gaming Websites Folder. An advertising agency is tracking the popularity of various gaming websites. Data on the websites has been captured in a text file named **sites.txt** with #-symbol delimited text formatted as follows:

<SiteName>#<AverageRating>#<TotalRating>#<NumberOfRatings>

e.g. Constructoid#3#80#27

3.1. In the form's OnShow event write code to:

- Test if the file sites.txt exists. If it exists, connect to, and open the file for reading.
- Loop through the textfile, reading each line and adding it to the lstSites ListBox.
- If the file does not exist, display 'sites.txt no found' and terminate the program.

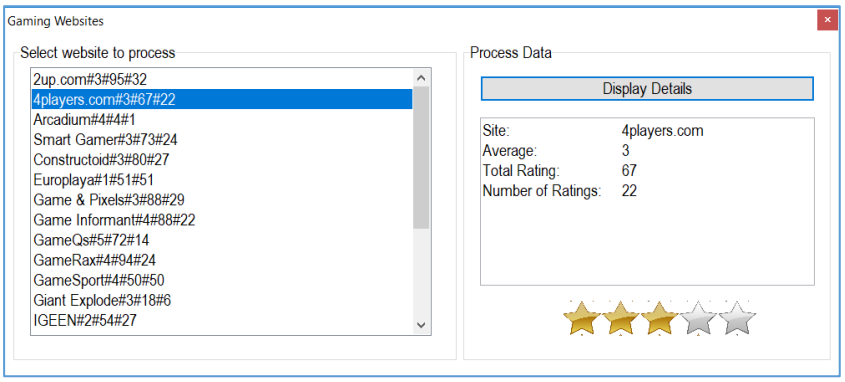
3.2. In the OnClick event of the [Display] Button write code to:

- Check if an item in lstSites is selected. If not, then provide an appropriate error message.
- Extract the selected item from the lstSites ListBox.
- Process the extracted data, separating the delimited data.
- Display the Site Name, Average, Total and Number of Ratings in separate lines in the redOut RichEdit component.

Six image files are provided in the project folder holding images representing ratings ranging from 0 stars to 5 stars.

For example, the file name for the image with 5 stars is 5.jpg.

3.3. Use the Average Rating to generate a file name by combining the rating with '.jpg'. Use this filename to load the appropriate image to the imgRating Image Box.



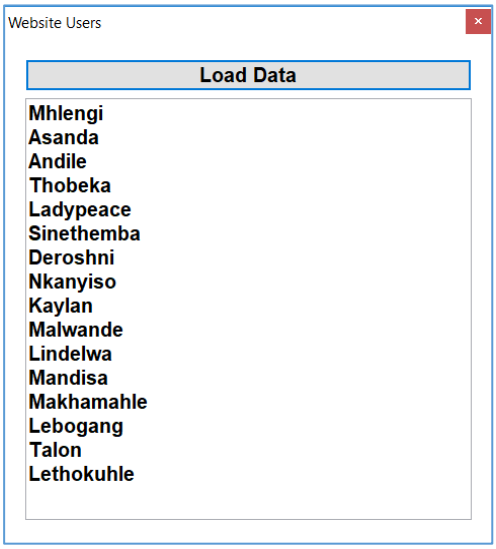
4. Question 4: Text Files (Chapter 5: DBE Textbook)

4. Open project WebsiteUsers_p from the 05 – Website Users Folder. Details on registered users for a popular website are stored in a text file Users.txt. Storing data into this text file without any security would put the system at risk. As a result, a user's name is obfuscated (hidden) by inserting dummy data between the actual data. The actual data is found at the even positions of the provided text.

For example: FTBaYLHoKnU represents the name Talon

F	T	B	a	Y	l	H	o	K	n	U
1	2	3	4	5	6	7	8	9	10	11

First 3 lines from the Text File: rMMhUlOeCnDgKiB
SAWsIaNnCdHaI
VABnOdKiFlVeK



In the OnClick event of the **[Load Data]** button write code to:

- Check if the Users.txt text file exists. If the file does not exist, display an error message and terminate the program.
- Connect to the file and open it for reading.
- Loop through the text file, extracting a single line from the file each time the loop runs.
- Process the extracted line, copying only the characters at even positions in the extracted line.
- Display the processed line (decrypted) in the redOut RichEdit Box.

5. Question 5: Arrays (Chapter 3 DBE Textbook)

5. Can you write code to?
   - Declare an array?
   - Populate an array?
   - Display the elements of an array?
   - Count the elements based on some criteria?
   - Insert and delete elements in an array?
   - Remove duplicates from an array?
   - Search and Sort the elements of an array?
   - Process parallel arrays?

Given the following set of marks for the subjects Mathematics, English and IT:

Learner name	Math %	Eng %	IT %
Bradley	56	82	59
Shaun	78	56	63
Shanaaz	82	73	67
Letitia	62	45	75
Vuyo	79	76	85

Write code statements to:

5.1. Declare an Array for the learners called arrLearner and populate it with given names.

5.2. Declare an array for the mathematics marks called arrMath and initialise the elements with the given values.

5.3. Declare arrEng to hold the english marks and arrIT for the IT marks.

5.4. Allow the user to enter the English marks using an input box that appears 5 times.

5.5. Assign the given IT marks to the elements of the IT array.

5.6. Determine the average maths mark and assign to variable aveForMath.

5.7. Determine the average performance of Bradley over the three subjects and assign to aveBradley.

Now without changing the original dataset (the table above) list what must be coded to achieve the following:

5.8. Rank the learners according to their IT mark.

5.9. Rank and display the learners according to their overall performance over the 3 subjects.

6. Question 6: Arrays (Chapter 3 DBE Textbook)

6. For this application, open the project saved in the Password Strength Folder. Once done, save the project in the same folder. For this question, an array called arrPasswords has been declared and populated in the **[Generate 20 Random Passwords]** button.

6.1. Write code for the **[Test Password]** button that reads the password from the EditBox edtPassword and determines whether the password is strong or weak. A strong password needs to meet all the following criteria:

- The length of the password is a minimum of 6 characters.
- The password contains at least one digit.
- The password contains at least one letter.
- The password contains at least one of the following special characters: * , # , ? , $. Otherwise, the password is considered to be weak.

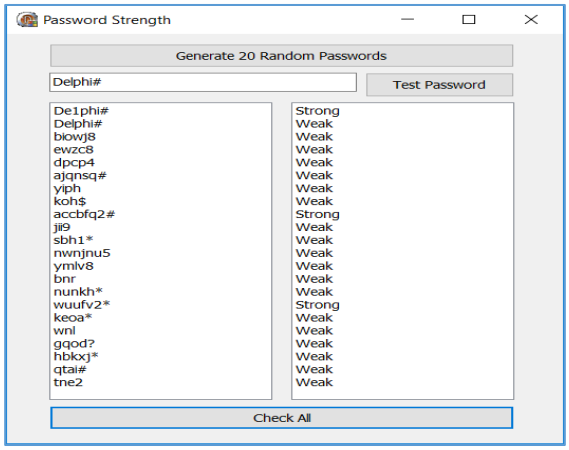
6.2. Add the password, as well as the strength of the password, to the ListBoxes as shown below. Use test cases: De1phi# and Delphi#

6.3. When the **[Check All]** button is pressed, use a FOR-loop to check the strength of all the passwords in the array.

6.4. Record the strength of all passwords in the parallel array named arrStrength.

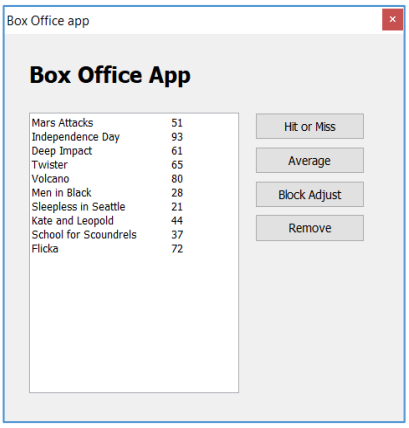
6.5. Display all the passwords, as well as the strength of the passwords, as shown below.

Except for entering De1phi# and Delphi# your list of randomly generated passwords will be different.



7. Question 7: Arrays (Chapter 3 DBE Textbook)

7. Open project BoxOffice_p in the Box Office Folder that provides the following interface:



Two parallel arrays have been declared and initialised:

- arrMovies – an array of type String containing the names of movies.
- arrTickets – a parallel array of type Integer containing the number of tickets sold for each movie in arrMovies.

The variable iItems tracks the number of items in the Array.

7.1. When the **[Hit or Miss]** button is pressed:
Determine and display which movie has sold the greatest number of tickets.
At the same time, determine and display which movie has sold the least number of tickets.

7.2. When the **[Average]** button is pressed:
Determine and display the average ticket sales across all the movies being shown.

7.3. A businessman has sponsored 100 tickets per movie to a local school. Write code for the **[Block Adjust]** button, which will increase the ticket sales of all movies by 100.

7.4. Movies have a limited run on the circuit. This means that eventually, it is removed from cinema listings and is released to home video or streaming services.
Write code for the **[Remove]** button which will prompt the user to input the name of a movie. Locate the movie in the movies array and remove its entries from both arrays.

8. Question 8: String handling, file handling and arrays (bringing it all together)

8. Open project StaffLogin_p from the Staff Login Folder.
A business requires a login system for employees when they interact with a work computer. Details on users have been captured in a text file named staff.txt. The text file contains delimited data formatted as follows: `<NAME>#<ID NUMBER>#<PASSWORD>`

For example: *Mike#9908045421087#ke*

- Mike is the staff member's name
- 9908045421087 is the staff member's ID Number
- ke is the staff member's password

For convenience, all passwords have been set to the last two letters of the staff member's name.
Note: all staff members were born before the year 2000.
The following data structures have been declared globally:

DATA STRUCTURE	TYPE	PURPOSE
arrName	Array [1..50] of String	Stores names of employees
arrPassword	Array [1..50] of String	Parallel array to *arrName*, storing employee passwords
arrGender	Array [1..50] of Char	Parallel array to *arrName* and *arrPassword*: stores gender of employees – M for Male and F for Female
arrAge	Array[1..50] of Integer	Parallel array to *arrName*, *arrPassword* and *arrGender*. Stores age of employees
iMax	Integer	Stores the number elements in the arrays
CURRENTYEAR	Integer constant	Stores the current year – This value should be changed in its declaration from 2019 to the current year, if necessary

Explanation of the SA ID Number:

Example: *9908045421087*

- 99 is the year of Birth
- 08 is the month of Birth
- 04 is the day of Birth
- Digits 7–10 indicate whether the ID belongs to a Male or Female. If the number >= 5000, the ID belongs to a male. If the number < 5000, the ID belongs to a female. In this case, the gender code is 5421 meaning that this ID belongs to a male.

8.1. In the Form's **onShow event** write code to:

- Initialise Imax to zero.
- Clear the Combobox.
- Connect to and open text file **staff.txt** for reading.
- Loop through the file, reading each line.
- Process each line, separating the name, ID number and Password.
- Increment the value of the iMax variable.
- Add the user's name to the arrName array.
- Add the user's password to the arrPassword array.

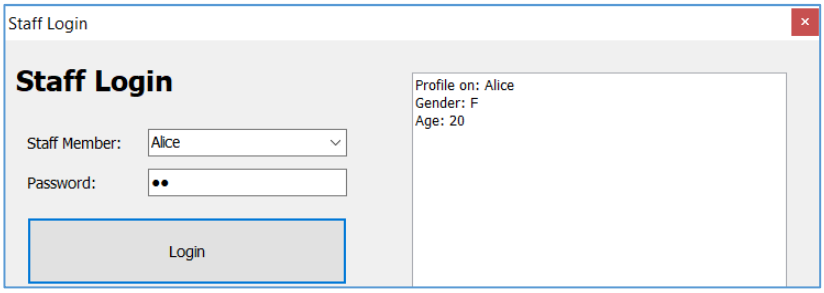
- From the user's ID Number:
  - Determine their Gender and store either 'M' or 'F' in the relevant index position of the arrGender array.
  - Calculate the user's age by determining the difference between the year value from their ID Number and the constant CURRENTYEAR. Store the user's age in the relevant index position of the arrAge array.
- Add the user's name to the cmbLogin ComboBox.
- After the loop terminates, close the text file.

8.2. In the OnClick event of the **[Login]** button write code to:

- Extract the Item Index from the cmbLogin ComboBox to determine the index position (in arrName) of the user attempting to login.
- Compare the password extracted from the edtPassword EditBox with a password from the arrPassword array (the Index position extracted from cmbLogin can be used to determine which element from arrPassword is tested). If the input password matches the corresponding password in arrPassword, display the user's details in the redOut RichEdit box (see the screenshot below for the format).
- If the passwords do not match, display an appropriate message.
- Furthermore, management requires that a log be kept of everyone who logs in.

When a user successfully logs in:

- Check whether text file Log.txt exists. If it does not exist, create a new file using the Rewrite procedure.
- If it exists, open it for writing using the Append procedure.
- Add the user's name (who logged in successfully) as a new line in the Log.txt file.
- Close the file.



8.3. In the OnClick event of the **[Register]** button write code to:

- Use InputBox dialogs to prompt the user to enter their name, ID Number and Password.
- Add the input data to the text file staff.txt, formatted with the '#' delimiter separating the data in the following format:

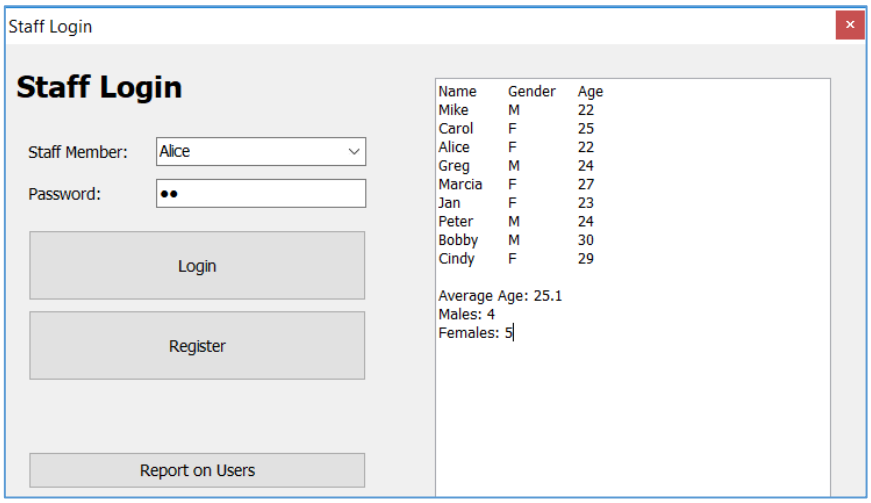
  <NAME>#<ID NUMBER>#<PASSWORD>

- Call FormShow to refresh the arrays and the Combobox as the last line in the OnClick event:

```
FormShow(nil);
```

8.4. In the OnClick event of the **[Report on Users**] button write code to:

- Display the contents of the arrays arrNames, arrGender and arrAge in neat columns, with suitable-headings.
- Calculate and display:
  - The average age of all staff members.
  - The number of male staff members and the number of female staff members.

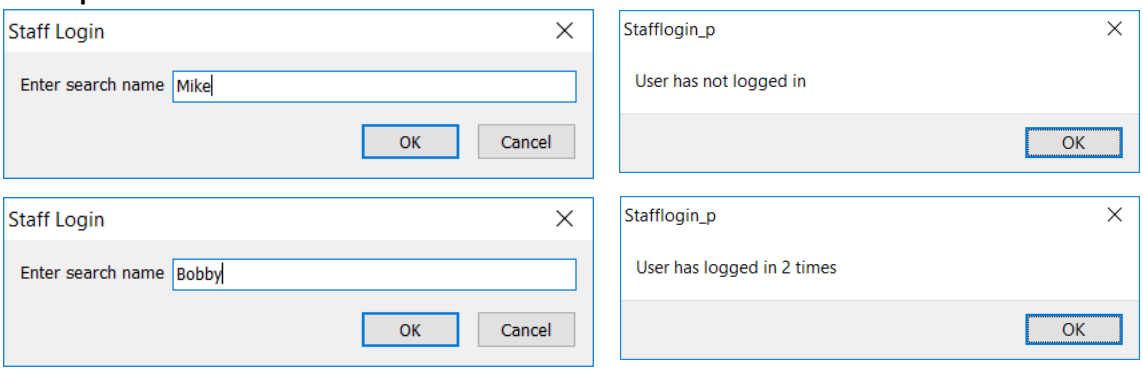


8.5. In the OnClick event of the **[Report on Logins]** button write code to:
Open file **log.txt** text file for reading. Loop through the file, displaying all logins. Count and display the total number of logins.

8.6. In the OnClick event of **the [Search for User Login]** button write code to:

- Prompt the user to input the name of a staff member using a DialogBox.
- Loop through the log.txt text file to count the number of times the staff member has logged in.
- If the staff member has never logged in, display a DialogBox with the message 'User has not logged in'.
- If the staff member has logged in, display the number of times their name appears in the log file using a DialogBox.

Sample Data 1



9. QUESTION 4: PROBLEM-SOLVING PROGRAMMING

(National Senior Certificate: Information Technology – Paper 1, November 2019)

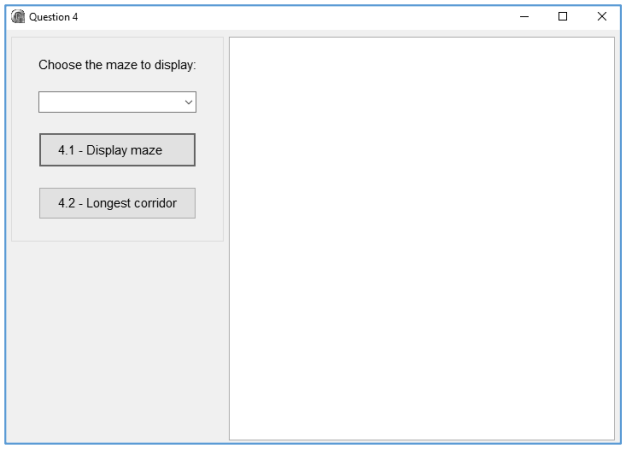
SCENARIO

A school uses a maze as a team-building activity for the rugby and netball first teams.

Do the following:

- Open the incomplete program in the **NSC Nov2019 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.

Example of the GUI:



The following code has been provided:

```
const
      iRowCount = 16;
var
      arrMaze : array[1..iRowCount] of String;
```

The maze is represented using various characters as follows:

- The '@' character indicates the outer border of the maze.
- The '#' character indicates a barrier (wall).
- The dash ('-') character indicates an open space (corridor).

4. Complete the code for EACH section of QUESTION 4, as described in QUESTION 4.1 and QUESTION 4.2 that follow.

4.1. **Button [4.1 - Display maze]**

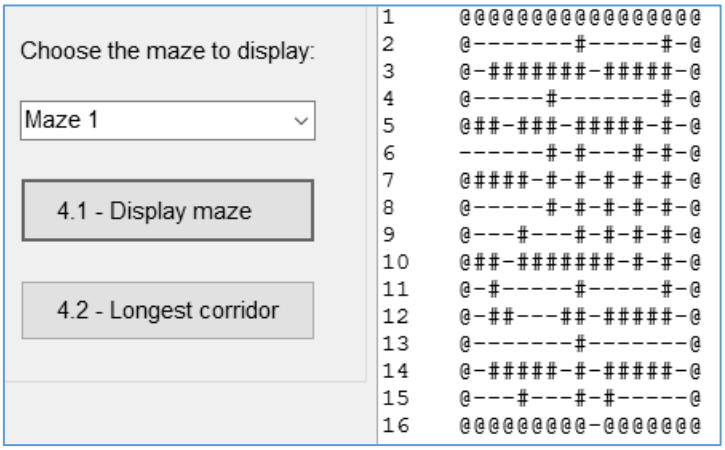
A combo box called **cmbQ4_1** has been populated with the names of the three mazes, namely **Maze 1**, **Maze 2** and **Maze 3**. Three text files called **Maze 1.txt, Maze 2.txt** and **Maze 3.txt** are provided. Each text file contains lines of characters that represent the layout of each maze respectively.

The user must select a maze from combo box **cmbQ4_1**. Code has been provided to clear the component called **redQ4**.

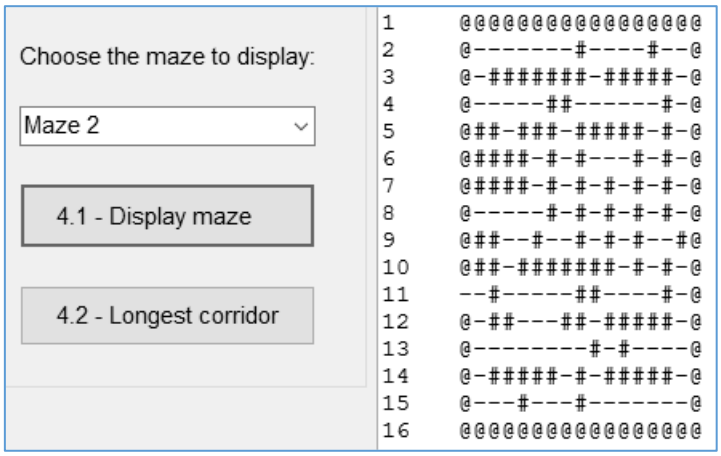
Write code to do the following:

- Extract the name of the selected maze from combo box **cmbQ4_1**.
- Display a suitable message if a text file does NOT exist for the selected maze.
- Do the following if a text file for the selected maze does exist:
  - Read ONE line at a time from the text file.
  - Save EACH line at the correct index in the array **arrMaze** provided.
  - Display EACH line of the maze with its corresponding line number in the output component **redQ4**.

Example of output if **Maze 1** was selected from the combo box:



Example of output if **Maze 2** was selected from the combo box:



(11)

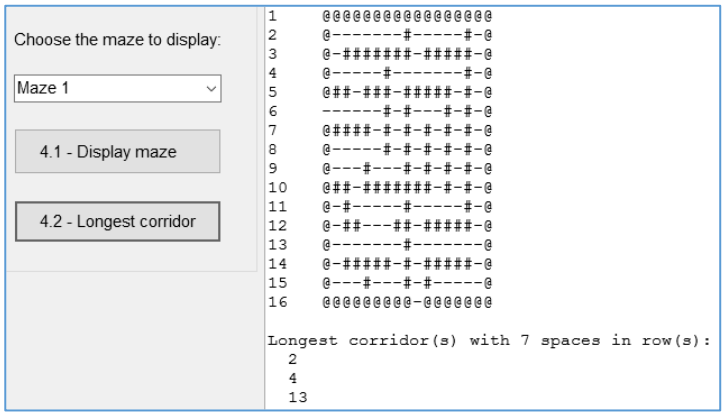
4.2. **Button [4.2 - Longest corridor]**

The longest corridor refers to the maximum number of consecutive horizontal open spaces in a row in the maze. An open space is represented by the dash ('-') character.

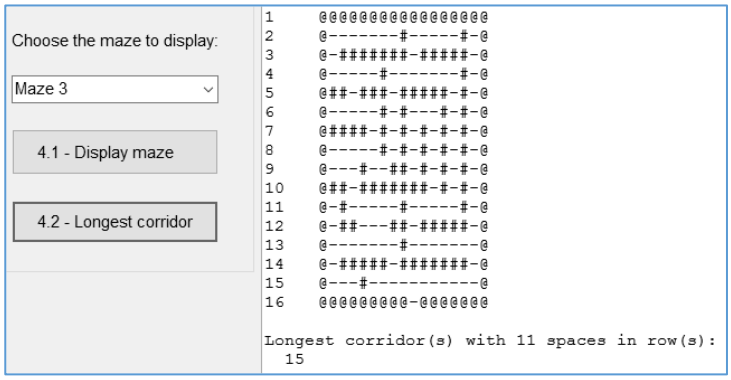
Write code to do the following:

- Determine the maximum number of consecutive horizontal open spaces in a row in the array **arrMaze**.
- Display the maximum number of consecutive horizontal open spaces as part of an output statement.
- Display a list of row(s) that contains a corridor with the maximum number of consecutive horizontal open spaces.

Example of output for **Maze 1**:



Example of the output for **Maze 3**:



(19)

Total 30

Solutions: Theory

1. Electronic communication

1. a. A
   b. D
2. 1-H, 2-C, 3-A, 4-F, 5-I, 6-B, 7-D, 8-J, 9-K, 10-G, 11-E
3. Electronic communication refers to any data, information, words, photos or symbols that are sent electronically in order to communicate with one or more people. Some of the most popular forms of electronic communication include calls, messages, group chats, emails, social networks and websites.
4. Emails are used for communication via the use of the internet to instantly deliver mail to a recipient, they are mainly used for work based communications.
5. – Be formal and direct.
   – Refrain from the use of slang in emails.
6. Blogging is created website where the creator of said website posts short, informal stories or articles. Any two of the following:
   – Easy to set up
   – Place to share a personal opinion
   – Can be both large or small
   – Does not need to be professional
   – Visitors understand layout
7. A smart phone has a high-resolution touch screen display and Wi-Fi connectivity where as a feature phone does not.
8. a. A firewall is hardware, software or a combination of both, that monitors incoming and outgoing traffic on the network.
   b. – The firewall decides whether to stop the traffic based on a set of predefined security rules.
   – It creates a barrier between an internal network and incoming traffic from external sources.
   c. A firewall blocks malicious malware or virus from entering the hardware / software.
9. a. A microblog is a combination of blogging and instant messaging and a vlog is like blogging but with videos.
   b. Microblog: Twitter / vlog service: Youtube
10. Encryption is the final security tool used on computers, any data sent between two computers is changed from something that is useful to encrypted data that is difficult to decrypt and use by unauthorised people.
11. With encryption, any data sent between two computers is changed from something that is useful to encrypted data that is difficult to decrypt and use by unauthorised people. The only way to turn the encrypted data back into useful data is to know the encryption key, which is only known by the receiving computer.
12. – They can be streamed live, allowing people to watch the video as it is created
   – they can be made on any topic that peaks your interest.
13. – Requires a fast internet connection.
   – Uses a significant amount of data, so it can be expensive.
14. Any two of the following:
   - Choose a password that is long (at least 8 characters).
   - Include uppercase and lowercase letters, as well as numbers, in your password.
   - Never use personal information such as a birthdate or the name of your favourite sports team as a password.

- Create different passwords for different websites. In this way, if someone hacks your social media account, they cannot use the same password for your online banking.
- Do not share your passwords with other people and do not write your passwords down.

15. a. – It has a limited battery life.
    – it can be easily misplaced.
    b. Learner dependent answer.
    c. – They are smaller and easy to navigate
    – They provide less detailed pages compared to the desktop pages.

2. Chapter 7: Social implications

1. Accept all reasonable answers.

FARMER	Digitalisation is reducing the need for short term, manual labour that performs the "heavy lifting" of agriculture by replacing these jobs with a reduced number of highly-skilled full-time positions.
SECRETARY	Automating tasks in the office can have both positive and negative effects on workers. Certain tasks can be performed more quickly and accurately using a computer, which would allow the workers to spend more time on other aspects of their jobs. Workers may be resistant to the fact that they would have to learn how to work with computing devices in order to complete these tasks and they may feel that their jobs are threatened by the devices
MECHANIC	Robots can effectively be used to perform tasks that would be too dangerous for a human to perform or that require a large degree of repetition. They could also be used to perform tasks that require strength beyond what a human being would have.
MEDICAL FIELD	Artificial intelligence (or AI) refers to a field of computer studies in which programmers try to create or simulate human intelligence in machines. In the workplace, the goal of AI is to allow computers to do tasks that typically require human intelligence.

2.

CAREER	JOB DESCRIPTION	EXPLAIN IF YOU WOULD LIKE TO WORK IN THIS CAREER
3D architect	3D architects are designers who use 3D software to create models of buildings and other structures. The process of 3D printing involves utilising computeraided design (CAD) information to print products in layers. A 3D printing operator oversees the printing process. Examples include prostatic limbs, plastic models and cameras.	Learner dependent answer
Privacy consultant	Is exactly that, a consultant who deals with the online privacy of a corporation. They assess and define system specifications in relation to compliance with data protection and privacy regulations. They follow proper data management systems and build positive relationships with a variety of stakeholders.	Learner dependent answer

Medical nanobot technician	Nanorobotics is a technology field that creates machines or robots with components that are at or near the scale of a nanometre. Nanotechnology in medicine involves applications of nanoparticles currently under development research that involves the use of manufactured nano-robots to make repairs at the cellular level, this can cure cancer cells in the future.	Learner dependent answer

3. Use strong passwords; Check social media privacy settings; Avoid public Wi-Fi; Avoid Phishing emails; Always use secure websites; Update security updates; Shred sensitive documents.
4. Learner dependent answer.

3. Chapter 8: Database management

1. 1-B, 2-D, 3-, 4-A, 5-F, 6-E
2. a. Personal database
   b. Microsoft Access
   c. Distributed Database
   d. – Amazon web services
      – Google Firebase
3. a. Distributed databases are databases that are stored on multiple computers at the same time.
   b. Learner dependant answer.
   c. Learner dependant answer.
   d. Google Firebase.
   e. Learner dependant answer.
   f. – Create database and database structures
      – develop database queries
      – optimise database performance
4. a. C
   b. A
5. 1-E, 2-B, 3-F, 4-C, 5-D, 6-A
6. A database is used to store valuable information.
7. – What type of data you would be storing.
   – The size of the company.
8. A database on a desktop is for personal use of one person only, and a database on a server is for anyone to use who has been granted access to it as is accessible on any computer.
9. – who you would be sharing the data with.
   –the security of the data.
   –the management of the data.
10. – MySQL
    – PostgreSQL
11. A relational database management system developed by Microsoft
12. a. Learner dependant answer
    b. Learner dependant answer
    c. Learner dependant answer

13. Learner dependent answer.
14. a. Database management software.
    – Data sharing
    – Have data independence.
    – Have better data integrity.
    b. – Designing and building databases
    – Providing access to the data.
15. b. A local database is made for a personal computer and for the use of one person, while a online database is made for multiple people or a company, that is able to grant access to everyone and they are able to access it from any computer.
    c. Learner dependant answer.
16. Learner dependent answer.
17. a. – Plan and design databases
    – Add and remove fields from existing databases.
    b. Open source DBMS
    c. It is free to use and easy to access.

4. Chapter 9: Database design

1. a. BookID
    MemberID
    b. Learner dependent answer. Accept all reasonable answers.
    c. Learner dependant answer. Accept all reasonable answers.
    d. Data validation refers to the process in which you check whether the data is accurate, in the correct format or of the correct type before recording it in your database. This ensures that the data in your database is consistent and accurate.
    Data verification is a process in which different types of data are checked for accuracy and inconsistencies after data migration is done. It helps to determine whether data was accurately translated when data is transferred from one source to another, is complete, and supports processes in the new system.
    e. Your tables and fields should use effective names that make sense and are easy to understand. Working with a database where all the tables are called “Table 1”, “Table 2” and so forth is not best practice.
2. a. A. It is a field that uniquely identifies each record in the table.
    B. Learner dependent answer. Accept all reasonable answers.
    b. A. Any of the following:
    – Values are atomic.
    – All of the values in a column have the same data type.
    – Each row is unique.
    – The sequence of columns is insignificant.
    – The sequence of rows is insignificant.
    – Each column has a unique name.
    B. Learner dependent answer.

Solutions: Practical

1. Question 1

1.1. String methods

Method	What is it used for?	State function or procedure and how it is used.
Pos (str1, str2)	Determines the position str1 in str2. If found it returns the position in str2 of the first character of str1 else if not found returns 0	Function: str1 the string to look for str2 the string to look in for str1 Assign the return value to an integer variable
Copy (s, n, m) Copy (s, n)	Returns a string m characters long starting at position n in string s. Returns a string from position n to the end of s	Function: s the string your copy from n the position to start copying from m the number of charaters to copy Assign the return value to a string variable
Length(s)	Returns the number of charaters in string s	Function: s the string whose length is needed Assign the return value to an integer variable
Concat (s1, s2, ..., sN)	Returns a string that has the strings joing in the order given, s1 in front and sN last	Function: s1 the first part of new string s2 the second part sN the nth part or in this case the last part of the new string. Assign the return value to a String variable
SetLength (s, n)	Let m = Length(s). Sets the length of string s to n characters. Truncates if n < m. Adds unintialised characters if n>m	Procedure: s the string whose length is set n the new length of s. Call the procedure
Insert (s1, s2, p)	Inserts string s1 into s2 at position p	Procedure: s1 string to insert s2 string in which s1 is inserted n position in s2 where s1 is inserted Call the procedure
Delete (s, p, n)	Deletes n characters from s starting at position p	Procedure: s string to delete characters from p position to start deleting from n number of characters to delete
Uppercase (s)	Converts lowercase characters in s to uppercase	Function: s the string needed in uppercase Assign the return value to a string variable.
Lowercase (s)	Converts uppercase characters in s to lowercase	Function: s the string needed in lowercase Assign the return value to a string variable.
CompareText (s1, s2)	Compares s1 to s2 ignoring case Returns: 0 if s1 = s2 Integer > 0 if s1 > s2 Integer < 0 if s1 < s2	Function: s1 and s2 are string to be compared to each other Assign return value to an integer variable

1.2. Character methods

Method	What is it used for?	How is it used:
chr(ch)	To find the ASCII code value of a character	Function: chr is the character whose ASCII code value is required. Assign the return value to an integer variable
ord (n)	To find the character given the ASCII code value	Function n is the ASCII value whose character equivalent is needed Assign the return value to a char variable
Upcase(ch)	To convert a character to uppercase	Function: ch the character to convert to uppercase Assign the return value to a char variable

1.3. See solution in folder WildLife Ans

2. Question 2

2.1.	`Assignfile (infile, filename);` `Assignfile (outfile, filename);`

2.2.	`If FileExists(filename) then`
	`  // use the file`
	`else`
	`  Showmessage ('File not found');`

2.3.	`Reset (infile);`
2.4.	`Rewrite (outfile); // overwrites and existing fiel with the same name`
2.5.	`Append (outfile);`
2.6.	`Readln (infile, line);`
2.7.	`Writeln (outfile, line);`
2.8.	`Writeln (outfile, line);`
2.9.	`CloseFile(infile);` `CloseFile(outfile);`

3. Question 3

See solution in folder Gaming Websites Ans

4. Question 4

See solution in folder WebsiteUsers Ans

5. Question 5

5.1.	`arrLearners: Array[1..5] of String = ('Bradley', 'Shaun', 'Shanaaz', 'Letitia', 'Vuyo');`				
5.2.	`arrMath: Array[1..5] of Integer = (56, 78, 82, 62, 79);`				
5.3.	`arrEng: Array[1..5] of Integer;`		`arrIT: Array[1..5] of Integer;`		
5.4.	`Var  j: Integer;`		`for j := 1 to 5 do` `  arrEng[j] := StrToInt(InputBox('English marks', 'Enter mark'));`		
5.5.	`arrIT[1] := 59;`	`arrIT[2] := 53;`	`arrIT[3] := 67;`	`arrIT[4] := 75;`	`arrIT[5] := 85;`
5.6.	`Var` `  j, sum: Integer;`		`sum := 0;` `for j := 1 to 5 do`		

	aveForMath: real	sum := sum + arrMath[j]; aveForMath := sum / length(arrMath);
5.7.	Var aveBradley: real	aveBradley := (arrMath[1] + arrEng[1] + arrIT[1])/3;
5.8.	Declare arrays arrCopyLearners and arrCopyIT Copy original data to arrCopyLearners and arrCopyIT Sort the parallel arrCopyLearners and arrCopyIT in order of descending IT marks	
5.9.	Declare arrays arrCopyLearners and arrPerformance Copy original names from arrLearners to arrCopyLearners In a for loop calculate learner average (see 5.7.) with loop variable as index assign answer to corresponding arrPerformance array element Parallel sort arrCopyLearner and arrPerformance in order descending performance mark In a for loop Display the elements of arrCopyLearner and arrPerformance in the required output component	

6. Question 6

See solution in folder PasswordStrength Ans

7. Question 7

See solution in folder Box Office Ans

8. Question 8

See solution in folder Staff Login Ans

9. QUESTION 4: PROBLEM-SOLVING PROGRAMMING

National Senior Certificate: Information Technology paper 1, November 2019

See solution in folder NSC Nov2019 Question 4 Ans

See datafiles for coded solutions. Please first complete the activities before you look at the solutions as struggling to solve the questions is what assists you in learning.