education

Department: Education
PROVINCE OF KWAZULU-NATAL

GREENBURY SECONDARY SCHOOL

Information Technology
November 2017
Paper 2

GRADE 11

MARKS:	150	EXAMINER: M PADAYACHEE
TIME:	2 ½ hours	MODERATOR: S NAIDOO

This paper consists of 12 pages including a cover page.

INSTRUCTIONS AND INFORMATION:

1.   This question paper consists of **6** sections and **12** pages:

Section A:	Short questions	(20)
Section B:	System Technologies	(30)
Section C:	Communication and Network Technologies	(20)
Section D:	Data and Information Management	(20)
Section E:	Solution Development	(30)
Section F:	Integrated Scenario	(30)

2.   Read ALL the questions carefully.

3.   Answer ALL the questions.

4.   The mark allocation generally gives an indication of the number of facts/reasons required.

5.   Number the answers correctly according to the numbering system used in this question paper.

6.   Write neatly and legibly.

SECTION A

QUESTION ONE – SHORT QUESTIONS

1.1. From the options A to D given, select the option, for each question and write down only the letter that best suites the description given.

1.1.1. A device driver …

   A) Is not required in plug and play.
   B) Is not required in hot swapping.
   C) Has to be used by every device attached to a personal computer.
   D) Is not needed for older technologies.

1.1.2. The technology such as retinal scanner is called…

   A) Intelligent scanning.
   B) Biometrics
   C) RFID
   D) Eye scanning

1.1.3. A collection of programs that are designed to infiltrate a computer and gain the highest level of privileges to take control of the infected computer.

   A) Rootkit
   B) Trojan
   C) Admin Bug
   D) Malware

1.1.4. It takes an entire program and translates it into a machine language.

   A) Interpreter
   B) Compiler
   C) Programmer
   D) Decoder

1.1.5. A superfast connection technology which can support multiple conections.

   A) Firewire
   B) HDMI
   C) Thunderbolt
   D) USB

1.1.6. Which one of the following is not an example of an Operating System?

   A) Windows 8.1
   B) iOS
   C) Linux
   D) MS Office Suit

1.1.7. A software that monitors each keystroke a user makes on a specific computer's keyboard, is referred to as...

    A) Keylogger
    B) Adware
    C) Spyware
    D) Cookie

1.1.8. A protocol that is used to deliver from an e-mail client to an e-mail server or from one e-mail server to another.

    A) Spam
    B) SMTP
    C) POP3
    D) TCP

1.1.9. A virtual office is one...

    A) That uses a LAN and intelligent terminals.
    B) Where employees never enter a physical office but rather conduct their business via internet.
    C) That implements virtual memory in a LAN using a suite of office software.
    D) That can only be used in a metropolitan area network(MAN).

1.1.10. Which of the terms is not associated with social engineering?

    A) Shoulder Surfing
    B) Phishing
    C) Artificial intelligence
    D) Role playing   (10)

1.2. ***Supply ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.1.1-1.1.10) in your answer book.***

1.2.1. A key field in a database table that links to the primary key in another table in order to create a relationship between the two tables.

1.2.2. Software that is stored permanently on the ROM chip of a device, such as a printer, to control the basic operation of the device.

1.2.3. A field of study that involves the simulation of human decision making processes by a computer system that is programmed to react on input that is received from the sensors.

1.2.4. A company that has a permanent, fast connection to the internet and sells internet access and services at a monthly fee.

1.2.5. This component generates pulses at regular frequencies to control the activities of the motherboard.

1.2.6. Initiatives to design, use and dispose of technology in an environmentally friendly way.

1.2.7. A pair of fibre optic rings is used, with each ring passing a token in opposite directions so no collisions occur.

1.2.8. It refers to the waiting period when a file is being streamed.

1.2.9. A series of steps that need to be followed when designing a database to ensure that data redundancy occurs.

1.2.10. A signal sent to the CPU from the hardware/software indicating the need for the CPU's attention. (10)

TOTAL SECTION A : [20]

SECTION B: SYSTEM TECHNOLOGIES

SCENARIO:

The municipality has nominated your school as the centre to hold training classes to upgrade the skill levels of the community members in ICT. This initiative is aimed at helping individuals market themselves and promote employment.
The municipality has provided your school with some computers to assist.
The I.T. Educator and I.T. learners will assist in the learning programs.

QUESTION TWO

2.1. A certain class teaching students about the architecture and design of hardware had the following questions posed.

'The motherboard is a large circuit board with many slots, connectors and different parts clearly visible all over it.'

2.1.1. The name of the connector was SATA. What is this connector used for? (1)

2.1.2. What does the motherboard use to transfer data and signals to different parts of the motherboard? (1)

2.1.3. The motherboard has a ZIF socket. What component connects to the motherboard using this socket? (1)

2.2. The donated computers are old and slow. A method of **Overclocking** was suggested to make the computer faster.

2.2.1. Explain the process of overclocking. (1)

2.2.2. Discuss why it is disadvantageous to apply this technique. (2)

2.2.3. The main function of the CPU is to carry out the machine cycle. List the **four** steps of the machine cycle performed by the CPU. (4)

2.2.4. The CPU uses three levels of CACHE memory. Discuss how CACHE memory helps make processing faster. (2)

2.3. Since RAM is so small in the old computers, there is a need for using virtual memory.

2.3.1. State the purpose of virtual memory and how it works.   (2)

2.3.2. What is the main problem experienced when using Virtual storage? How is this problem caused?   (2)

2.3.3. Suggest **one** cost effective way to solve the problem of using virtual storage.
                    (1)

2.4. The Operating system being used in the computers at the learning centre is Windows 8 with and EULA and a copyright protection certificate.

2.4.1. List **three** functions of the Operating system.   (3)

2.4.2. What is firmware?   (1)

2.4.3. List **two** reasons why you would want to update your firmware?   (2)

2.4.4. What exactly is an EULA?   (1)

2.4.5. What is the difference between copyright and Open Source?   (2)

2.5. One of the key functions of the OS is to manage processes and tasks of the CPU. Give a short description of:

2.5.1. Multiprocessing   (2)
2.5.2. Multithreading   (2)

TOTAL SECTION B : [30]

SECTION C : COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION THREE

Your school has decided to link all the computers used for the training sessions. This will mean that the computers will have access to the Internet.

3.1. Different topologies may be used to setup a cabled Ethernet LAN for the computers in question. The most popular LAN topology for schools is a Star topology.

3.1.1. List **two** advantages of having a network.   (2)

3.1.2. Name **one** other type of topology that may be used in LAN.   (1)

3.1.3. State **two** reasons why the Star topology is the best suited for the school LAN.
                                                                                      (2)

3.2. The school has been given a choice between UTP, Fibre Optic cables and Wireless connection.

3.2.1. State **two** advantages that UTP have over Fibre Optic cables in the school setup.   (2)

3.2.2. List **two** advantages of fibre optic cables have over UTP cables.   (2)

3.2.3. Explain the difference between Crosstalk and EMI when UTP cables are used.
                                                                                      (2)

3.3. *Wireless systems have developed over the years and have made communication and networking much easier.*

3.3.1. How does WiFi differ from WiMax?   (2)

3.3.2. State **two** advantages of wireless connectivity.   (2)

3.3.3. State **two** disadvantages of wireless connectivity to your school network. (2)

3.3.4. Wireless systems make use of Access Points. What is the purpose of an access point?   (1)

3.3.5. State the difference between a Repeater and a Router by outlining the function of each respectively.   (2)

TOTAL SECTION C: [20]

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION FOUR

A Database is set up to control and manage the records of training sessions, students and tutors. Study the database provided and answer the questions based on it.

Structure of tables	Tables created in database
Table 1 | * | Session No | | | Course Name | | | Date of Course | | | | **Table 2** | | Tutor ID | | | Tutor Name | | * | Session No | | | |	**Session** | **Tutor** Session No | Course Nam | Date of Cour | Clic 1 Hardware 2017/10/17 TutorID | Tutor Name | Click to Add 100 Paul Links 107 Alvin Chipple 0 2 Software 2017/11/02 TutorID | Tutor Name | Click to Add 101 Calvin Thudor 0 3 Operating Syst 2017/09/12 TutorID | Tutor Name | Click to Add 102 Fred Coulbles 0 4 Databases 2017/10/02 TutorID | Tutor Name | Click to Add 104 Dan Withers 105 Carey Smith 106 Tony Danza

4.1. Name the two tables created in the database. (2)

4.2. The two tables are linked by the fields indicated in the diagram above. It also shows the type of relationship that is created by the data in the database.

4.2.1. Name the type of relationship created by examining the diagram carefully. (1)

4.2.2. Identify the name of the **table 1** and **table 2** as designed in the database. (2)

4.2.3. Name the tutor/s involved in Session 1. (2)

4.2.4. Define the terms primary key and foreign key. Identify these keys and state the table that contains it. (5)

4.2.5. Redraw the two tables and show the relationship that exists between them with labels. (Show the relevant symbols of the relationship) (4)

4.3. Explain the meaning of the terms *Data Validation* and *Data Verification* and give one example of each. (4)

TOTAL SECTION D: [20]

SECTION E: SOLUTION DEVELOPMENT

QUESTION FIVE

A registration form for students is created in Delphi. Study the GUI that helps the administration team to capture the details of students that have registered.

Study the GUI and answer the questions that follows:

5.1. List any **two** aspects of the above GUI that does not satisfy HCI principles.   (2)

5.2. Explain why the Full Name entry field will never cause a runtime error.   (1)

5.3. List a more appropriate component to capture the following field values:

    5.3.1. Age   (1)
    5.3.2. Gender   (1)

5.4. Examine the scenarios below and classify each one as either a syntax, logical or run-time error.

5.4.1. The programmer placed a semicolon (;) at the statement just before the else statement.   (1)

5.4.2. The names in an array is sorted but the display is an unsorted array.   (1)

5.4.3. The file name is entered correctly but the file is not accessed.   (1)

5.4.4. In infinite loop is generated. (1)

5.5. An array containing the aggregate test scores of 16 students, all of whom attended the classes, has been stored. The array is sorted in descending order. Study the Delphi code and answer the questions based on it.

```
1. Type ScoreArray = array[1..16] of integer;
2. var
3.   Form1: TForm1;
4.   scores : ScoreArray;
5. implementation
6.
7. {$R *.dfm}
8.
9. Procedure What(sc:ScoreArray; answer : real);
10. Var x , y : Integer;
11. begin
12.   x := 16 div 2;
13.   y := 16 div 2 +1;
14.   answer := sc[x] + sc[y];
15.   answer := answer / 2;
16. end;
17. Function mean: Integer;
18. var
19.   i , sum : Integer;
20. begin
21.   for i := 1 to 16 do
22.     sum := sum + scores[i];
23.   end;
24.   mean := sum div 16;
25. end;
26.
27. procedure TForm1.Button1Click(Sender: TObject);
28. Var ans : Real;
29. begin
30.
31.   redDisplay.Lines.Add('The answer is '+FloatToStr(ans));
32.
33.   redDisplay.Lines.Add('The mean is '+IntToStr(mean));
34. end;
```

5.5.1. What is the difference between a procedure and a function? (1)

5.5.2. What is the purpose of the procedure What? (2)

5.5.3. Explain why the result value of the function is incorrect. Write down the statement that will make it work. (2)

5.5.4. Complete the statement in line 30 that calls the procedure and brings back the answer calculated. (2)

5.5.5. When the procedure is executed it does not change parameter *ans* in the call. Redefine the procedure in line 9 so that the value *ans* is changed.   (2)

5.5.6. A new student joined the classes. Would the procedure send back the correct value including the new student? If not, rewrite the code to send back the correct answer.   (4)

5.6. Write an algorithm that will return the student with the highest merit pass.   (8)

SECITON E: [30]

SECTION F: INTEGRATED SCENARIO

QUESTION SIX

The department of Education was very impressed with the sterling job that your school is doing with the community at large. They have given some funding to assist the school to advertise on-line. In addition to that, they have sponsored some data projectors, laptops, tablets and wireless routers.

6.1. The tablets and the computers each use a different kinds of Operating system.

6.1.1. What is **two** the basic difference between these two operating systems.   (2)

6.1.2. Name **one** example for each type of Operating System you mentioned in **6.1.1**.   (2)

6.2. In order to advertise properly, there is a need for a website. The internet is however fast evolving and the school will need to decide on the choice of Web 1.0 , Web 2.0 and Web 3.0.

6.2.1. What is a website?   (1)

6.2.2. Explain the difference between Web1.0, Web2.0 and Web3.0 by stating a defining character of each one based on the user.   (3)

6.2.3. Explain the purpose of a cookie with respect to web browsing.   (2)

6.3. Multimedia formats have enhanced the users experience on the internet and is useful in creating interactive adverts.

6.3.1. What does **MIME** stand for?   (1)

6.3.2. What is a Podcast?   (1)

6.3.3. What is the difference between downloading and streaming?   (2)

6.4. Files downloaded/transferred over the internet may require large amounts of memory. Compression techniques are therefore essential in saving memory and increasing speed of transfer.

6.4.1. Explain what is meant by *lossy compression*. (1)

6.4.2. What is JPEG? (1)

6.5. Security is a major concern for internet users, especially social institutions like schools. This is largely due to the vulnerability of a network.

6.5.1. Why do you think the school would a firewall? (1)

6.5.2. Explain how Phishing and Spoofing are used together to scam internet users?
(2)

6.5.3. What is spam e-mail? . (1)

6.5.4. Suggest two ways the school may prevent spam e-mail. (1)

6.5.5. Malware found on one of the user's computer was described as *spyware*. What is *spyware*? (2)

6.5.6. State two ways in which the computers may be infected by malware. (2)

6.6. The network for the school is currently a Peer-to-Peer network. It has been decided to change the network to a Client-Server network.
State two benefits of changing to a client server network. (2)

6.7. A mobile device has what we call an 'always on' function. Explain what this term means. (1)

6.8. Mobile devices rely on battery power. State two ways one may improve the battery life of a mobile device. (2)

TOTAL SECTION F: [30]

GRAND TOTAL : [150]

GREENBURY SECONDARY SCHOOL

Information Technology
November 2017
GRADE 11 Paper 2

MARKING MEMORANDUM

SECTION A

QUESTION ONE – SHORT QUESTIONS

1.1. From the options A to D given, select the option, for each question and write down only the letter that best suites the description given.

1.1.1. A device driver …

A) Is not required in plug and play.
B) Is not required in hot swapping.
C) Has to be used by every device attached to a personal computer.
D) Is not needed for older technologies.

1.1.2. The technology such as retinal scanner is called…

A) Intelligent scanning.
B) Biometrics
C) RFID
D) Eye scanning

1.1.3. A collection of programs that are designed to infiltrate a computer and gain the highest level of privileges to take control of the infected computer.

A) Rootkit
B) Trojan
C) Admin Bug
D) Malware

1.1.4. It takes an entire program and translates it into a machine language.

A) Interpreter
B) Compiler
C) Programmer
D) Decoder

1.1.5. A superfast connection technology which can support multiple conections.

A) Firewire
B) HDMI
C) Thunderbolt
D) USB

1.1.6. Which one of the following is not an example of an Operating System?

A) Windows 8.1
B) iOS
C) Linux
D) MS Office Suit

1.1.7. A software that monitors each keystroke a user makes on a specific computer's keyboard, is referred to as...

A) Keylogger
B) Adware
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D) Cookie

1.1.8. A protocol that is used to deliver from an e-mail client to an e-mail server or from one e-mail server to another.

A) Spam
B) SMTP
C) POP3
D) TCP

1.1.9. A virtual office is one...

A) That uses a LAN and intelligent terminals.
B) Where employees never enter a physical office but rather conduct their business via internet.
C) That implements virtual memory in a LAN using a suite of office software.
D) That can only be used in a metropolitan area network(MAN).

1.1.10. Which of the terms is not associated with social engineering?

A) Shoulder Surfing
B) Phishing
C) Artificial Intelligence
D) Role playing

1.2. **Supply ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.1.1-1.1.10) in your answer book.**

1.2.1. A key field in a database table that links to the primary key in another table in order to create a relationship between the two tables. Foreign Key✓

1.2.2. Software that is stored permanently on the ROM chip of a device, such as a printer, to control the basic operation of the device. Firmware✓

1.2.3. A field of study that involves the simulation of human decision making processes by a computer system that is programmed to react on input that is received from the sensors. Artificial Intelligence ✓

1.2.4. A company that has a permanent, fast connection to the internet and sells internet access and services at a monthly fee. ISP / Internet service provider✓

1.2.5. This component generates pulses at regular frequencies to control the activities of the motherboard. System Clock✓

1.2.6. Initiatives to design, use and dispose of technology in an environmentally friendly way. Green Computing✓

1.2.7. A pair of fibre optic rings is used, with each ring passing a token in opposite directions so no collisions occur. Fibre Distributed Data Interface/[FDDI] ✓

1.2.8. It refers to the waiting period when a file is being streamed. Buffering✓

1.2.9. A series of steps that need to be followed when designing a database to ensure that data redundancy occurs. Normalization✓

1.2.10.A signal sent to the CPU from the hardware/software indicating the need for the CPU's attention. Interrupt /Interrupt Request / IRQ ✓

TOTAL SECTION A : [20]

SECTION B: SYSTEM TECHNOLOGIES

SCENARIO:

The municipality has nominated your school as the centre to hold training classes to upgrade the skill levels of the community members in ICT. This initiative is aimed at helping individuals market themselves and promote employment.

The municipality has provided your school with some computers to assist.

The I.T. Educator and I.T. learners will assist in the learning programs.

QUESTION TWO

2.1. A certain class teaching students about the architecture and design of hardware had the following questions posed.

'The motherboard is a large circuit board with many slots, connectors and different parts clearly visible all over it.'

2.1.1. The name of the connector was SATA. What is this connector used for?   (1)

Connecting Hard drive, CD/dvd, drive or SSD ✓

2.1.2. What does the motherboard use to transfer data and signals to different parts of the motherboard?   (1)

A bus ✓

2.1.3. The motherboard has a ZIF socket. What component connects to the motherboard using this socket?   (1)

CPU ✓

2.2. The donated computers are old and slow. A method of **Overclocking** was suggested to the computer faster.

2.2.1. Explain the process of overclocking. (1)

Is a technique that makes the components of the computer perform beyond their stock performance levels by manipulating the frequencies at which the component was set to run. ✓

2.2.2. Discuss why it is disadvantageous to apply this technique. (2)

- Voltages may cause erratic behaviour ✓
- Overheating or premature failure ✓

2.2.3. The main function of the CPU is to carry out the machine cycle. List the **four** steps of the machine cycle performed by the CPU. (4)

- Fetching the instructions and data from the ram(memory) ✓
- Decoding the instructions✓
- Executing the instructions✓
- Transferring data back to memory✓

2.2.4. The CPU uses three levels of CACHE memory. Discuss how CACHE memory helps make processing faster. (2)

Cache memory is high speed SRAM that is store very close to the CPU or inside the CPU. This makes the fetching of instructions very fast compared to the normal RAM. This cache stores the most frequently used instructions so that they do not have to be fetched thus making processing extremely fast. ✓✓

2.3. Since RAM is so small in the old computers, there is a need for using virtual memory.

2.3.1. State the purpose of virtual memory and how it works. (2)

Virtual storage is there to deal with low RAM in a computer. When there are many tasks and the RAM is already full, virtual storage takes over. ✓✓

2.3.2. What is the main problem experienced when using Virtual storage? How is this problem caused? (2)

Thrashing. ✓ This problem is caused by excessive paging. When there are too many pages waitinh for processing and the RAM cannot store anymore. ✓

2.3.3. Suggest **one** cost effective way to solve the problem of using virtual storage. (1)
Buy more RAM

2.4. The Operating system being used in the computers at the learning centre is Windows 8 with and EULA and a copyright protection certificate.

2.4.1. List **three** functions of the Operating system. (3)

- File Input / Output

- Device I/O
- Memory Management   any 3 ✓✓✓
- Process management

(1)

2.4.2. What is firmware?

Software stored on ROM chips✓

2.4.3. List **two** reasons why you would want to update your firmware? (2)

- Additional features or functions are added ✓
- A bug or problem has been correted ✓   any 2
- Support for newer hardware that was not previously available. ✓

2.4.4. What exactly is an EULA? (1)

End user License Agreement✓

2.4.5. What is the difference between copyright and Open Source? (2)

Copyright is a law that protects the intellectual property of a proprietor from being copied. ✓
Open source is software that is free to use and copy and also make changes. ✓

2.5. One of the key functions of the OS is to manage processes and tasks of the CPU. Give a short description of:

2.5.1. Multiprocessing (2)
Is a processing technique where the computer uses many processes✓ to process one or more instructions.

2.5.2. Multithreading (2)
Is a processing technique where more than one task✓ in the same program✓ is being carried out.

TOTAL SECTION B : [30]

SECTION C : COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION THREE

Your school has decided to link all the computers used for the training sessions. This will mean that the computers will have access to the Internet.

3.1. Different topologies may be used to setup a cabled Ethernet LAN for the computers in question. The most popular LAN topology for schools is a Star topology.

3.1.1. List **two** advantages of having a network.

* Easy transfer of files without using external media eg flash drive✓
* Sharing of software without downloading and installing on each computer✓
* Sharing of hardware e.g. many computers may share printer✓
* Communication between computers✓ Any2   (2)

3.1.2. Name **one** other type of topology that may be used in LAN.

Bus Topology ✓   Ring Topology ✓   any 1   (1)

3.1.3. State **two** reasons why the Star topology is the best suited for the school LAN.

* It is easy to install ✓
* It is cheap not a lot of expertise is required ✓
* It covers small areas and is fast ✓
* It offers more security as no two computers may communicate without passing the central server or node. any 2
* If one computer fails, the network still works.
* Easy to add devices to network without interrupting the network.   (2)

3.2. The school has been given a choice between UTP, Fibre Optic cables and Wireless connection.

3.2.1. State **two** advantages that UTP have over Fibre Optic cables in the school setup.

* It is cheaper ✓
* Easier to install✓
* Easier to repair✓ any 2   (2)

3.2.2. List **two** advantages of fibre optic cables have over UTP cables.

* It is much faster ✓
* No interference of signal ✓ through EMI or eavesdropping or Crosstalk✓   (2)

3.2.3. Explain the difference between Crosstalk and EMI when UTP cables are used.   (2)

* EMI refers to electromagnetic interference caused by sources such as other machinery that may corrupt signals travelling in copper wires. ✓
* Crosstalk however is when signals in adjacent wires can interfere with each other as in a crossed telephone conversation. ✓

3.3. *Wireless systems have developed over the years and have made communication and networking much easier.*

3.3.1. How does WiFi differ from WiMax?   (2)

The main difference WiFi and WiMax is the distance and speed. WiMax covers a greater distance and is faster. It is an upgrade of WiFi. WiFi is meant for inside a building while WiMax is from inside to outside of a building. ✓✓

3.3.2. State **two** advantages of wireless connectivity.   (2)

* Provide temporary connections to an existing cabled network✓
* Help provide backup to an existing network✓
* Provide some degree of portability ✓
* Extend networks beyond the limits of cabled connectivity ✓ any 2
* Faster transmissions ✓

3.3.3. State **two** disadvantages of wireless connectivity to your school network. (2)

* Easy to gain access from outside into the network✓
* It is too expensive ✓
* It requires high level to expertise to maintain and run✓ any 2
* Software and equipment to run the network✓

3.3.4. Wireless systems make use of Access Points. What is the purpose of an access point?   (1)

* Provides access to a wireless network through a switch or router ✓

3.3.5. State the difference between a Repeater and a Router by outlining the function of each respectively.   (2)

* A repeater connects network segments and strengthens weakening signals over long distances ✓
* The router is more sophisticated in that it is able to connect segments, boost signals and provide internet access by selecting the best path of communication. ✓

TOTAL SECTION C: [20]

QUESTION FOUR

A Database is set up to control and manage the records of training sessions, students and tutors. Study the database provided and answer the questions based on it.

Structure of tables

Tables created in database

Table 1

*	Session No
	Course Name
	Date of Course

Table 2

*	Tutor ID
	Tutor Name
	Session No

TutorID	Course Nam	Date of Cou	Click
1 Hardware		2017/10/17	Click to Add

TutorID	Tutor Name	Click to Add
100 Paul Links		
107 Alvin Chippie		

TutorID	Tutor Name	2017/11/02
2 Software		

TutorID	Tutor Name	Click to Add
101 Calvin Martin		

TutorID	Tutor Name	2017/09/12
3 Operating Syst.		

TutorID	Tutor Name	Click to Add
102 Fred Couples		

TutorID	Tutor Name	2017/10/03
4 Database Syst		Click to Add
104 Dan Withers		
105 Carey Smith		
106 Tony Danza		

4.1. Name the two tables created in the database. (2)

Session ✓ , Tutor ✓

4.2. The two tables are linked by the fields indicated in the diagram above. It also shows the type of relationship that is created by the data in the database.

4.2.1. Name the type of relationship created by examining the diagram carefully. (1)

One to many ✓

4.2.2. Identify the name of the table 1 and table 2 as designed in the database. (2)

Table1 – Session ✓
Table – Tutor ✓

4.2.3. Name the tutor/s involved in Session 1. (2)

Paul Links ✓

Alvin Chippie ✓

4.2.4. Define the terms primary key and foreign key. Identify these keys and state the table that contains it. (5)

* Primary Key – Is a unique field that is used to identify a record ✓ Table1 or Session Table ✓
* Foreign Key – Is a non key field in a table that is a primary key in another table that forms the relationship. ✓ Table 2 or Tutor Table ✓ Session number is the field ✓

4.2.5. Redraw the two tables and show the relationship that exists between them with labels. (Show the relevant symbols of the correct relationship) (4)
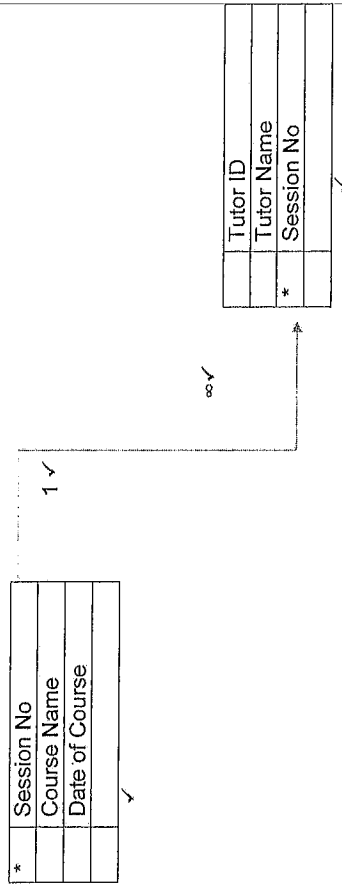
*	Session No
	Course Name
	Date of Course
	✓

	Tutor ID
	Tutor Name
*	Session No
	✓

1 ✓   ∞ ✓

TOTAL SECTION D: [15]

QUESTION FIVE

A registration form for students is created in Delphi. Study the GUI that helps the administration team to capture the details of students that have registered.

Study the GUI and answer the questions that follows:

5.1. List any **two** aspects of the above GUI that does not satisfy HCI principles. (2)

Components not aligned ✓
Text areas not cleared ✓
The save button cannot be seen ✓
Only text values ✓

any 2

5.2. Explain why the Full Name entry field will never cause a runtime error. (1)

Because it requires a text value and text needs no validation ✓

5.3. List a more appropriate component to capture the following field values:

5.3.1. Age   Spinner✓   (1)
5.3.2. Gender   Radio Button✓   (1)

5.4. Examine the scenarios below and classify each one as either a syntax, logical or run-time error.

5.4.1. The programmer placed a semicolon (;) at the statement just before the else statement. (1)

Syntax Error✓

5.4.2. The names in an array is sorted but the display is an unsorted array. (1)

Logical✓

5.4.3. The file name is entered correctly but the file is not accessed. (1)

Logical ✓

5.4.4. In infinite loop is generated. (1)

Run Time✓

5.5. An array containing the aggregate test scores of 16 students, all of whom attended the classes, has been stored. The array is sorted in descending order. Study the Delphi code and answer the questions based on it.

```
1. Type ScoreArray = array[1..16] of integer;
2. var
3. Form1: TForm1;
4. scores : ScoreArray;
5. implementation
6.
7. {$R *.dfm}
8.
9. Procedure What(sc:ScoreArray; answer : real);
10. Var x , y : Integer;
11. begin
12. x := 16 div 2;
13. y := 16 div 2 +1;
14. result := sc[x] + sc[y];
15. answer := answer / 2;
16. end;
17. Function mean: Integer;
18. var
19. i , sum : Integer;
20. begin
21. for i := 1 to 16 do
22. sum := sum + scores[i];
23. end;
24. mean := sum div 16;
25. end;
26.
27. procedure TForm1.Button1Click(Sender: TObject);
28. Var ans : Real;
```

29. begin
30.
31.   redDisplay.Lines.Add('The answer is '+FloatToStr(ans));
32.
33.   redDisplay.Lines.Add('The mean is '+IntToStr(mean));
34. end;

5.5.1. What is the difference between a procedure and a function?   (1)

A procedure is s subprogram that processes and changes values without a return value. ✓

A function is a subprogram that processes and returns a value. ✓

5.5.2. What is the purpose of the procedure What?   (2)

Returns the median of the list of scores. ✓✓

5.5.3. Explain why the result value of the function is incorrect. Write down the statement that will make it work.   (2)

The sum value is not initialised✓ to zero. Sum := 0; ✓

5.5.4. Complete the statement in line 30 that calls the procedure and brings back the answer calculated.   (2)

What(scores,ans); ✓✓

5.5.5. When the procedure is executed it does not return the correct value. Redefine the procedure in line 9 so that the answer is returned.   (2)

Procedure What(sc:ScoreArray; answer : real); ✓✓

5.5.6. A new student joined the classes. Would the procedure send back the correct value including the new student? If not, rewrite the code to send back the correct answer.   (2)

result := sc[17 div 2 +1] ✓✓ or any other variations

5.6. Write an algorithm that will input an integer for the size of a sorted list of scores and return the same value that is returned in the procedure. The algorithm must work for both an even/odd set of scores   (10)

1. Input N ✓
2. If N mod 2 = 0 then ✓
3. Begin
4.   X := N Div 2 ✓
5.   Y := X + 1 ✓
6.   Ans := (sc[x] + sc[y])/2 ✓✓
7. End
8. else ✓
9. begin
10.   x := N div 2 +1 ✓
11.   Ans := sc[x] ✓
12. End
13. Display/Return (Ans) ✓
14. End.

SECITON E: [30]

SECTION F: INTEGRATED SCENARIO

QUESTION SIX

The department of Education was very impressed with the sterling job that your school is doing with the community at large. They have given some funding to assist the school to advertise on-line. In addition to that, they have sponsored some data projectors, laptops, tablets and wireless routers.

6.1. The tablets and the computers each use a different kinds of Operating system.

6.1.1. What is the **two** basic difference between these two operating systems.   (2)

* The features offered by computer OS is much larger ✓and has more features ✓

6.1.2. Name one example for each type of Operating you mentioned in 6.1.1.   (2)

* Windows, iOS ✓
* Android ✓

6.2. In order to advertise properly, there is a need for a website. The internet is

however fast evolving and the school will need to decide on the choice of Web 1.0 , Web 2.0 and Web 3.0.

6.2.1. What is a website? (1)

- Is a collection of web pages ✓ supporting files such as formating information, images, movies, sounds and Java script programming

6.2.2. Explain the difference between Web1.0, Web2.0 and Web3.0 by stating a defining character of each one based on the user. (3)

- Web 1.0 – Users were only allowed to view but not interact or change✓
- Web 2.0 – Allowed interaction by creating user generated sites. ✓
- Web 3.0 – Personalised according to the users profile. ✓

6.2.3. Explain the purpose of a cookie with respect to web browsing. (2)

A small piece of software stored on the user's web browser so that information may be remembered about the history of browsing a particular site. ✓✓

6.3. Multimedia formats have enhanced the users experience on the internet and is useful in creating interactive adverts.

6.3.1. What does MIME stand for? (1)

Multimedia Internet Mail Extensions ✓

6.3.2. What is a Podcast? (1)

- Audio files distributed through RSS feeds. ✓

6.3.3. What is the difference between downloading and streaming? (2)

Downloading – is saving a file on the hard drive of your computer from the internet and then opening it to view ✓
Streaming is when a file is opened on the internet and viewed online without saving on the hard drive. ✓

6.4. Files downloaded/transferred over the internet may require large amounts of memory. Compression techniques are therefore essential in saving memory and increasing speed of transfer.

6.4.1. Explain what is meant by 'lossy compression'. (1)

Lossy comprehension reduces the number of bits by identifying and eliminating statistical redundancy. ✓

6.4.2. What is JPEG? (1)

Is a method of lossy comprehension used for digital photography. ✓

6.5. Security is a major concern for internet users, especially social institutions like schools. This is largely due to the vulnerability of a network.

6.5.1. Why do you think the school would need a firewall? (1)

To prevent unauthorised access to the school network and confidential files ✓

6.5.2. Explain how Phishing and Spoofing are used together to scam internet users? (2)

Phishing is usually a convincing email ✓ that requests a user to click on a link that takes them to a spoofed or fake website ✓

6.5.3. What is spam e-mail? (1)

Unsolicited bulk Junk emails ✓

6.5.4. Suggest two ways the school may prevent spam e-mail. (1)

- Do not open any unknown emails
- Do not click on any links on emails
- Use content filtering software to check mails
- Use antispam software

6.5.5. Malware found on one of the user's computer was described as spyware. What is spyware? (2)

Software that enables a user to obtain covert information about another's computer activities by transmitting data covertly from their hard drive

6.5.6. State two ways in which the computers may be infected by malware. (2)

- Social engineering ✓
- Downloading from unprotected sites ✓
- Responding to adware ✓   any 2
- Opening pop-ups or adware ✓
- Transferring via disks like USB etc ✓

6.6. The network for the school is currently a Peer-to-Peer network. It has been decided to change the network to a Client-Server network. State two benefits of changing to a client server network. (2)

- Data is centralised no access is given other than the central computer ✓
- Data maintains its integrity ✓
- Content is filtered ✓   any two
- More secure ✓

6.7. A mobile device has what we call an 'always on' function. Explain what this term means. (1)

It means that apps are running in the background even if the phone is off. ✓

6.8. Mobile devices rely on battery power. State two ways one may improve the battery life of a mobile device. (2)

Close all apps running in background ✓
Decrease light intensity ✓