

**INFORMATION TECHNOLOGY P2**

**GRADE 11**

**15 NOVEMBER 2016**

**MEMORANDUM**

**MARKS: 150**

**TIME: 3 hours**

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| --- | --- | --- | --- |
| **SECTION A: SHORT QUESTIONS** | |  |  |
| **QUESTION ONE** | |  |  |
| 1.1.1 | Driver | ✓ | (1) |
| 1.1.2 | Modular Design | ✓ | (1) |
| 1.1.3 | Query | ✓ | (1) |
| 1.1.4 | Lossy Compression | ✓ | (1) |
| 1.1.5 | Data Validation | ✓ | (1) |
| 1.1.6 | Power On Self Test (POST) | ✓ | (1) |
| 1.1.7 | Really Simple Syndication (RSS) | ✓ | (1) |
| 1.1.8 | Topology | ✓ | (1) |
| 1.1.9 | Array | ✓ | (1) |
| 1.1.10 | Trojan | ✓ | (1) |
| 1.2.1 | C | ✓ | (1) |
| 1.2.2 | A | ✓ | (1) |
| 1.2.3 | D | ✓ | (1) |
| 1.2.4 | B | ✓ | (1) |
| 1.2.5 | B | ✓ | (1) |
|  |  |  |  |
| **TOTAL SECTION A:** | |  | **[15]** |

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| **SECTION B: SYSTEM TECHNOLOGIES** | | |  |  |
| **QUESTION TWO** | | |  |  |
| 2.1 | The motherboard is a large circuit board with many slots, connectors and different parts clearly visible all over it. | |  |  |
|  | 2.1.1 | One of these connectors on your motherboard is a SATA connector. What would be connected to it? |  | (1) |
|  |  | **Hard drive, CD/dvd, drive or SSD ✓** |  |  |
|  | 2.1.2 | Referring to a motherboard what is a bus? |  | (1) |
|  |  | **A bus is a set of wires(or paths) etched into a motherboard ✓**  **Used to transfer data between the parts of a computer** |  |  |
|  | 2.1.3 | Where will you connect the CPU to the motherboard? |  | (1) |
|  |  | **Zif socket✓** |  |  |
| 2.2 | The CPU and RAM are two of the most important components in a computer. | |  |  |
|  | 2.2.1 | What is the purpose of RAM in your computer? |  | (1) |
|  |  | **RAM is used to temporarily store data and instructions for the CPU to process. ✓** |  |  |
|  | 2.2.2 | A point-to-point connection between these two components is available on the motherboard. What does this mean? |  | (1) |
|  |  | **A point-to-point connection means that the wires or paths used to transfer data are not shared between multiple components. ✓** |  |  |
|  | 2.2.3 | List the four steps of the machine cycle performed in 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 | You are upgrading your RAM to 8GB of RAM. The computer only recognises 4 GB of RAM. It is installed correctly and the RAM is not faulty. What could be the problem? |  | (2) |
|  |  | **Your operating system could be a 32 bit operating system that can only recognise 4GB of memory. ✓✓** |  |  |
| 2.3 | In need of more memory, you decided to make use of virtual memory. | |  |  |
|  | 2.3.1 | What is virtual memory? |  | (2) |
|  |  | **Virtual memory is an area of storage or disk space that the operating system keeps for its own use to fool the computer into thinking that there is more RAM than there actually is. ✓✓** |  |  |
|  | 2.3.2 | How does the computer make use of virtual memory? |  | (2) |
|  |  | **The operating system creates pages/swop files ✓and swops part of the program/data presently being used between the RAM and the hard drive. ✓** |  |  |
|  | 2.3.3 | Suggest one cost effective way to solve this problem. |  | (1) |
|  |  | **Add more RAM✓** |  |  |
| 2.4 | Look at the following screen shot and answer the questions that follow: | |  |  |
|  | 2.4.1 | What is firmware? |  | (1) |
|  |  | **Software stored on ROM chips✓** |  |  |
|  | 2.4.2 | List TWO reasons why you would want to update your firmware. |  | (2) |
|  |  | **It can make the device work faster/better✓**  **New features can be added to the device✓** |  |  |
| 2.5 | The operating system being used in the computers at the learning centre is Windows 8.1 | |  |  |
|  | What are the functions of the Operating System? | |  | (3) |
|  |  | **Provides an interface✓**  **Manages processes and tasks✓**  **Manages memory✓**  **Manages input and output (any 3)**  **Manages the disks** |  |  |
| 2.6 | One of the key functions of the CPU is to manage processes and tasks. Give a short description of: | |  |  |
|  | 2.6.1 | Multiprocessing |  | (2) |
|  |  | **The type of processing that takes place when the operating system divides the programs /threads /processes✓ between multiple CPU’s✓** |  |  |
|  | 2.6.2 | Multithreading |  | (2) |
|  |  | **The ability of an O.S to allow programs to split themselves✓ into multiple tasks (or threads) that can be run at the same time. ✓** |  |  |
| 2.7 | Due to the high volume of people using the computers at the learning centre, it is important for the learning centre to safeguard their data. One such threat is malware. | |  |  |
|  | 2.7.1 | Provide a short description of the following: |  |  |
|  |  | 1. A virus |  | (2) |
|  |  | **A form of malware that attaches itself to a file or executable program, thereby enabling it to spread between computers. ✓✓** |  |  |
|  |  | 1. Spyware |  | (2) |
|  |  | **A form of malware that tries to monitor and track the way you use your computer to discover confidential information and then relay this to a third party. ✓✓** |  |  |
| **TOTAL SECTION B:** | | |  | **[30]** |

**SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**

**QUESTION THREE**

3.1 Different topologies may be used to set up a cabled Ethernet LAN in the resource centre.

3.1.1 Draw a labelled sketch to illustrate the layout of devices in a star topology.

**** ***NOTE***: *Include labels for the devices in your sketch*. (3)

**Correct layout **

***Diagram include*:**

**Switch/Hub **

**Computers **

3.1.2 Give THREE reasons why a star topology is used in the majority of modern LANs.

(3)

***Any THREE:* **

**• Easy to troubleshoot**

**• Easy to replace individual computers**

**• If one device stops working, network is not disrupted**

**• Easy to install/set up/maintain**

3.1.3 Name ONE other type of topology that can be used in a LAN. (1)

**Bus or Ring**

3.2 The ICT training programme involves teaching the community members about communication through social networking.

3.2.1 What is meant by the term tweet? (1)

***Any ONE:***

**• *Tweet* is the use of a social media website called Twitter to send messages**

**• Short message**

3.2.2 What term is used to refer to the practice of publishing insulting remarks about people on an online or public forum? (1)

***Any ONE:* **

**• Flaming**

**• Trolling**

**• Smashing/Smearing**

**• Cyber bullying**

**• Defamation of character**

3.3 The committee involved in the running of this ICT programme decide to create a blog for the programme.

3.3.1 What is a blog? (1)

**A blog is an online public diary (focused on a specific topic) **

***Also accept any other correct and relevant explanation***

3.3.2 How would the community members involved in the training be advantaged by

the blog? (2)

***Any TWO advantages of the blog:* **

**• Some members may want to recap work done during lessons at the centre and the blog could provide summaries.**

**• Members may obtain help from specialised persons/tutors via the blog.**

***Also accept any other correct and relevant explanation***

3.4 A community member expressed his concern about the digital divide in South Africa. What is meant by the term digital divide? (2)

**Digital divide means not everybody has skills/access to computers/Internet**

**and is disadvantaged because of this lack of access.**

3.5

|  |  |
| --- | --- |
| ***COLUMN A***  **NETWORK VULNERABILITY** | |
| 3.5.1  3.5.2  3.5.3  3.5.4 | Trojan applications that install themselves on the system **B**  Hacking into the system from outside the network **D** ****  Unexpected breaks in the power supply **E**  Get access to confidential information which is sent across the Internet  **C** |

(4)

***TOTAL SECTION C*: [18]**

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| **SECTION D: DATA AND INFORMATION MANAGEMENT** | | |  |  |
| **QUESTION FOUR** | | |  |  |
| 4.1 | Explain the difference between data and information. Use examples as part of your answer. | |  | (3) |
|  | **Data is raw, unprocessed facts and numbers✓**  **Information is the result of the processing of data and should be useful and meaningful. ✓**  **Any suitable example underlining the differences✓** | |  |  |
| 4.2 | Briefly explain the difference between data warehousing and data mining. | |  | (2) |
|  | **Data warehousing – how to securely store, manage and retrieve large amounts of data✓**  **Data mining – how to process and analyse this data, looking for valuable information that you did not even know was there✓** | |  |  |
| 4.3 | A database can be described as a collection of data or facts regarding a specific topic. | |  |  |
|  | 4.3.1 | List THREE advantages of using database software. |  | (3) |
|  | * **Stores data electronically in a structured and organised way✓** * **Manipulates and changes data✓** * **Process the data within seconds✓** | |  |  |
|  | 4.3.2 | Tabulate TWO of the main differences between the functioning of a desktop database compared to a server DBMS. |  | (4) |
|  | |  |  | | --- | --- | | **Desktop Database** | **DBMS** | | **The tools that you need to work with the data are all included in a single application. ✓** | **Never directly accessed by the user ✓** | | **Usually for single user applications. ✓** | **Runs on many computers in different locations but connected to the database over the network. ✓** | | **Installed on personal computers** | **Installed on a server.** |   (Any two comparisons) | | |  |
|  | 4.3.3 | A distributed database is much more complex to manage than a database stored on a single computer. List TWO issues that arise from a distributed database. |  | (2) |
|  |  | **More complex security needed. ✓**  **Data synchronisation is important. ✓** |  |  |
| 4.4 | The table below are used to store the details of the community members.   |  | | --- | | **TblComMembers** | | memID | | memName | | memSurname | | memAge | | memCellNumber | |  | | |  |  |
|  | 4.4.1 | What is the purpose of a primary key in a table? |  | (1) |
|  |  | **To uniquely identify each record in a table. ✓** |  |  |
|  | 4.4.2 | Suggest a suitable primary from the table above. |  | (1) |
|  |  | **memID✓** |  |  |
| 4.5 | Data validation is very important as people make many mistakes when entering data. | |  |  |
|  | Name and discuss TWO measures that can be incorporated to ensure that data is valid. | |  | (4) |
|  | * **Format Check✓ – Data such as dates and telephone numbers should be entered in a specific format✓** * **Data type check✓ – When data is entered, the data type can be checked to ensure that the right type of data is entered✓** * **Range check – data can be checked if it is within a certain range** * **Presence check – data can be checked if mandatory fields are filled in (any two)** | |  |  |
| 4.6 | There are many careers that are related to databases and DBMS software. List TWO functions of: | |  |  |
|  | Database administrator. | |  | (2) |
|  | * **They control the allocation and supervision of the users of the database and their access rights✓** * **They also perform routine maintenance on the database✓** | |  |  |
| **TOTAL SECTION D:** | | |  | **[22]** |

**SECTION E: SOLUTION DEVELOPMENT**

**QUESTION FIVE**

5.1

5.1.1 Give a possible motivation for the choice of each of the following components:

(***NOTE: The same motivation will NOT be accepted for both answers.***)

(a) Radio buttons for the selection of gender (1)

***Gender*: only one of the given options may be selected. **

**OR prevents both options from being selected / prevents typing errors**

(b) Spinner for the selection of the age (1)

***Age*: the user has to select from list of options thus preventing invalid input. **

**OR prevents typing errors / all possible values displayed / saves time**

5.1.2 Why will a value entered into the Surname field rarely lead to a runtime error?

(1)

***Any ONE:* **

**• Any character can be saved in a string variable**

**• Text box is type string and the surname variable will be of the same type**

**• No type casting needed when using the value**

5.1.3 The components used for date selection will not prevent an invalid date from

being selected. Motivate this statement and use an example to illustrate your answer. (2)

**An incorrect day may be selected for a specific month 29 February used in a non-leap year OR 30 February/31 April, etc. **

5.2 Algorithms are important tools in software development. Define the term ‘Algorithm’

and explain why algorithms are universal. (2)

**An algorithm is a step by step point form design of a solution to a problem.  Algorithms are universal because they don’t contain programming language specific jargon therefore can be used by any programmer.**

5.3 Examine each of the following possible error scenarios, and determine whether the error is a syntax, run-time or logical error.

5.3.1 The program tries to convert an input value to an Integer, and fails to do so because it has alphabet characters. (1)

**run-time**

5.3.2 The programmer has neglected to check matching brackets, and there is one bracket missing. (1)

**syntax**

5.3.3 The names of the members have been sorted but they display in unsorted order. (1)

**logical**

5.3.4 The program is unable to access the file with the recorded names and work out how many members have entered the schools centre because the file-name was entered incorrectly. (1)

**run-time**

5.4 Tabulate 3 differences between procedures and functions. (6)

|  |  |
| --- | --- |
| **procedures** | **functions** |
| **1. can calculate/process more than 1**  **value/output.** | **1. can calculate/process only one**  **value/output. ** |
| **2. procedure header does not contain a**  **data type** | **2. function header contains the data type of**  **the returning value.** |
| **3. all output done in procdure and called**  **just by the procedure name.** | **3. output done when the function is called**  **attached to the function name.** |
|  |  |
|  | **Accept any correct difference** |

5.5

|  |
| --- |
| **1.** Create ICTVisitArr (array) with a size of 7 (integers)  **2.** Create daysArray containing the names of the days of the week  **3.** Initialise total to 0  **4.** Input number of visitors  **5.** Start a loop to execute 7 times  **6.** Input number of visitors  **7.** ICTVisitArr [loop\_value] ← number of visitors  **8.** total ← total + ICTVisitArr [loop\_value]  **9.** End loop  **10.** Display the numbers per day (e.g. Mon – 27) and the average |

5.5.1 One of the lines (1-9) is incorrect, and stops the algorithm from performing its required function correctly. Identify the line and state what could be done to

fix the error. (2)

***REMOVE**line 4***

***OR move line 6 after line 8***

5.5.2 Line 10 does not provide enough details to allow a programmer to create code. Break up line 10 into step-by-step instructions and write pseudocode that will

more clearly perform the required task. (4)

**11. Start a loop to execute 7 times**

**12. Print daysArray[loop\_value]+'-'+ ICTVisitArr [loop\_value] **

**13. End loop**

**14. Print 'Average is ' + total / 7 **

5.6

5.6.1 What kind of loop would you use to read this text file? Justify your answer. (2)

**While loop **

**You do not know how many records the file will contain. **

5.6.2 If you are required to sort the data into alphabetical order, what data structure would be the most appropriate to read the data into? Justify your answer. (3)

**Arrays. **

**One needs to read all the records into memory  in order to sort them and**

**the only data structure able to hold all the data would be arrays. **

5.6.3 Write down the declaration for the data structure you recommend in QUESTION 5.6.2. (2)

**arrName: array[1..50] of string **

***TOTAL SECTION E*: [30]**

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| **SECTION F: INTEGRATED SCENARIO** | | |  |  |
| **QUESTION SIX** | | |  |  |
| 6.1 | Other than the operating system name one example of each of the following categories of software from the above specifications.  6.1.1 System software  Avast! ✓  6.1.2 Application software  LibreOffice✓ | |  | (2) |
| 6.2 | ***LibreOffice is categorised as Open Source Software.***  6.2.1 List THREE potential disadvantages of using Open Source Software.   * No one to hold responsible for any glitches in the software✓ * Risk of poor support✓ * Various variety of the same software can arise✓ * Higher skills are neede to utilise the software to its fullest potential   (ANY 3)  6.2.2 How does Open Source Software differ from Propriety Software?   * Proprietary software involves a cost whereas OSS is usually free. ✓ * No access to proprietary software source code whereas OSS source code is accessible. ✓ | |  | (3)  (2) |
| 6.3 | Solid State Drives (SSD’s) are increasingly being used these days.  List TWO benefits that SSD’s provide over conventional HDD’s.   * SSD’s are electronic and HDD’s are mechanical✓ * SSD’s are faster than HDD’s✓ | |  | (2) |
| 6.4 | ***The donated computers are to be set up in a networked environment in the school hall so that devices and software can be shared and community members will have Internet access.*** | |  |  |
|  | 6.4.1 Supply TWO reasons why a client-server network would be a better  option than a peer to peer network.   * It has a faster performance✓ * Security is more sophisticated✓ * Improved control of users and user access to resources * Administration is easier   (ANY 2) | |  | (2) |
|  | 6.4.2 Clearly differentiate between a fat client and a thin client computer.  Fat clients run most of their applications from their local hard drives and make little use of network resources✓ whereas thin clients have low specifications and depend almost completely on a server to run applications and store data files. ✓ |  |  | (2) |
| 6.5 | It has been suggested by the network administrator that the server be set up such that virtualisation will be used to run different servers on a single physical server. |  |  |  |
|  | 6.5.1 What do you understand by the concept Virtualisation?  Virtualisation is when software is used to create an entity and this item will only exist as long as the software is running. ✓✓  6.5.2 List TWO advantages of virtualisation.   * One can install any operating system on the virtual machine✓ * One can install almost any compatible software✓ * One can specify the hardware the virtual machine can access * One can specify the size of the hard drive, CPU power and RAM of the virtual machine   (ANY 2) | |  | (2)  (2) |
| 6.6 | The community members making use of the learning centre have learned the Web 3.0 is the latest evolution of websites. Provide TWO reasons why they would prefer a Web 3.0 site instead of a Web 2.0 site.   * Establishes user needs/profile✓ * Provides personalised content for specific users✓ * Semantic web that can interpret information like humans * Defined by its mobile capabilities * More compatible in terms of hardware and software   (ANY 2) | |  | (2) |
| 6.7 | Teachers at the centre are now using e-learning (learning conducted via electronic media, typically on the Internet) to enhance their teaching.  6.7.1 State THREE ways in which e-learning may be beneficial to the learners at learning centre.   * Learners become responsible for their own learning✓ * Material is self-paced✓ * Immediate feedback is given✓ * Availability of information and ease of access   (ANY 3)  6.7.2 Lesson videos are available to *download* or *stream*. Clearly  differentiate downloading and streaming.   * When downloading, the entire file is downloaded before you can start watching/One copy is saved and can be reused✓ whereas when streaming the file is played as it is streamed/The file is not saved to your device and you have to be on-line to watch. ✓   6.7.3 Live broadcasts are being planned for revision classes. Give TWO  requirements of connectivity to successfully host a live broadcast.   * A high speed, high bandwidth Internet connection✓ * A permanent/dedicated connection✓ | |  | (3)  (2)  (2) |
| 6.8 | While certain basic technical controls may be put in place it is also important to inform users of what ‘acceptable use’ of the network entails and also the consequences for unacceptable use.  Outline THREE aspects that should be included in an AUP document.   * Details on when and where portable storage devices may be used✓ * Details of restrictions about installing any hardware or software✓ * Clear consequences of violating conditions spelt out in the AUP✓ | |  | (3) |
| 6.9 | Threats to data can take many forms.  6.9.1 List THREE basic categories of threats to data.   * Unauthorised access✓ * Malware threats✓ * Human issues✓ * Natural disasters * Hardware and software issues   (ANY 3)  6.9.2 What do you understand by the term *social engineering*?  It refers to any attempt to manipulate or ‘con’ someone into installing malware or giving out personal/sensitive information✓✓  6.9.3 The GIGO principal can mean that data and information stored in a  database can be utterly useless. What does the acronym stand for?  Garbage In Garbage Out✓  **TOTAL SECTION F:** | | **[35]** | (3)  (2)  (1) |
|  | **GRAND TOTAL:** | | **[150]** |  |