

## Case Study Scenario

In order to tackle the high levels of unemployment locally, the Mayor has partnered with several stakeholders, including representatives from the Department of Education and the Department of Labour, as well as potential sponsors and local community leaders. The aim of the initiative is to establish a pilot programme for providing community members with ICT skills. This will equip them with marketable skills and promote entrepreneurship. The stakeholders have established a trust, called the Vusani Trust, to fund the project. The Department of Education has provided a school hall which isn't being used. The hall will now be used as a venue for the community computer centre. The municipality has also donated some new computers, as well as some older, refurbished computers to assist the project.

## Systems Technologies 'sub-scenario'

1. The new computers that were donated have the following specifications:

Windows 10 Home 64-bit  
 2 x 8 GB, DDR4 DIMMs  
 Intel® Core™ i7 Quad-Core, 2.6 GHz  
 NVIDIA GeForce GTX 1060 6 GB GDDR  
 1TB 5400 RPM Hard Drive  
 Integrated webcam  
 Avast 2019  
 LibreOffice v6.1.2

- 1.1 Name the system software given in the specifications and specify what type of system software this represents.  
 1.1 Windows 10 Home, which is an operating system.
- 1.2 How much memory (RAM) is installed on this computer in total? Briefly explain your answer.  
 1.2 2 X 8 GB = 16 GB of RAM. DIMMs are RAM modules.
- 1.3 What is the speed of the processor listed in the specifications?  
 1.3 2.6 GHz.
- 1.4 What is the capacity of the hard drive listed in the specifications?  
 1.4 1 TB.
- 1.5 Explain how and why the quad-core specification would be of benefit.  
 1.5 The specification refers to the processor or CPU. Modern CPUs often have multiple cores (e.g. four in a quad-core). In this case, it is like having four processors on the chip. This will generally increase the speed at which the computer can process data and run programs.

- 1.6 Name the *open source* software listed in the specifications and give the category of software that it belongs to.
- 1.6 LibreOffice v6.1.2 – application software.
- 1.7 What is the main advantage of open source software, besides the fact that it is usually free?
- 1.7 You can get access to the programming code used to create the program, so it can be amended by a programmer to suit your needs.
- 1.8 What type of system software is Avast 2019?
- 1.8 Anti-virus software.
- 1.9 A video or graphics card is listed in the specifications.
- 1.9.1 Write down the specification that refers to the graphics card.
- 1.9.1 GeForce GTX 1060 6 GB GDDR.
- 1.9.2 Explain how a graphics card like the one listed would be of benefit if the Vusani Trust were considering offering basic video editing courses.
- 1.9.2 Graphics-intensive applications, such as video editing applications, require a separate graphics card to process the large amount of data involved when using video.
- 1.10 The CPU of a computer also contains its own cache memory. Briefly explain what cache memory is and the function it performs.
- 1.10 Cache memory works on a similar principle to web caching but does not make use of disk space, but rather special high-speed memory called cache memory. Cache memory is built into various components on a computer, including the CPU. It keeps frequently or recently accessed data, based on the assumption that it will probably be accessed again soon. Cache memory is more expensive, because it is faster than normal memory (RAM), but it can increase the overall performance of a computer quite dramatically.
2. The older, donated computers have been unpacked and connected, but a few of them are not working properly.
- 2.1 One of the USB keyboards does not seem to be working.  
Give a few steps one can try to resolve this problem or use to pinpoint the source of the problem.
- 2.1 First try unplugging and reconnecting the keyboard to the same port.  
Try plugging the keyboard into another USB port on the same computer.  
Try rebooting the computer to see if the keyboard is 'detected' and if it starts to work.  
Try connecting another working keyboard to the same PC to see if it is a keyboard or PC problem.
- 2.2 Nothing is displayed on one of the monitors, but one can 'hear' that the machine has booted.  
  
Give a few steps one can try to resolve this problem or use to pinpoint the source of the problem.

- 2.2 Check that the cable from the monitor to the PC is plugged in, or try another cable.  
Check that the monitor has power and that it is switched on.  
Check that the brightness control has not been completely 'turned down'.  
Try swapping it with a working monitor to see if it is the monitor or the computer that is the problem.
- 2.3 Most of the hard drives are very full and some seem less 'responsive' than others. It was suggested that they run the *Defragmentation* and *Disk Cleanup* utilities to try and improve the situation.
- 2.3.1 Give two things that the Disk Cleanup utility will do to try to free up disk space on the hard drives.
- 2.3.1 Two of:  
It will remove temporary files.  
It will empty the Recycle Bin.  
It will remove system files and other items that are no longer necessary.
- 2.3.2 How would using the Defragmentation utility 'speed up the computer'?  
Explain your answer by referring to the concept of *disk fragmentation*.
- 2.3.2 Disk fragmentation occurs on the hard disk as files are saved and deleted over time. Separate parts of a file often end up being stored on several different locations on the disk. This slows down access to the hard drive, because it takes longer to open a fragmented file.  
  
The Defragmentation utility rearranges the data on the hard disk and connects fragmented files so that access to files is faster which 'speeds up the computer'.
- 2.3.3 It was suggested that the Disk Defragmentation utility be scheduled to run on each of the hard drives every day to free as much disk space as possible.  
  
Do you think this is good advice? Comment critically on this advice to support your answer.
- 2.3.3 No, it is not good advice, because defragmenting a drive will speed up disk access, but it will not free disk space. Fragmentation takes place over a long period of time. It can also take quite a long time to defragment a hard disk. Therefore defragmentation does not need to be done on a daily basis. Defragmenting a drive once a month should be enough.
- 2.3.4 What is a disk scanner and how does it differ in function to a Disk Cleanup utility?
- 2.3.4 A disk scanner utility can be used to check a drive for errors and 'bad sectors' and try to fix them. It usually comes included with all operating systems. A disk cleanup utility frees up storage space as it allows you to remove temporary files, installed programs, etc.

3. A proposal needs to be put together for the possible upgrading of these computers, as opposed to buying additional (new) computers.
- 3.1 Assuming that all the hardware is working, what would the two main, general motivations or reasons be for upgrading the existing computers?
- 3.1 To improve the performance ('speed') of the computers.  
To allow the computers to perform tasks that they cannot currently perform (such as running particular versions of software).
- 3.2 Explain why adding more RAM would increase the overall performance of the computers. Explain your answer by referring to the general function of RAM.
- 3.2 All data and information that needs to be processed, as well as any programs that need to be run, have to be loaded from the disk into the RAM. The more RAM you have, the more data and programs you can load simultaneously into the RAM. More RAM improves the overall performance of the computer and it is relatively cheap to purchase.
- 3.3 Mention two ways in which the addition of SSDs can improve the overall performance of these computers, as well as any two other potential benefits they provide.
- 3.3 Solid State Drives (SSDs Drive) are a completely electronic alternative to traditional magnetic hard drives and therefore perform much faster. They can make the computer 'boot' a lot faster and programs and data files can also be accessed/loaded a lot quicker.  
In addition, SSDs have no moving parts and therefore are not easily damaged by being dropped or moved whilst in use. SSDs are also much more energy-efficient, durable and run quieter than hard drives.
- 3.4 One of the trust members wanted to know the purpose of adding additional hard drives to the computers if they would not really improve the overall performance of the computers. Briefly explain what the main benefit of adding additional hard drives would be.
- 3.4 To have more storage space in which to store data and to install additional software.
- 3.5 One can also add additional hard drives to the computers using external hard drives. One of the trust members was asked to find out what external hard drives cost, and he found that there are both 2.5" and 3.5" external hard drives available.
- 3.5.1 Which port would generally be used to connect external hard drives to the computers?
- 3.5.1 A USB port.
- 3.5.2 What is the main benefit of the 2.5" external hard drives when compared to the 3.5" external hard drives?
- 3.5.2 The 2.5" hard drives do not require a separate power supply as they are powered by the USB port that they are connected to.
- 3.5.3 What would be the main drawback or potential disadvantage of using external hard drives instead of adding internal hard drives?
- 3.5.3 The external hard drives can easily be stolen or damaged if they are moved or dropped.

- 3.6 One of the computers has a DVD writer, but none of the other computers has a CD or DVD drive.
- 3.6.1 Give two reasons why it would not be necessary for every computer to have an optical drive installed.
- 3.6.1 CD and DVD discs are no longer practical for backing up information – external drives are much better for this purpose.  
If necessary, a single external DVD drive could be purchased and connected to each computer in turn – for example, if software needed to be installed from a DVD or CD.
- 3.6.2 Give two benefits that Blu-ray technology has over 'normal' DVDs?
- 3.6.2 Two of:
- Can read both Blu-ray and DVD discs.
  - Have a different format that can provide better image and sound quality.
  - Blu-ray discs have a larger storage capacity than DVDs.
- 3.6.3 One of the trust members struggled when trying to burn a DVD.  
Give two steps you could take to resolve this problem (still using the same drive).
- 3.6.3 Two of:
- Try writing (or burning) the data at a lower speed.
  - Try a different make or brand of DVD disc.
  - Close any other programs you are running, etc.
4. Some of the keyboards need to be replaced and a quote for *wireless, ergonomically designed, full QWERTY* keyboards was obtained.
- 4.1 What type of wireless technology would these keyboards use to communicate with the computer?
- 4.1 Bluetooth.
- 4.2 Give two potential disadvantages of using a wireless keyboard (besides any cost considerations).
- 4.2 Any two of:
- Wireless keyboards are easier to steal.
  - They need batteries to maintain the wireless signal.
  - There is the possibility of interference with the wireless signal, etc.
- 4.3 What does the 'full QWERTY' specification of the keyboard mean?
- 4.3 This means it is a keyboard with a conventional layout (the first 6 letters in second row are 'QWERTY'). It also means that there is a separate key for each letter, character and symbol.
- 4.4 The keyboards are listed as being *ergonomically* designed.
- 4.4.1 What are the two main aims of ergonomically designed hardware?
- 4.4.1 This type of hardware is equipment that is comfortable to use and helps to prevent health issues and injuries that can result from its long-term use.

4.4.2 Give the generic (general) name for the class of injuries that can arise from using equipment, like keyboards and mice, over a long period of time.

4.4.2 Repetitive Stress/Strain Injuries (RSI).

4.4.3 Give one feature that an ergonomically designed keyboard could possibly have.

4.4.3 Any one:

- a wrist or palm rest
- 'soft-touch' keys
- a 'split' keyboard designed with the keys separated into two or three groups, etc.

5. The trust needs to produce a multimedia presentation for potential sponsors and they want to purchase a digital camera and digital video camera.

5.1 What is meant by the term *multimedia* presentation?

5.1 It refers to using a mixture of text, sound, pictures and video in a document or presentation.

5.2 What implication does the use and production of multimedia material have in terms of storage?

5.2 Multimedia material, especially video, is large in size and would therefore require a lot of storage space.

5.3 Give two specifications or factors to consider when buying a digital camera besides issues concerning the brand name, cost, warranty issues and the MP specification.

5.3 Any two of:

- Storage capacity (memory cards).
- What software is included – if any.
- 'Zoom' capabilities – digital versus optical zoom which is better.
- The colour depth – the higher the colour depth, the better.
- The sensor size – the bigger the sensor in a camera, the better the quality of the image.
- ISO rating (the camera's sensitivity to light) – the higher the rating, the better, etc.

5.4 Would it be necessary for the trust to purchase a digital video camera if they have a digital camera?

Briefly motivate your answer.

5.4 No, a digital camera can also be used to take videos, but if high-quality video is needed, they may have to consider purchasing a digital video camera.

5.5 The trustees have purchased a digital camera. They have started taking photos to document their project, but the SD card has filled up very quickly.

5.5.1 Briefly explain what an SD card is.

5.5.1 It is a memory or storage card used to store the photographs taken by the camera.

5.5.2 Why would reducing the resolution of the pictures solve this problem in the future?

5.5.2 The lower the resolution, the smaller the size of the images and the less storage space is required.

5.5.3 Give three ways in which the photographs stored on the camera can be transferred to a PC.

5.5.3 Via a USB cable, by using a wireless Bluetooth connection or by inserting the SD card into a card reader slot on the computer.

5.5.4 Give two ways in which the trust members could reduce the size of the existing photographs stored on the computer, so they can send the photographs to potential sponsors via email.

5.5.4 They can change or save the photographs to a lower resolution or format (e.g. jpeg), or they can compress the pictures by using WinZip, for example.

5.5.5 What is the general name or 'abbreviation' given to or associated with more 'professional' digital cameras as opposed to those found on phones?

5.5.5 DSLR (Digital Single Lens Reflex)

6. One of the services the trust would like to provide is to have electronic copies of old hard copy versions of exam papers. Learners and teachers can then print these, or save them to a flash disk.

6.1 What is meant by the term *hard copy*?

6.1 It refers to printed versions of the exam papers.

6.2 What additional hardware would be needed to convert these exam papers into electronic copies?

6.2 Scanner.

6.3 Clearly explain why it would be useful to 'OCR' these scanned documents by explaining the function of OCR software.

6.3 Scanning the exam papers with a scanner would not allow anyone (like a teacher) to edit or make changes to these papers, and it would not be easy to extract parts of the papers for tests, etc.

OCR (Optical Character Recognition) software would convert the *images of text* in the scanned exam papers to *text*, so that it can be edited with a word processor.

7. One of the sponsors gave the trust members biometric flash disks as gifts.

7.1 What would the capacity of these flash disks most likely be given in: KB, TB, GB or PB?

7.1 GB

7.2 What does the term *biometric* refer to in general?

7.2 The use of unique physical characteristics of human beings, such as their fingerprints, to identify the person.

7.3 How and why would biometric technology typically be used on a flash disk?

7.3 The flash disk would have a fingerprint scanner, so that only the owner of the flash disk would be able to get access to the files on the flash disk by scanning his fingerprint.

8. There are a number of disabled people in the local community who would benefit from computer courses, so there needs to be an investigation into what software and hardware is available to help these users.
- 8.1 Name and briefly describe the function of two software settings or utilities of the operating system that can be used to assist people with very poor sight.
- 8.1 Two of:
- The magnifier utility can be used to magnify an area of the screen.
  - The narrator utility can be used to read out any text on the screen.
  - You could choose a high-contrast colour scheme for these users.
  - You could increase the size of the text and the icons, etc.
- 8.2 There are a number of specialised hardware devices for users who cannot use or who struggle to use a 'normal' keyboard or mouse. These include large key keyboards and large trackballs.
- Mention two other hardware devices designed for these users.
- 8.2 Any two of:
- eye tracking devices
  - head movement devices
  - joysticks
  - Braille keyboards and printers
  - foot pedal control devices
  - sip and puff devices (these are devices which use the sucking and blowing of air into a straw in different ways to control devices).
- 8.3 Describe the two main ways in which voice recognition software can help disabled people in particular.
- 8.3 Two ways:
- Voice recognition software allows disabled people to verbalise ('speak') instructions instead of typing.
  - One can dictate text in applications e.g. in a word processing document.
- 8.4 Explain what a *virtual assistant* is and describe how it can help disabled people in particular.
- 8.4 A virtual assistant e.g. Apple's Siri is software that allows you to speak to your device and have it 'understand' and respond to what you say, e.g. 'turn off the lights'.
9. All the existing hardware and new hardware will need to be placed in an inventory (list of stock). The trust is considering adding barcodes to the hardware.
- 9.1 What hardware would they need to enter the information from the barcodes onto a computer automatically?
- 9.1 A barcode reader/scanner.
- 9.2 Give two broad benefits of using a system of barcodes linked to a POS (Point-of-Sale) computer system.



9.2 Any two of:

- Quicker to input data.
- More accurate in terms of capturing the data on the barcodes.
- Can be linked to a stock system database to keep track of hardware, etc.

9.3 Someone suggested using RFID tags instead of barcodes.

Briefly explain what RFID tags are and give their main benefits when compared to conventional barcodes.

9.3 RFID (Radio-Frequency Identification) tags contain a small chip which stores identification information. This information can be read wirelessly so it is not necessary to scan each item.

10. A secretary has been appointed to run the day-to-day business affairs of the trust. She will need to have a printer. A trust member obtained quotes for laser and inkjet printers and multi-function devices.

10.1 Give the two main reasons why a laser printer might be better suited for general office use as opposed to an inkjet printer (excluding the initial purchase costs of both).

10.1 Any two of:

- lower running costs
- generally faster speeds

10.2 One of the printer quotes gave the specifications 15/28 ppm, 5760 X 1440 dpi and 802.11.

10.2.1 Explain what the 15/28 ppm specification refers to and why two figures are given.

10.2.1 It refers to the printing speed measured in pages per minute (ppm). The two figures can refer either to the best quality speed versus the draft quality speed, or the difference in the speeds of colour versus monochrome (black and white) printing.

10.2.2 Explain what the 5760 X 1440 dpi specification refers to.

10.2.2 It refers to the maximum quality of the printing, which is measured in dots per inch (dpi). The '5760' and the '1440' specifications refer to the number of dots used horizontally and vertically (respectively) to produce the output.

10.2.3 What is the implication or significance of the 802.11 specification?

10.2.3 It means that the printer has a wireless connection.

10.3 Give two other functions of a multi-function device or printer, besides printing.

10.3 Any two of:

- scanning
- emailing
- faxing
- converting to PDF format
- OCR facilities

- 10.4 Give two advantages of multi-function devices or printers, other than the fact that they have more functions than just printing.
- 10.4 They save space as they take the place of several devices and they are usually cheaper than purchasing the devices separately.
- 10.5 Explain why a 3D-printer would not be needed in typical office environment by referring to their typical purpose and function.
- 10.5 3D-printers allow you to create physical three-dimensional objects from designs that you have created on your computer using CAD or 3D modelling software.
11. Another sponsor has come forward and has offered each of the members of the trust's committee a choice between a *tablet* and a *smartphone*.
- 11.1 One of the quotes for a *tablet* specified that it used 'Android 9 (Pie)'.
- What does this specification refer to?
- 11.1 Android 9 (Pie) is an operating system designed for mobile devices.
- 11.2 A committee member thought a *phablet* would be the perfect solution in terms of *convergence*.
- Explain what the terms *phablet* and *convergence* refer to in this context.
- 11.2 A phablet is a smartphone with midway in size between a smartphone and a tablet. The larger screen size is convenient, and the device can also make phone calls like a normal smartphone.
- Convergence refers to the trend where separate technologies and functions that required different devices in the past are combined into one single device that has all or some of the functionality of each of the separate devices. A phablet combines various devices and gadgets into a single 'super gadget' that allows us to do a whole range of tasks without carrying around many different devices.
- 11.3 One of the quotes for an entry-level smartphone listed 'with over 400,000 apps for the Android platform from Google Play – ideal for the SOHO user'.
- Explain what this means by referring to the concept of *entry-level*, *apps*, *platform* and *SOHO* in your answer.
- 11.3 All types of computers and devices have an entry-level model. These models are the cheapest to purchase in their range as they have fairly low hardware specifications.
- The word app is short for application. It refers to programs that we can install and run on mobile devices, such as smartphones or tablets. Google Play is a website/app store where you can browse and download apps specifically written for the Android platform or operating system.
- A SOHO (Small Office Home Office) user refers to a user in a smallish business, typically run from a home or a small business office.
- 11.4 One of the quotes for a tablet showed a specification of 11.6".
- 11.4.1 What component does this specification refer to?
- 11.4.1 The display.

11.4.2 Clearly indicate how this specification is measured.

11.4.2 The screen size is measured in inches diagonally from corner to corner.

11.5 A smartphone can be connected to a computer.

Give two reasons why someone might want to connect a smartphone to a computer.

11.5 Any two of:

- To use it as a device to connect to the internet via the cellular network.
- To charge the battery of the smartphone by connecting it to a USB port
- To transfer files between the smartphone and the computer.

12. One of the trust members suggested buying a large monitor for training purposes, and obtained a quote for a 42-inch (1366×768) monitor.

12.1 What does the '1366×768' specification refer to?

12.1 It refers to the maximum resolution of the monitor measured in pixels (1366 pixels horizontally and 768 pixels vertically).

12.2 Name an output device that would perhaps be better suited for computer training in the school hall where the training will take place.

12.2 A data or projector.

12.3 HDMI is a *digital* standard used to connect monitors etc.

What does the term 'Digital migration' refer to and describe two benefits it provides.

12.3 Digital migration is the process of changing TV signals so that they are broadcast in a digital format instead of an analog format. Using digital rather than analog broadcasting technology brings with it several advantages, including the following:

Any two of:

- With digital broadcasting you can get High Definition Television (HDTV) which offers superior picture and sound quality – far better than with the traditional analog standard.
- Digital signals carry more data than analogue signals. This means that they take up less bandwidth, allowing more channels to be broadcast simultaneously and giving people more viewing choice.
- The efficient use of channels also means that the unused frequencies can be used for other purposes – e.g. increasing the performance of cellular data communications.

13. The secretary, Mary, has downloaded some useful software from the internet. A great deal of the software is *shareware*, which is available to download for free from the internet.

Give two differences between shareware and 'normal' proprietary software (software that is purchased), other than the prices.

13. Shareware usually stops working when the trial period has expired. The trial version also sometimes does not include all of the features of the full version – you need to pay to get the 'full' version.

Proprietary software does not have a test period and it includes a 'full' version.

14. Mary has been told to make a *daily backup* of her work and to take it home on the *external hard drive* that was purchased for this purpose.
- 14.1 Why is it advisable to take the external hard drive home each night?
- 14.1 To store the backups safely off-site in case of theft, fire, etc.
- 14.2 Give three reasons why it is critical to back up or make copies of files on a regular basis.
- 14.2 Any three of:
- Files can be accidentally deleted or overwritten.
  - Files can sometimes become corrupt.
  - Files can become infected with malware (viruses, spyware, etc.).
  - Hardware such as a disk drive can fail, etc.
- 14.3 Mary is finding that her external hard drive is only just managing to store the contents of the hard drive on her computer.
- Give two ways in which she can reduce the amount of files she needs to back up.
- 14.3 Any two of:
- Only back up data files (not software that can be reinstalled).
  - Only backup file changes since the previous backup.
  - Compress ('zip') the files that will be backed up into a single zipped ('compressed') file.
  - First perform housekeeping tasks such as removing duplicate files.
15. Mary is trying to create a logical folder structure. The following files are saved in one of the folders: Claims.docx, Agenda.pdf, Table.txt, Hardware.accdb, Team.bmp, Backup.zip, Song.mp3
- 15.1 Name the graphics file(s) listed in the screenshot.
- 15.1 Team.bmp
- 15.2 What common file type could be used to save the graphics file shown in the screenshot in order to reduce its size?
- 15.2 JPEG
- 15.3 The Agenda file is stored in *PDF* format.
- 15.3.1 What program would you need to open and read this file?
- 15.3.2 A PDF reader such as Adobe Reader. Newer versions of Word can also open these files.
- 15.3.2 Give two reasons why files are often distributed in PDF format.
- 15.3.2 Any two of:
- So that the person receiving the file does not have to have the application in which the file was originally created, installed.
  - PDF is a widely accepted and widely used standard file format.
  - To prevent users from (easily) changing the contents of the file.
  - It can reduce the size of files, etc.

- 15.4 Mary received a message that the database was *read-only* when she tried to open it.  
Explain why this might happen and how she can resolve this problem.
- 15.4 This might be because it was loaded from a read-only medium, such as a DVD, and its read-only attribute is set. You can copy the file to another location and remove the read-only attribute. Alternatively, you can simply open the file and save it under a different file name or in a different folder.
- 15.5 When inspecting the properties of the MP3 file, Mary saw extra *metadata* such as the artist's name and the genre of the music.  
  
Briefly explain what metadata is by referring to two typical items of metadata you might find associated with a digital photograph.
- 15.5 Metadata is commonly referred to as 'information about data'. It provides information about the contents of the file. For example, metadata for a photograph may include the colour depth, the image resolution, the type of camera used to take the photograph, as well the location of where the photo was taken (geo-tagging).
16. Mary asked if she could upgrade from her current office suite. She did some research and noted that there are *Home* and *Professional* editions of the same suites and that they often have *minimum* and *recommended* requirements. There are also different types of *licensing agreements* available.
- 16.1 What would be the main difference between a *Home* and *Professional* edition of the same office suite?
- 16.1 Home editions typically include fewer programs or features than the Professional editions.
- 16.2 What is the difference between *minimum* and *recommended* requirements in terms of software?
- 16.2 Minimum requirements are those needed to load and run the program, but these will not guarantee good performance. Recommended specifications are the higher requirements or specifications needed in order for the software to run efficiently and smoothly.
- 16.3 One of the hardware requirements listed was the hard drive space needed to install the package. Two specifications were given – one for a *typical* installation and one for a *full* installation.  
  
Briefly explain the difference between these two types of installations.
- 16.3 A full installation means installing all the programs and features available in the package. A typical installation refers to installing the most commonly used programs and features that most users would most probably need.
- 16.4 Give two other typical hardware requirements for software installation, besides free disk space.
- 16.4 Any two of:
- the minimum specification for a CPU/processor/type of configuration
  - the amount of RAM required
  - specialised devices such a video card or joystick, depending on the specific software.

- 16.5 Give two reasons why it might *not* be advisable to switch over to a newer version of the office suite.
- 16.5 Any two of:
- You may need training to be able to use the new version.
  - The new version may not have enough new or useful features to justify the upgrade.
  - May run slower on Mary's computer if it needs 'higher' hardware specifications.
- 16.6 Mary was surprised to see that she needed an internet connection to install the new office suite. Give two reasons why it may be necessary to connect to the internet when installing software.
- 16.6 An internet connection is required for software activation, user validation and access to online services.
- 16.7 The three different types of software licences available are *single-user*, *multi-user* and *site* licences. In addition, there is a move towards *subscription-based software* models such as Office 365.
- 16.7.1 What is a software licence?
- 16.7.1 It is a legal agreement between the user and the software vendor, specifying the conditions under which the software may be installed and used.
- 16.7.2 Mary wants to know if she can make a copy of the office suite DVD. She worries that this might be considered *software piracy*.
- Explain why this would not be considered software piracy by describing what software piracy is.
- 16.7.2 Software piracy refers to the illegal copying, distributing and usage of software. You are usually allowed to create a copy of the original DVD for safekeeping, so this would not be considered piracy.
- 16.7.3 If the trust wanted to install the office suite on all the other computers, they would have to make a choice between a multi-user licence and a site licence.
- Explain the differences between these two types of licences.
- 16.7.3 Multi-user licences allow the software to be installed and run on a specified number of computers. Site licences allow the installation of the software on any number of computers within the company or organisation. Site licences are usually the cheaper option for a larger number of computers.
- 16.7.4 Briefly explain how subscription-based software differs from Traditional licensing models.
- 16.7.4 Traditional licensing models have the user paying 'up-front' for a license to use the software indefinitely. With subscription software, the user pays a monthly or yearly subscription for the use of the software. You do, however, need to have internet connectivity (usually at least once a month) so that your account can be verified, and for updates.

- 16.8 Mary may need to uninstall the older version of the office suite before she installs the new office suite.

Give one reason why she cannot simply select the program and delete it. Also give the correct way to remove the program from the computer.

- 16.8 Any one reason why she cannot simply select the program and delete it:

- The program is installed across several folders / won't be completely removed.
- Simply deleting the program can corrupt the system, etc.

Any one correct way to remove the suite from the computer:

- Use the operating system function or the Control Panel to remove it.
- Use the uninstall option of the program to remove it.

- 16.9 It is always important to check if the new version of the software is 'backwards' or 'downwards' compatible.

16.9.1 Explain what this statement means.

- 16.9.1 It means that it is important to check if the software can read and open files that are stored in older versions of the same software.

- 16.9.2 Mary received a file that was created in a newer version of the program that she uses, but she cannot open it.

Recommend two possible solutions to this problem.

16.9.2 Any two of:

- Ask the person who sent the file to export or save it into an older or lower version that Mary's version can open.
- See if the file can be opened by another program that Mary has installed on her computer.
- See if the file can be read by a program on the internet (if Mary has internet access), etc.

17. Mary was asked if she had kept her *operating system* updated, and whether she felt the need to upgrade to a newer version or not. She felt very embarrassed, as she had not known that she had an operating system on her computer, let alone that she had to keep it updated!

- 17.1 Give three general reasons why a user needs an operating system by referring to its functions.

17.1 Any three of:

- managing programs
- storage or disk management
- memory (RAM) management
- input/output management
- providing basic security
- providing the user interface, etc.

- 17.2 If the operating system was to be upgraded to a newer version of the Windows operating system, there might be a problem with the *device drivers* of older equipment.
- 17.2.1 Clearly explain what a device driver is and the role it plays in the functioning of a computer.
- 17.2.1 A driver is a small piece of software needed by the operating system or computer for the operation of a device.
- 17.2.2 Give two ways or specific places where one could try to find a new driver.
- 17.2.2 Any two of:
- the internet
  - the operating system itself
  - a computer shop or the manufacturer, etc.
- 17.3 Mary complained that her cap is used up quickly because of the automatic updates that Windows needs.
- 17.3.1 Give two reasons why it is important to keep software updated, for example your operating system.
- 17.3.1 Any two of:
- to add new features
  - to fix bugs in the software
  - to fix security loopholes, etc.
- 17.3.2 Clearly explain what a cap is and why it is being used up so quickly in this situation.
- 17.3.2 The word 'cap' refers to the amount of data you may download and upload in a period of time, usually a month. The cap is being used due to updates being downloaded from the internet.
- 17.3.3 Explain what a software bugs are and mention two possible risks they might cause or represent
- 17.3.3 Bugs are mistakes that were made by accident when the programmers wrote the software – they are not viruses. Any software that is written will initially have 'bugs' in it.
- Any two of:
- Corrupted data or invalid information
  - Unexpected and dangerous behaviour of computer controlled machinery
  - Security breaches and the existence of 'loopholes' for malware and hackers to exploit etc.
- 17.3.4 Many programs, including operating systems, have their own scheduling options.
- Explain what a scheduler is and give two broad benefits or uses of a scheduler.
- 17.3.4 A scheduler is a program used to run certain programs at specific times. For example, it can be used to check for and download updates automatically, and to perform housekeeping tasks such as disk defragmentation. It can be set to automatically run at off-peak times, so as not to slow down the computer.



- 17.4 Operating systems have similar functions and are loaded when a computer or device is switched on or *booted*. In addition they can be classified as *single-user*, *multi-user* and *multitasking*.
- 17.4.1 What typically happens during the 'booting' of a computer? Refer to the concept of *ROM* in your answer.
- 17.4.1 When a computer is switched on the first thing they do is look for instructions to follow. These instructions are stored on special memory chips called ROM that keep their contents even when the computer is off. When you switch on the computer these instructions perform some basic hardware tests to ensure everything is working correctly and try to find and load the operating system from the disk drive
- 17.4.2 What is the difference between a as single-user and a multi-user operating system?
- 17.4.2 A single-user operating system can only be used by one user at a time, whereas a multi-user operating system allows multiple users to access a computer system simultaneously.
- 17.5 Operating systems often include a basic *firewall*. Explain what a firewall is and how it functions.
- 17.5 A firewall acts as a barrier between your computer and the internet. It checks which programs are trying to access your computer via the internet or are trying to access the internet from your computer. It can consist of hardware or software or a combination of both. It allows one to prevent applications that you don't know or trust from connecting to the internet.
18. Mary printed a document, but it was not printed out by the printer. One of the trust members said she should check her *default printer* setting as well as the *printer queue*.
- 18.1 What is meant by the term *default printer setting*?
- 18.1 It is the setting in the operating system which specifies the printer that must be used automatically to print a document, unless another printer is specified by the user.
- 18.2 Explain what the terms printer queue and spooling refer to.
- 18.2 All print tasks are temporarily stored on disk until the printer is ready to print them. Each printer has its own area set aside for this, known as its printer queue. Spooling is the process of sending print tasks temporarily to disk (hard drive), until the printer is ready to print them.
- 18.3 List two actions that can be taken by the user in the printer queue, besides viewing the printer tasks.
- 18.3 The user can cancel, pause and restart print tasks in the printer queue.

18.4 List three trouble-shooting actions that a user can take if a printer will not work or print properly, besides making use of the printer queue.

18.4 Any three of:

- The printer may not be plugged in or the power is off.
- The printer may not be properly connected to the computer.
- The printer may be low on ink or toner (the printout will be faded and irregular).
- You have selected the wrong printer in the print dialog box.
- The network settings of the printer or computer are wrong in a network setting
- Your computer has the wrong printer driver installed (the printer will print, but the content will be incorrect and will not make sense).
- You are using the wrong type of paper (this is when the ink spreads out too much or the toner does not stick to the paper).
- The paper occasionally gets stuck in the printer and must be manually removed. Be careful not to damage the printer while removing the paper.

19. Mary created a budget in a spreadsheet and saved it on her hard drive, but later in the week she could not find it. She also could not remember what the name of the spreadsheet was. Give three parameters that Mary can use to help her to search for the file.

19. Any three of:

- the type of file (file extension)
- the date 'range' of when the file was modified
- the locations where Mary might have stored the file (her hard drive)
- some of the contents of the file that Mary might remember, for example, a heading or a phrase, etc.