Systems Technologies ‘sub-scenario’

# 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.

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 >>

1.2 How much memory (RAM) is installed on this computer in total? Briefly explain your answer.

1.2 >>

1.3 What is the speed of the processor listed in the specifications?

1.3 >>

1.4 What is the capacity of the hard drive listed in the specifications?

1.4 >>

1.5 Explain how and why the quad-core specification would be of benefit.

1.5 >>

1.6 Name the *open source* software listed in the specifications and give the category of software that it belongs to.

1.6 >>

1.7 What is the main advantage of open source software, besides the fact that it is usually free?

1.7 >>

1.8 What type of system software is Avast 2019?

1.8 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

2.3.4 What is a disk scanner and how does it differ in function to a Disk Cleanup utility?

2.3.4 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

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 >>

3.6.2 Give two benefits that Blu-ray technology has over ‘normal’ DVDs?

3.6.2 >>

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 >>

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 >>

4.2 Give two potential disadvantages of using a wireless keyboard (besides any cost considerations).

4.2 >>

4.3 What does the ‘full QWERTY’ specification of the keyboard mean?

4.3 >>

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 >>

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 >>

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

4.4.3 >>

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 >>

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

5.2 >>

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 >>

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 >>

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 >>

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

5.5.2 >>

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

5.5.3 >>

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 >>

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 >>

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 >>

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

6.2 >>

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

6.3 >>

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 >>

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

7.2 >>

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

7.3 >>

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 >>

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 >>

8.3 Describe the two main ways in which voice recognition software can help disabled people in particular.

8.3 >>

8.4 Explain what a *virtual assistant* is and describe how it can help disabled people in particular.

8.4 >>

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 >>

9.2 Give two broad benefits of using a system of barcodes linked to a POS (Point-of-Sale) computer system.

9.2 >>

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 >>

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 >>

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 >>

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

10.2.2 >>

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

10.2.3 >>

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

10.3 >>

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 >>

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 >>

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 s*martphone*.

11.1 One of the quotes for a *tablet* specified that it used ‘Android 9 (Pie)’.

What does this specification refer to?

11.1 >>

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 >>

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 >>

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 >>

11.4.2 Clearly indicate how this specification is measured.

11.4.2 >>

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 >>

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 >>

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 >>

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 >>

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. >>

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 >>

14.2 Give three reasons why it is critical to back up or make copies of files on a regular basis.

14.2 >>

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 >>

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 >>

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 >>

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 >>

15.3.2 Give two reasons why files are often distributed in PDF format.

15.3.2 >>

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 >>

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 >>

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 >>

16.2 What is the difference between *minimum* and *recommended* requirements in terms of software?

16.2 >>

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 >>

16.4 Give two other typical hardware requirements for software installation, besides free disk space.

16.4 >>

16.5 Give two reasons why it might *not* be advisable to switch over to a newer version of the office suite.

16.5 >>

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 >>

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 >>

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 >>

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 >>

16.7.4 Briefly explain how subscription-based software differs from Traditional licensing models.

16.7.4 >>

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 >>

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 >>

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 >>

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 >>

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 >>

17.2.2 Give two ways or specific places where one could try to find a new driver.

17.2.2 >>

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 >>

17.3.2 Clearly explain what a cap is and why it is being used up so quickly in this situation.

17.3.2 >>

17.3.3 Explain what a software bugs are and mention two possible risks they might cause or represent

17.3.3 >>

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 >>

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 >>

17.4.2 What is the difference between a as single-user and a multi-user operating system?

17.4.2 >>

17.5 Operating systems often include a basic *firewall*. Explain what a firewall is and how it functions.

17.5 >>

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 >>

18.2 Explain what the terms printer queue and spooling refer to.

18.2 >>

18.3 List two actions that can be taken by the user in the printer queue, besides viewing the printer tasks.

18.3 >>

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 >>

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. >>

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