Level 2 - Unit 28 - Optimise IT System Performance (4 credits)

Gold - Unit 28 - Optimise IT System Performance

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Overview

The candidate can plan and optimise a PC to get the best performance for the given hardware and software. Learners need to demonstrate that they can manage a PC effectively, including file management and basic trouble-shooting activities. They also need to be able to customise the environment in line with a customer needs and maintain the PC over time.

A work activity will typically be 'non-routine or unfamiliar' because the task or context is likely to require some preparation, clarification or research to separate the components and to identify what factors need to be considered. For example, time available, audience needs, accessibility of source, types of content, message and meaning, before an approach can be planned; and the techniques required will involve a number of steps and at times be non-routine or unfamiliar.

Example of context – work as part of the school IT team to maintain a small group of PCs and keep records of the work undertaken.

Assessor's guide to interpreting the criteria

General Information

QCF general description for Level 2 qualifications

- Achievement at QCF level 2 (EQF Level 3) reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgement subject to overall direction or guidance.
- Use understanding of facts, procedures and ideas to complete well-defined tasks and address straightforward problems. Interpret relevant information and ideas. Be aware of the types of information that are relevant to the area of study or work.
- Complete well-defined, generally routine tasks and address straightforward problems. Select and use relevant skills and procedures. Identify, gather and use relevant information to inform actions. Identify how effective actions have been.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed.

Requirements

- Standards must be confirmed by a trained Gold Level Assessor or higher
- Assessors must at a minimum record assessment judgements as entries in the on-line mark book on the INGOTs.org certification site.
- Routine evidence of work used for judging assessment outcomes in the candidates' records of their day to day work will be available from their e-portfolios and on-line work. Assessors should ensure that relevant web pages are available to their Account Manager on request by supply of the URL.
- When the candidate provides evidence of matching all the criteria to the specification subject to the guidance below, the assessor can request the award using the link on the certification site. The Account Manager will request a random sample of evidence from candidates' work that verifies the assessor's judgement.
- When the Account Manager is satisfied that the evidence is sufficient to safely make an award, the candidate's success will be confirmed and the unit certificate will be printable from the web site.
- This unit should take an average level 2 learner 40 hours of work to complete.

Assessment Method

Assessors can score each of the criteria N, L, S or H. N indicates no evidence. L indicates some capability but some help still required. S indicates that the candidate can match the criterion to its required specification. H indicates performance that goes beyond the expected in at least some aspects. Candidates are required to achieve at least a S on all the criteria to achieve the full award.

Expansion of the assessment criteria

1. Candidates will keep computer hardware and software operating efficiently

1.1 I can describe the main features and functions of the computer operating system

Candidates should be able to describe what makes an operating system, in terms of features and functions.

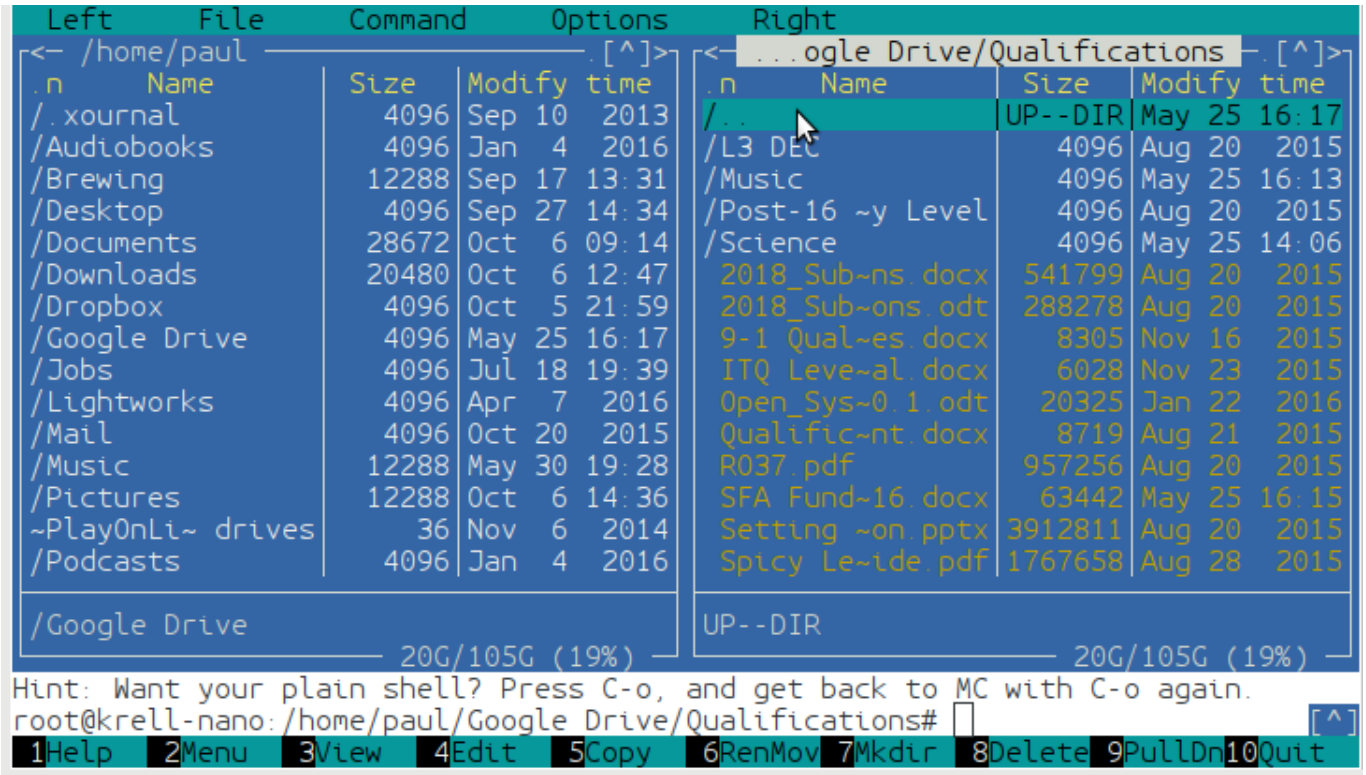
Evidence: will be provided by portfolio work.

Additional information and guidance

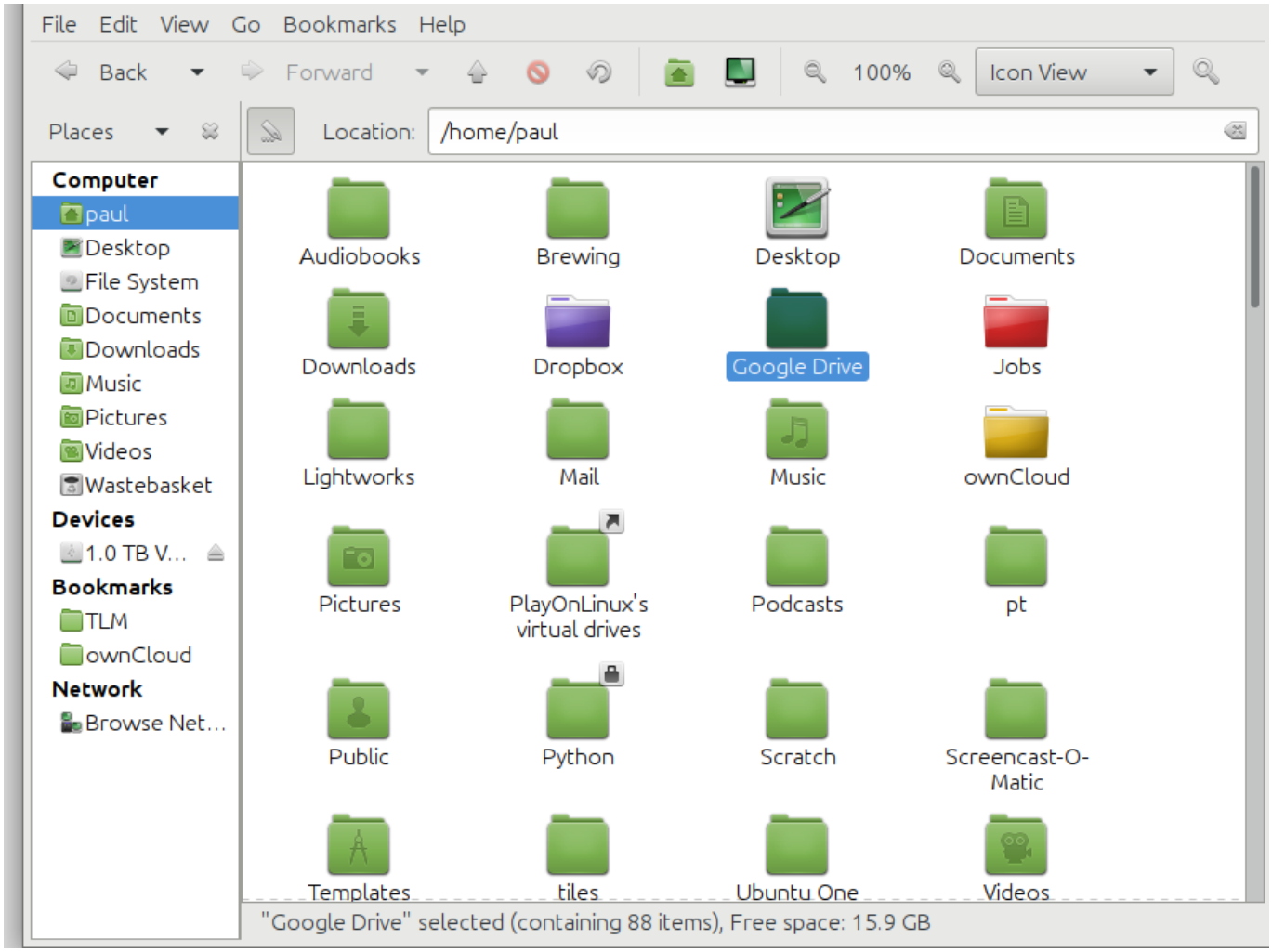
Candidates should be able to produce a short piece, or presentation, highlighting and explaining what an operating system is or does. Most manufacturers have these summaries on their websites as part of their sales material, so they can use this as a starting point. The overview of what the Ubuntu OS offers is here [3]. Other OS manufacturers will have similar functions and features. It might be useful to have a comparative chart of what 2 different operating Systems offer with a side-by-side table. They need to show they understand what a feature is and what a function is. All operating systems should be able to manage files and have some sort of graphical display manager, but some OS will have features that others don't, for example, most operating systems now have 64

bit memory management, though some might still use 32 bit. Some systems might be true multi-user, while others will only manage some of this functionality. The main features of an OS are: **system calls** (sending messages to the hardware i.e. by typing something in); **device drivers** (making things like keyboards work); **file system** and **user interface**.

The user interface can be a command line system:



Or the same thing in a graphical form.



Functions are related to these as these are ways of accessing these functions, such as **processing files**, **managing memory** or **managing devices**. All of these functions can be carried out with a command line or graphical system.

1.2 I can take appropriate steps to protect computer hardware from loss or damage

Candidates should be able to show the main dangers to a PC and how to minimise or prevent these.

Evidence: will be provided from portfolios or assessor feedback.

Additional information and guidance

IN most working environments there will be physical security, i.e. locked rooms or CCTV in order to protect valuable hardware. Some machines also have locks and are secured to work spaces. candidate's responses will depend on what systems they are investigating. In terms of protecting the hardware, the main issues will be static charges to sensitive electrical equipment, as well as electrical surges, which can be addressed with the appropriate plugs and adapters. There should be rules in place to prevent liquids being used around machines to protect from spillage. Other steps will include the use of backup routines and various hardware and software solutions to make sure that there is the possibility to recover from some disaster.

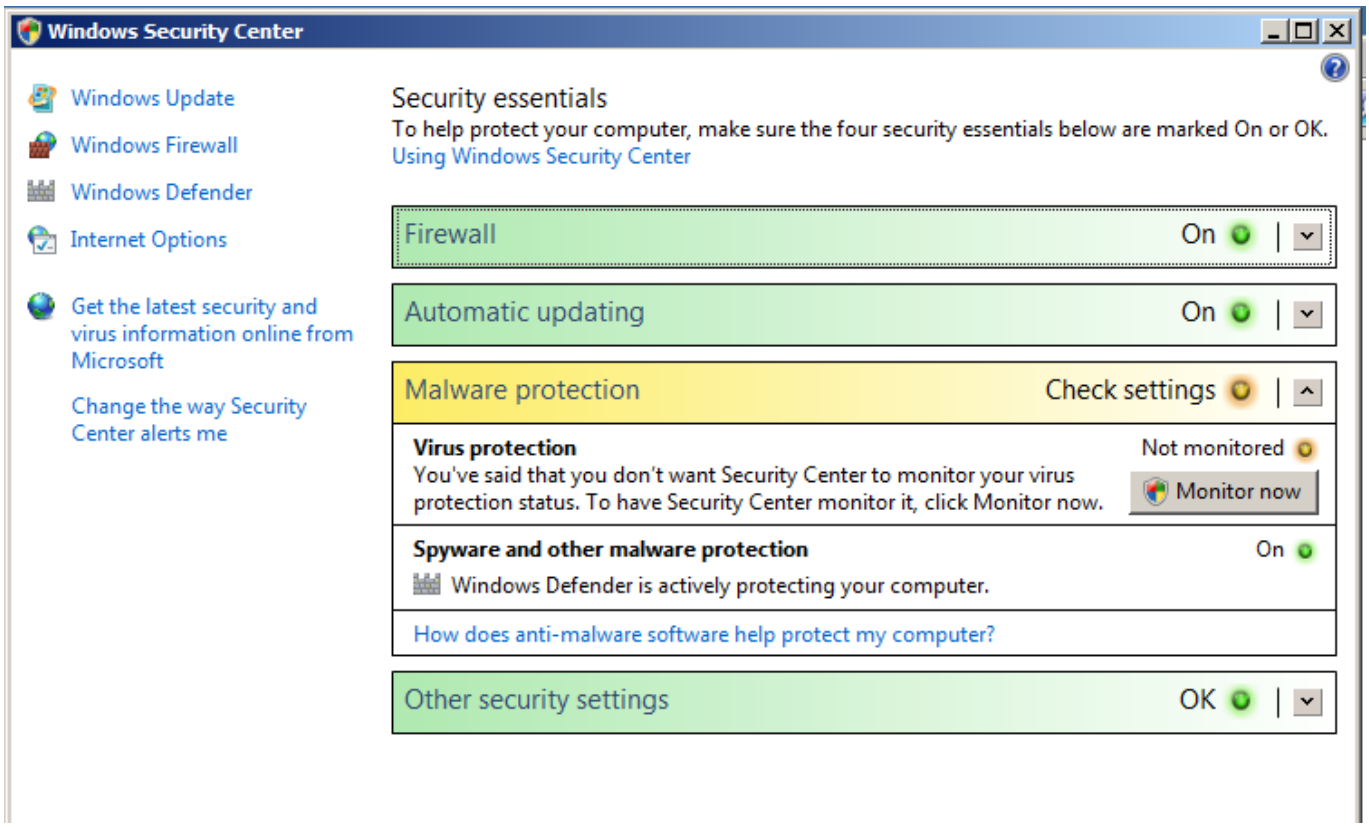
1.3 I can configure anti-virus and other security software

Candidates should be able to make the most basic settings to their system to protect it from harm.

Evidence: will be provided by portfolios, presentations (videos included) or assessor feedback.

Additional information and guidance

Most systems will include some basic protective elements such as firewalls or systems to prevent software etc. They may also have a system to set regular updates to check for fixes to software that has been found to be compromised.



The above window have various options for onboard systems or remote ones. It can also be set to send alerts and reminders to make sure the system is always protected.

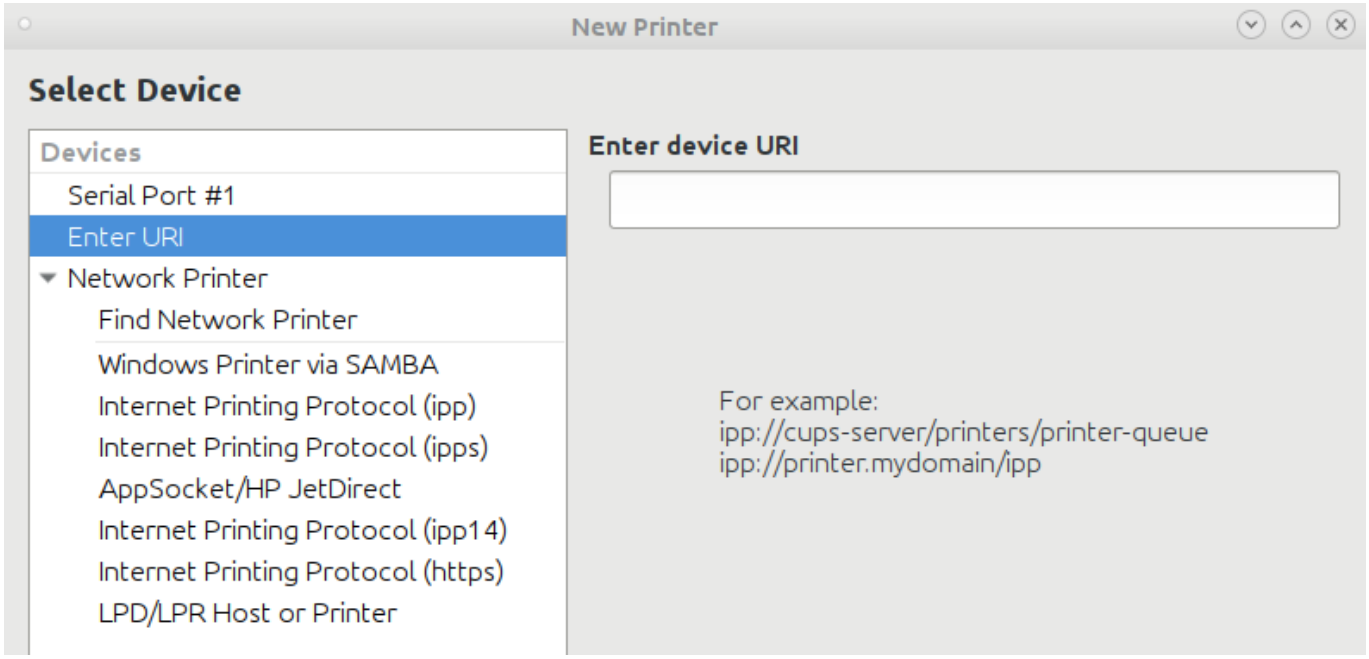
1.4 I can install and configure printers and other peripheral devices

Candidates should be able to demonstrate they can add external devices to a system.

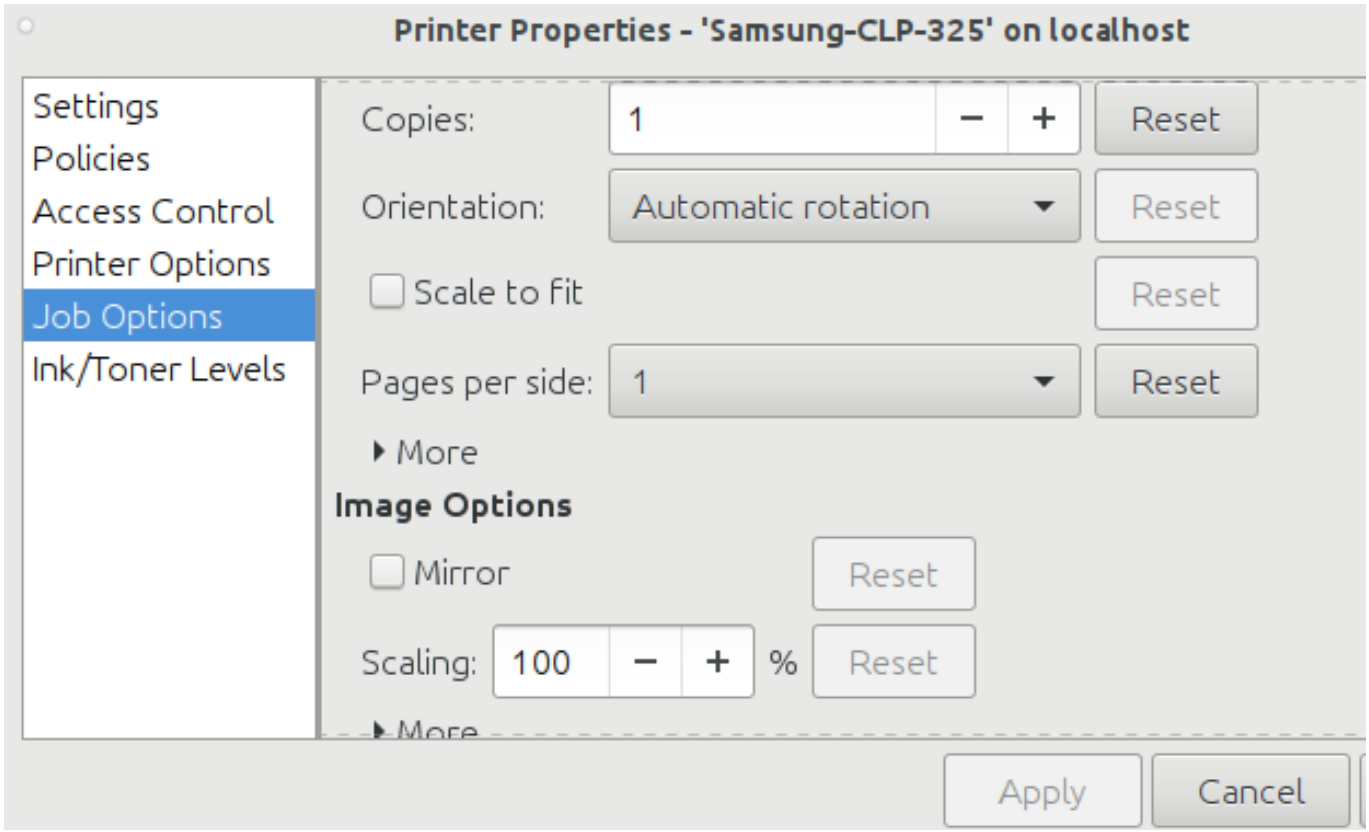
Evidence: will be provided by portfolios, presentations (including videos) and assessor feedback.

Additional information and guidance

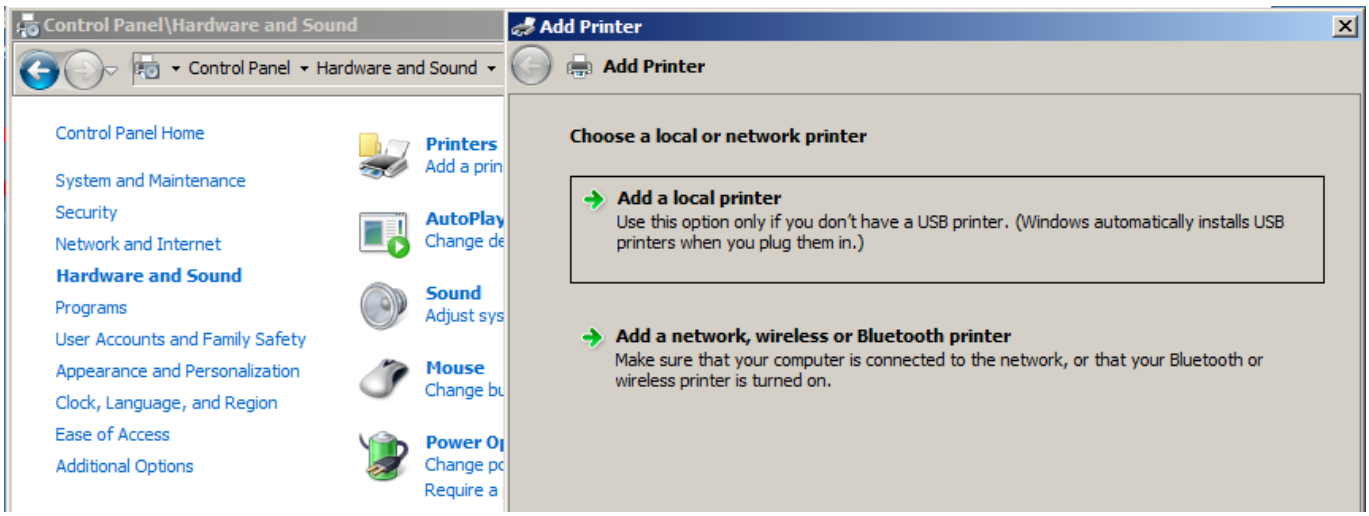
Machines on their own may not be enough to make a system optimum for the work that need to be done. Most will require the ability to do some printing or possibly scanning, some may need to connect to an external hard drive for storage or to a set of speakers for sound. All of these will need to be connected and configured to work effectively. In most cases, this will be a case of plug and play, but in some cases, candidates may need to find and install a newer driver software to make the device work effectively. The following shot owns some of the options available to add a printer to a Linux system. This includes both locally attached printers, as well as remotely connected ones through the Internet or internal network.

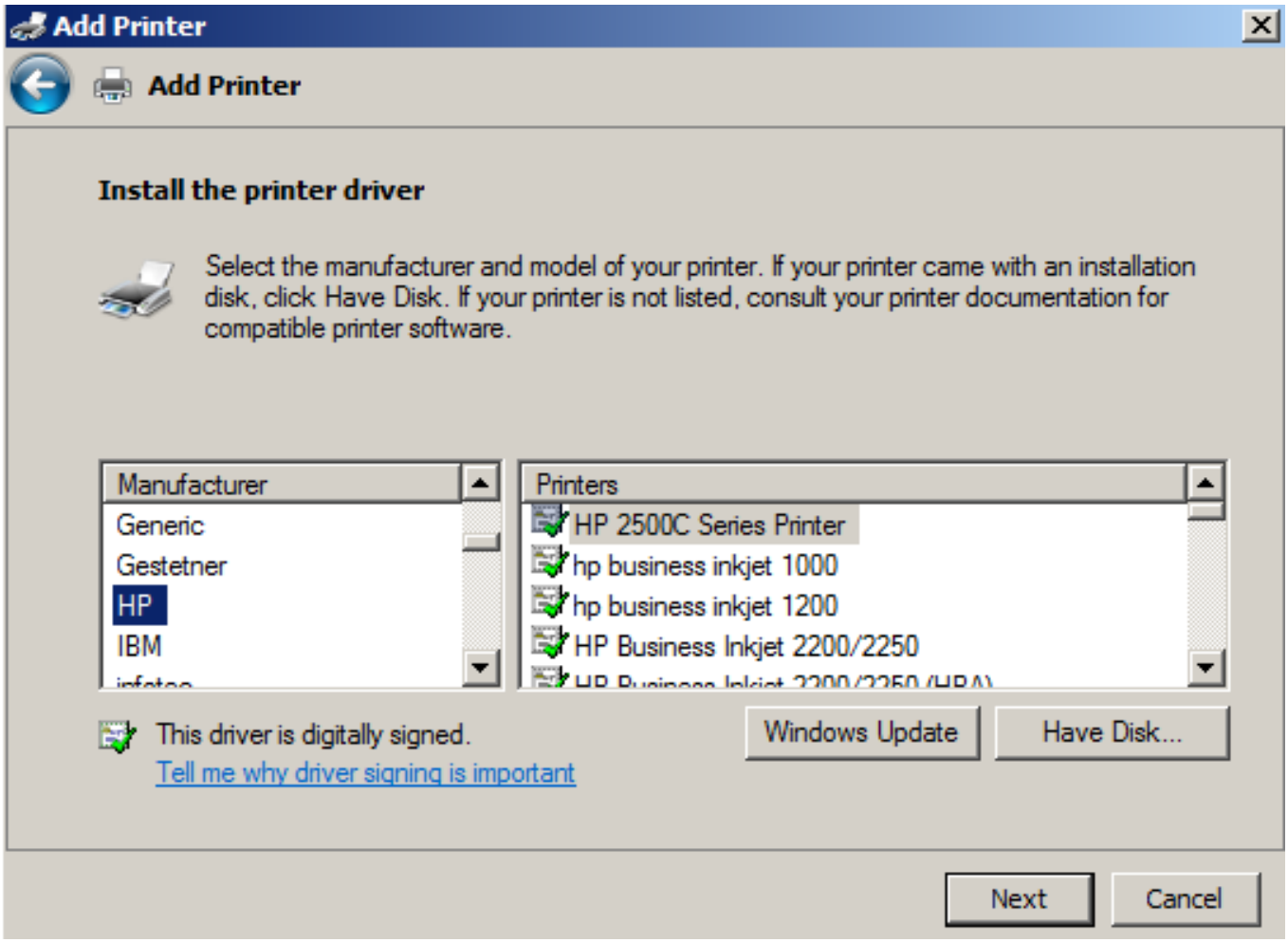


Once the printer has been found and enabled, it can then be further modified and adjusted.



The windows configuration is similar in appearance, showing the consistency across many operating systems.





1.5 I can configure network settings for mobile and remote computing

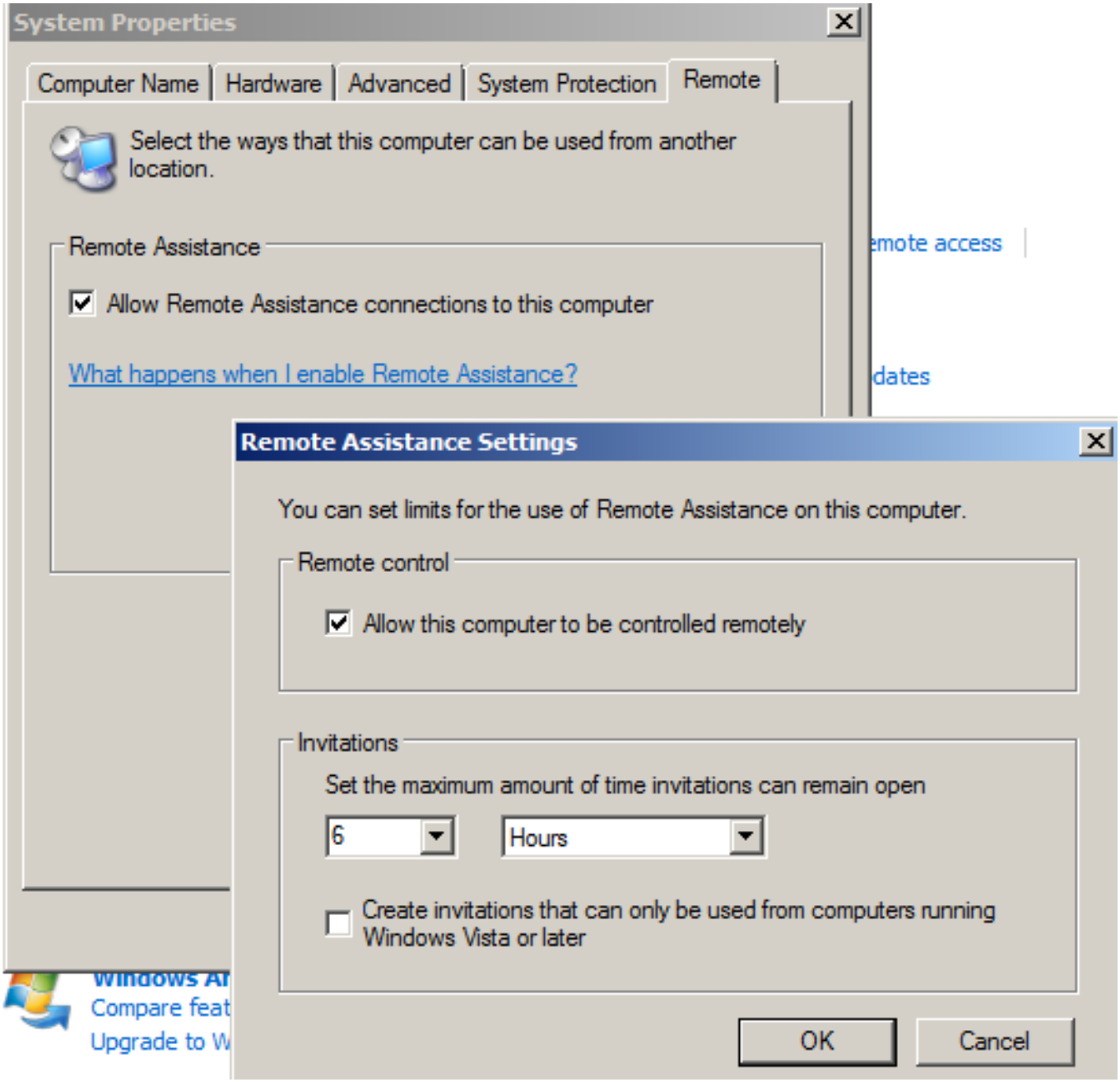
Candidates should be able to prepare a machine to be used in a variety of settings.

Evidence: will be provided by portfolio work and assessor feedback.

Additional information and guidance

Increasingly, computers are used on the move and most Y11 students now carry a powerful computer in their pocket. If you work as a technician in a company, you will be expected to either assist people taking their computers for presentations at another venue, or help visitors to your organisation set up their devices. Candidates should be able to demonstrate that they can configure a range of devices to work with the Internet, whether that is mobile or setting up a machine to be

controlled from a different location, such as for support. Most modern computers have built in software for remote control to assist in troubleshooting abd candidates should demonstrate their ability to configure and test this effectively.



There are also different software applications that can be used such as VNC [4].

1.6 I can configure a computer to present or display information to an audience

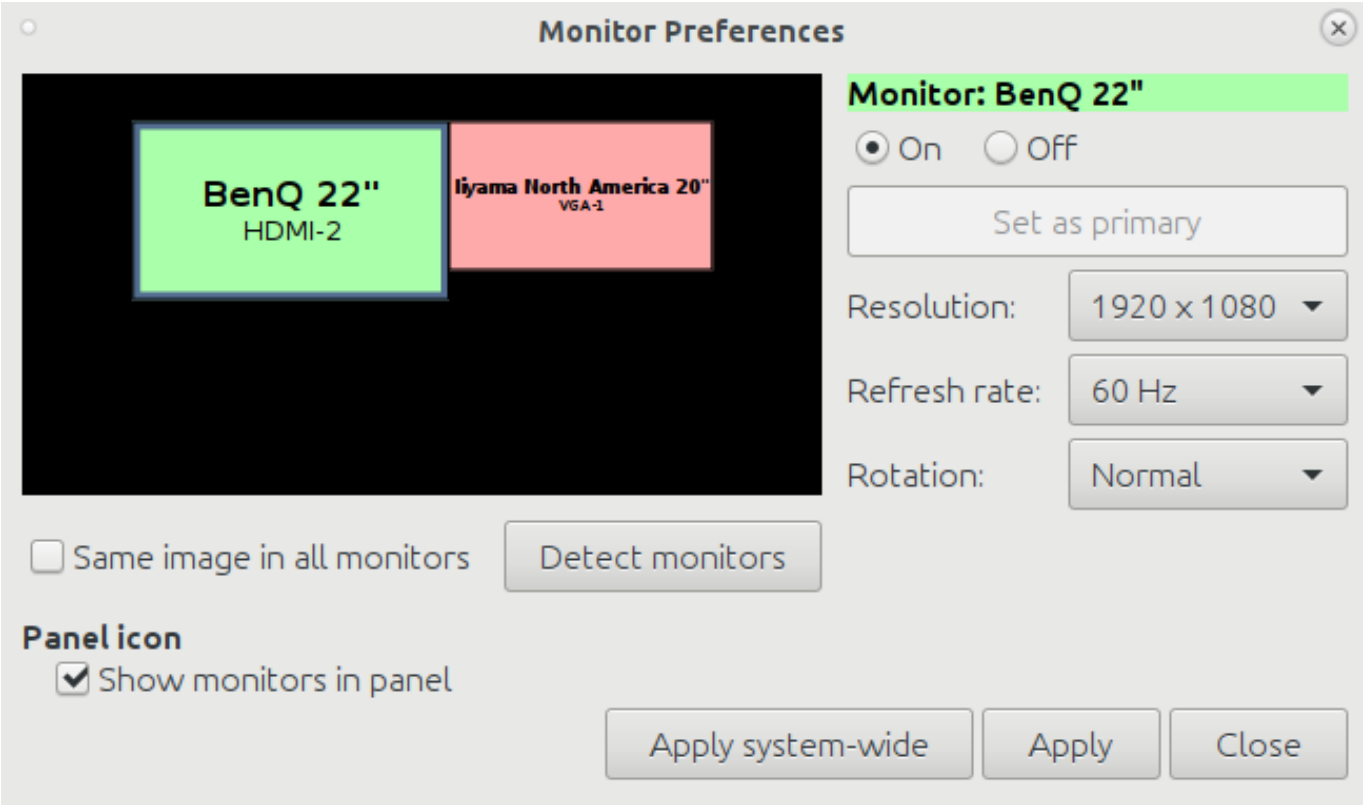
Candidates should be able to configure a device to be able to present material to an audience.

Evidence: will be provided directly from the presentation and assessor feedback.

Additional information and guidance

Many people when they visit companies will need to present some information to them. In most cases, the host company will provide the facilities which will be something like a VGA or HDMI cable which will be attached to a projector. generally, there will be no need for additional configuration, but in some cases the resolution will not work properly and will need some adjustment. In the following image, there is the ability to make adjustments to an external monitor and have different

resolutions and sizes as well.



2. Candidates will manage files and disks to optimise performance

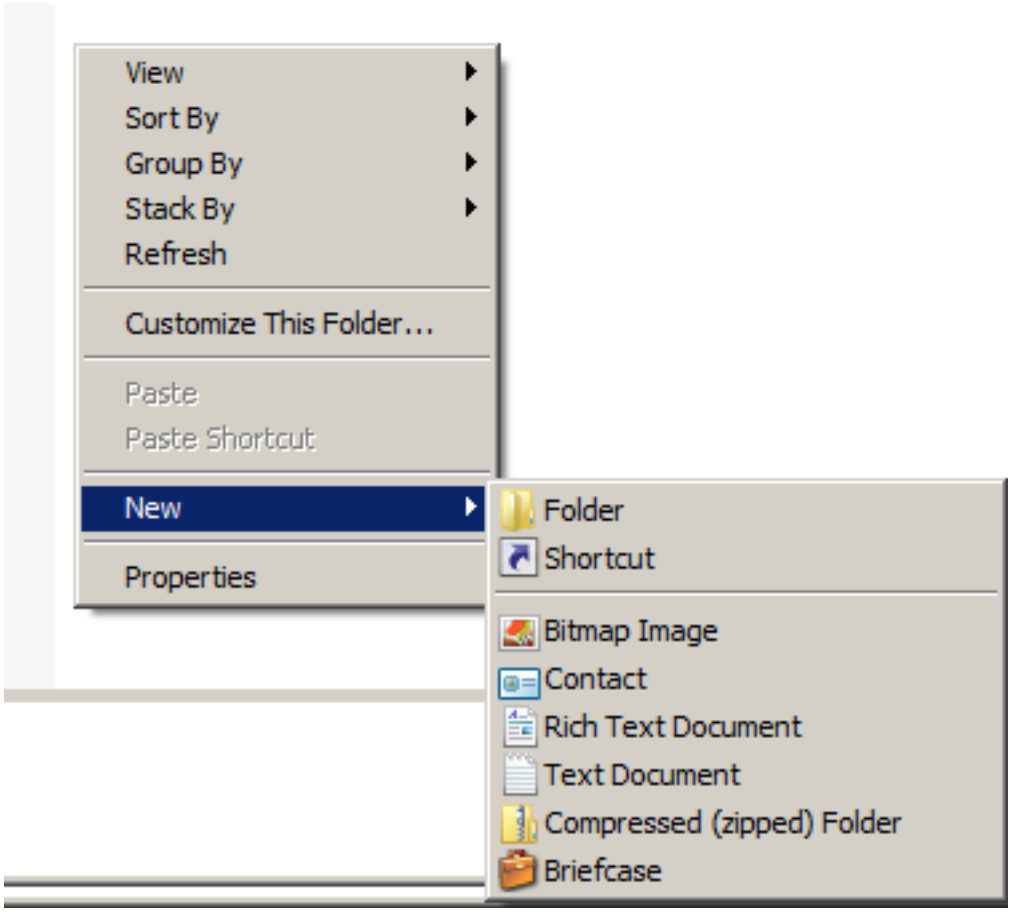
2.1 I can use file navigation software to organise files into an appropriate folder structure

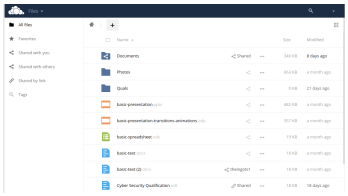
Candidates should be able to demonstrate their understanding and application of good file management.

Evidence: will be provided by portfolio work or assessor feedback.

Additional information and guidance

Most operating systems have a file management system which allows candidates to create folder structures and name files to make sure they are easy to retrieve and manage. The file management system might also have the ability to set permissions or shares. They can also demonstrate this via cloud based systems as the principles and tools are very similar.





Candidates should be able to show how they have managed their files and give some details behind the resonating, unless it is obvious.

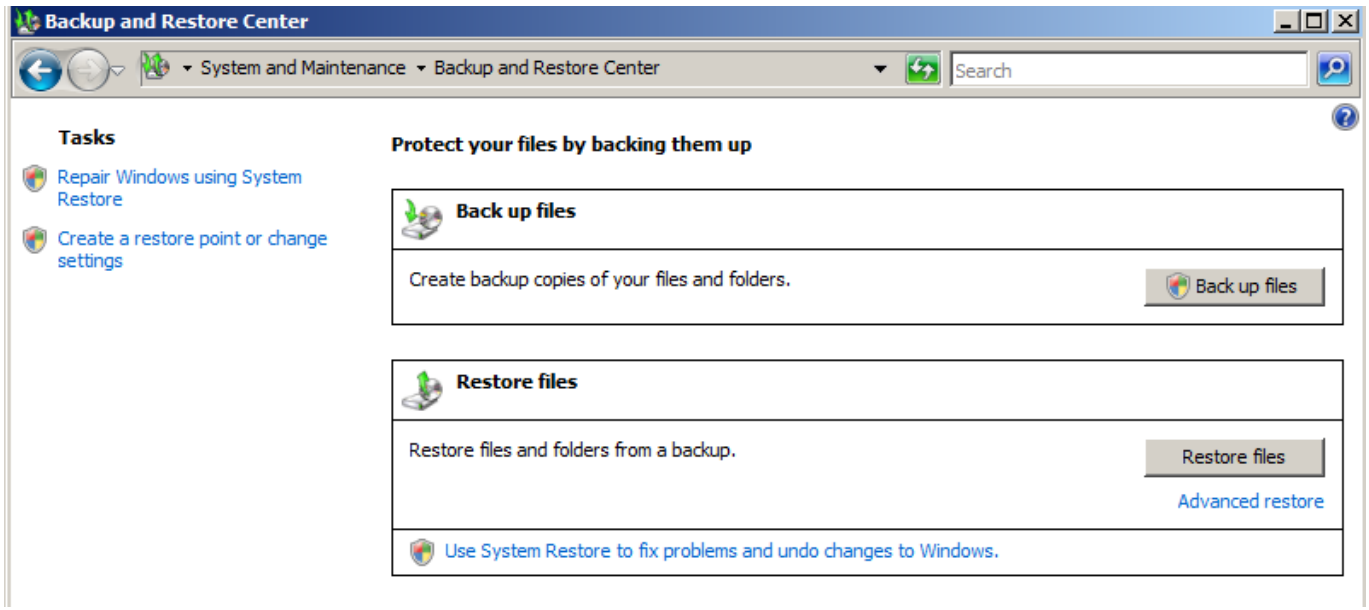
2.2 I can backup and restore files and folders

Candidates should be able to demonstrate their ability to make backups and restore them effectively.

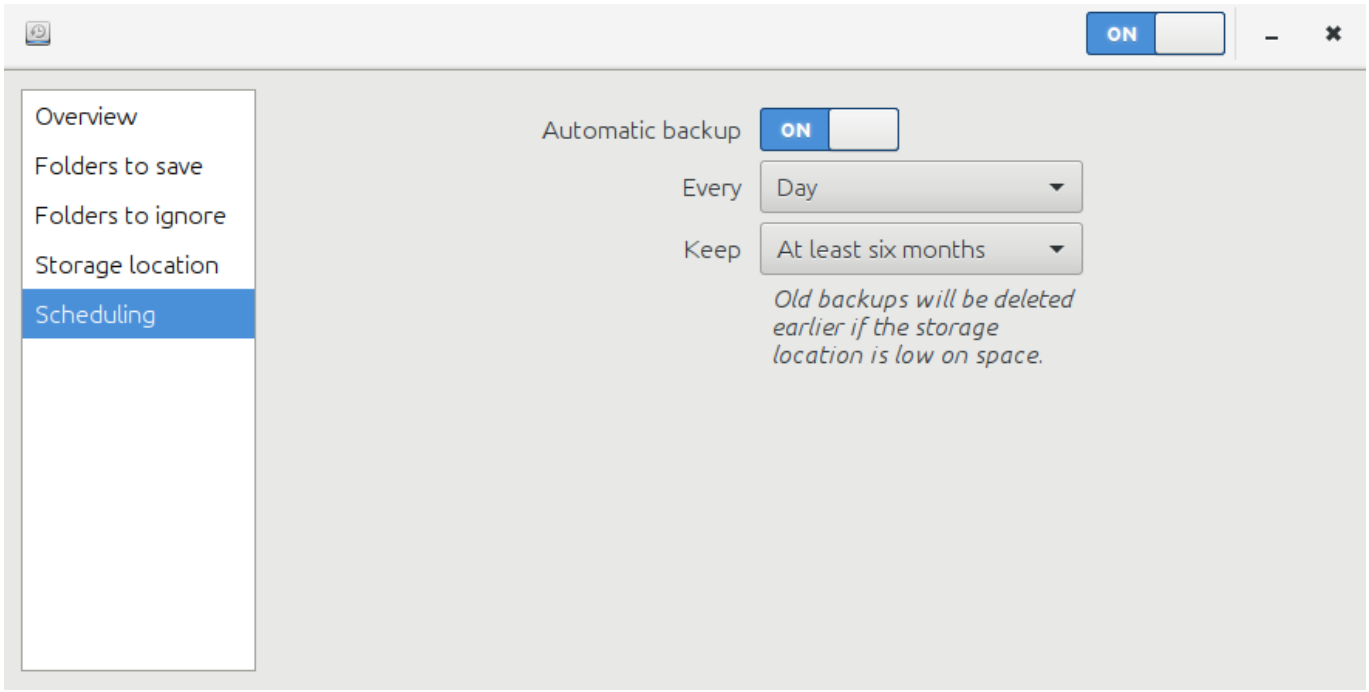
Evidence: will be provided directly from assessor feedback or a video presentation.

Additional information and guidance

Candidates will need to be able to show a good understanding of what and how to backup a system. Most operating systems will have the ability to be able to select what is backed up and therefore what needs to be restored. They can also be set on a time basis so that backups are always recent and therefore of a good quality. There is nothing worse than having a computer failure to find out that the last backup made was a year ago.



Systems generally have the ability to choose where the files are backed up to, and therefore restored from, as well as other options such as creating a schedule to backup every day or week.



2.3 I can describe why it is important to undertake file housekeeping of the information stored on computer systems and how it affects performance

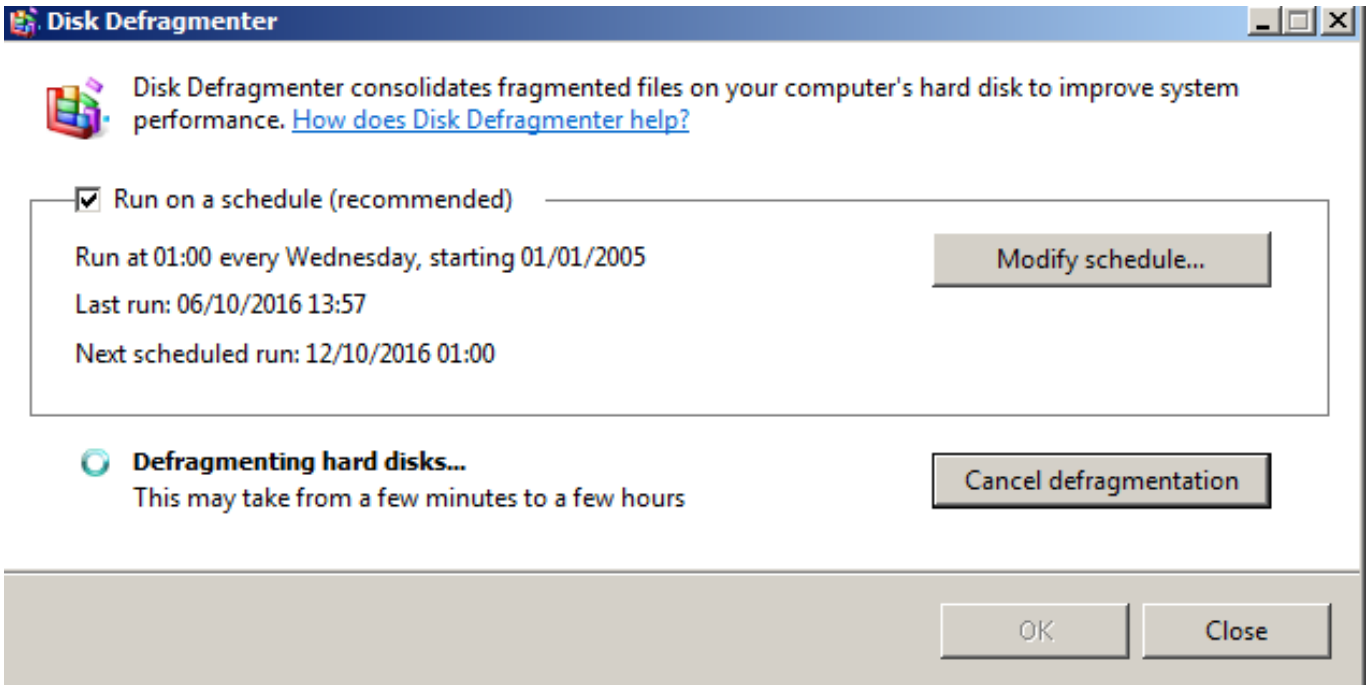
Candidates should be able to describe the reasons for file housekeeping and how it relates to performance.

Evidence: will be provided by assessor feedback or portfolio work.

Additional information and guidance

Candidates should appreciate that operating systems need to be properly managed to perform at their best. Most systems require a certain amount of free space on their hard drives in order to shuffle files around when they are operating. If the file system is almost full, the system will slow down noticeably. Some operating systems also deposits randomly onto a disk space as they operate and over time this will mean that the files that are used for programs or documents may be

physically separated. Even though disks are very fast, it still means it takes time to search and load the data required. This is known as fragmentation and drives need to be defragmented in order to minimise the effects. Modern systems like Linux do this automatically through journaling file systems, but candidates will probably need to work on legacy systems such as Windows XP which will require this to be performed.



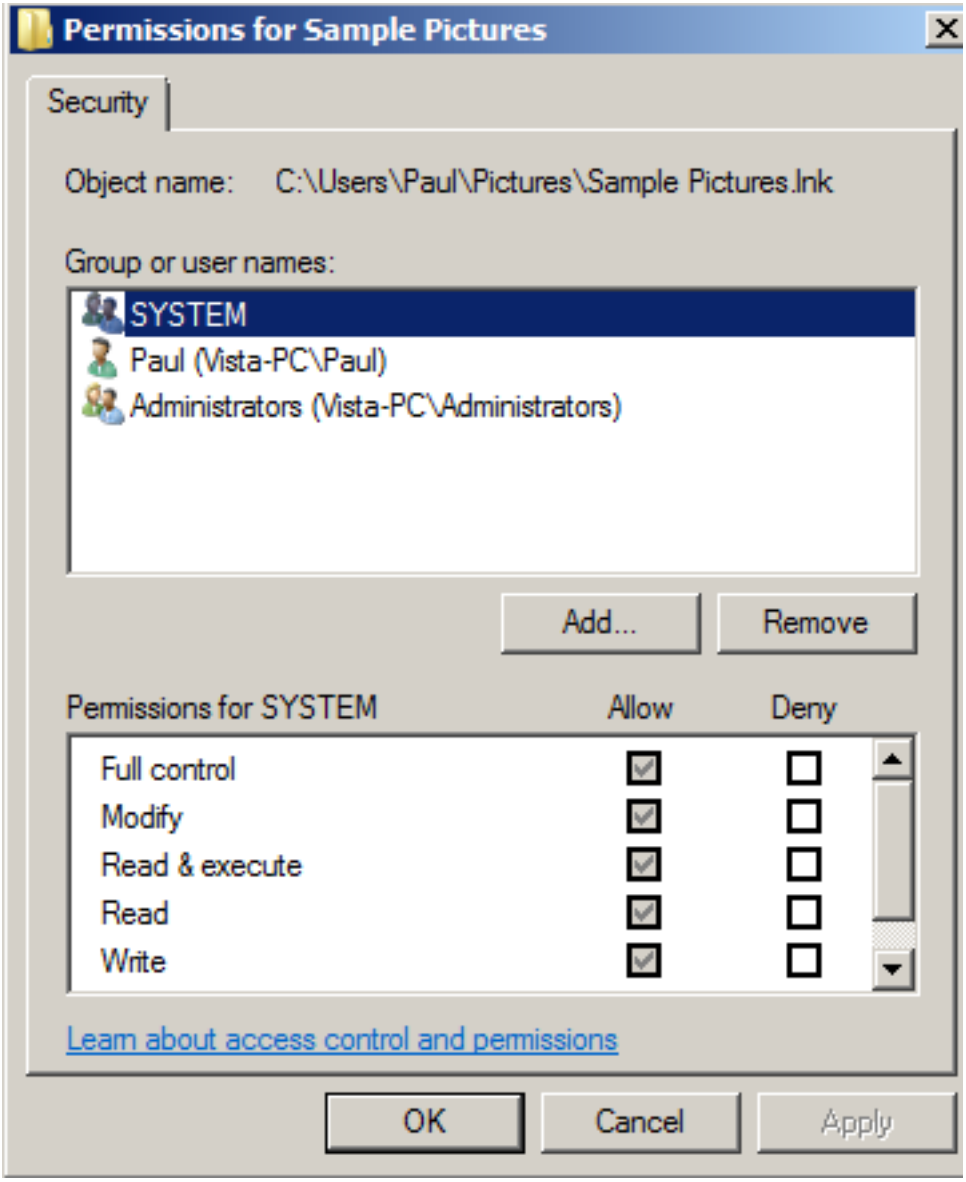
2.4 I can manage file and disk housekeeping so that information is secure and easy to find

Candidates should be able to show they can manage their file or someone else's files on a system.

Evidence: will be provided by portfolio work or assessor feedback.

Additional information and guidance

Candidates should be able to demonstrate basic disk management skills and organise hard drives or other file management systems so that they are effective and efficient. If files are important file, they will need to make sure they are not accessible by external people and perhaps use some form of encryption on them.



In the above image, folders and files can be made accessible (or not) to different people on the local system or more widely on a network.

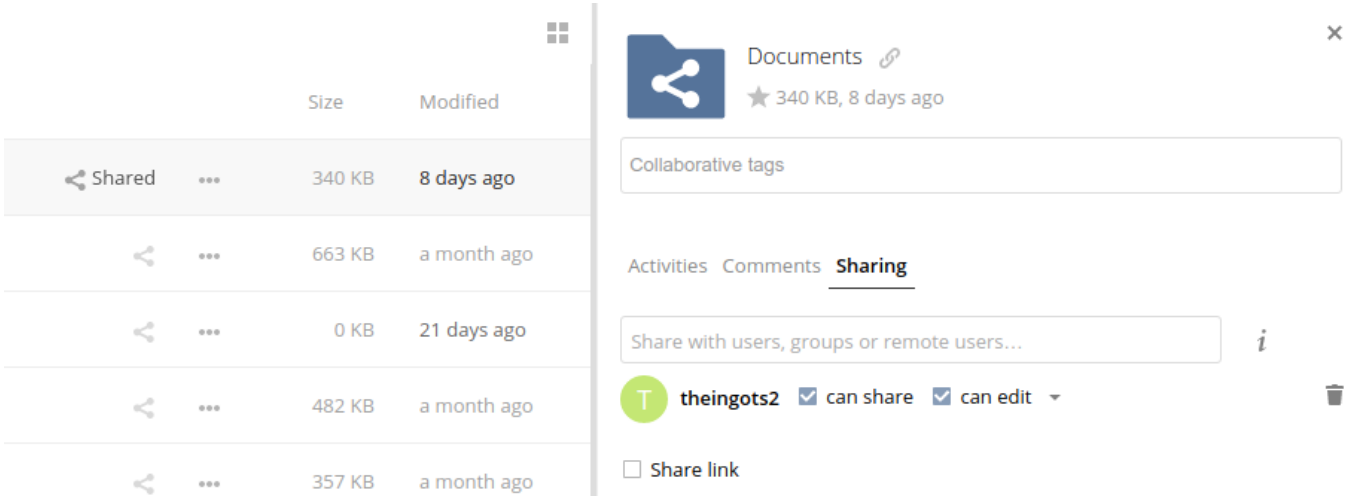
2.5 I can share files and folders with other users

Candidates should be able to demonstrate they can share files and folders.

Evidence: will be provided by portfolio evidence and assessor feedback.

Additional information and guidance

Candidates can use the same sort of approach in 2.4 above in order to allow other users to share files and folders. This can also increasingly be carried out using cloud based systems, but security here needs to be carefully checked.



2.6 I can distinguish between data and system file types

Candidates should be able to know what files are system files and what are just their own, or someone else's, data files.

Evidence: will be provided by assessor feedback.

Additional information and guidance

They should not delete system files by mistake. Knowing what types of files and their location will help to ensure that they can support and optimise systems effectively. Most of them will be labeled clearly anyway as the below image shows, but there will be other less obvious ones.

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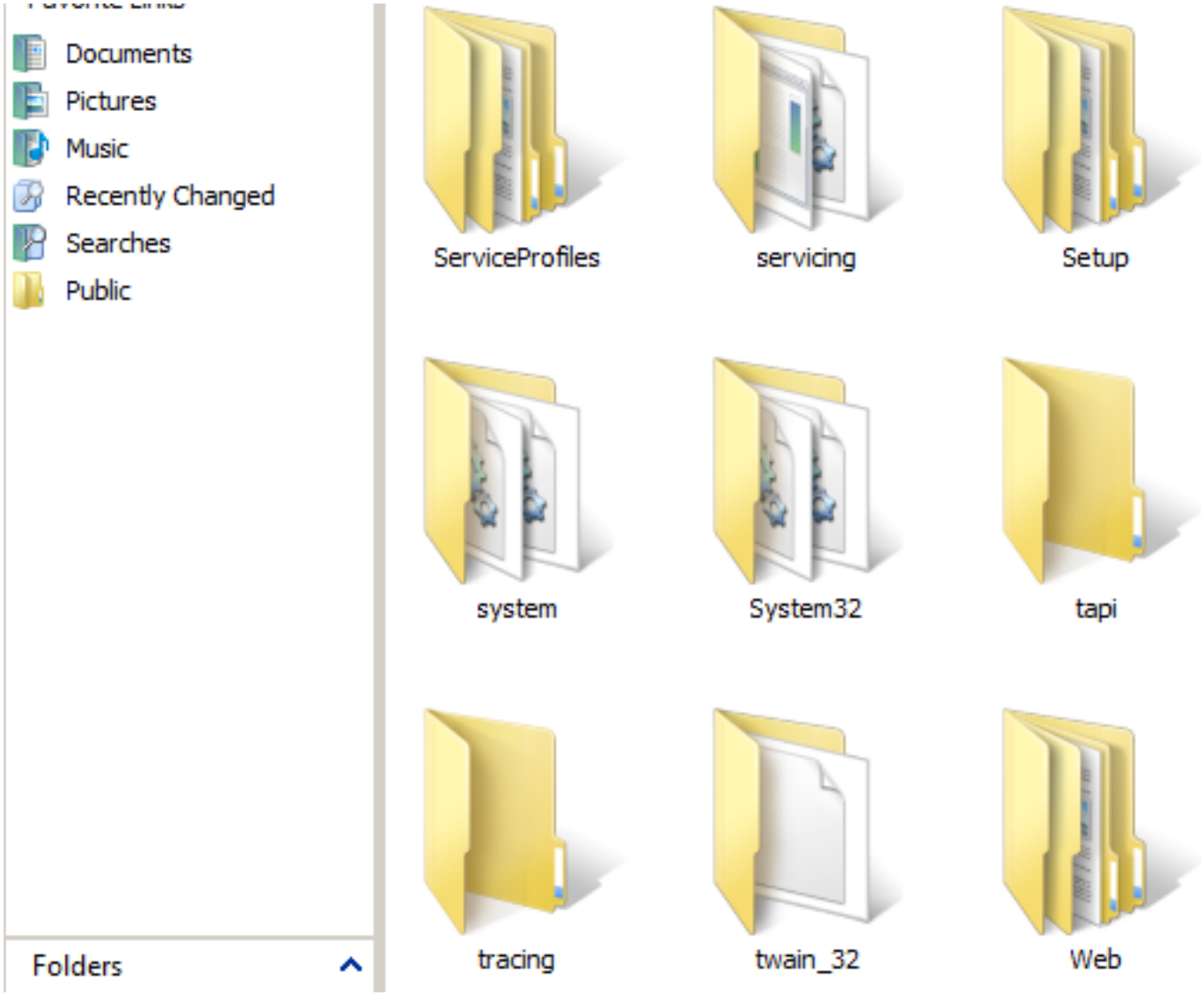

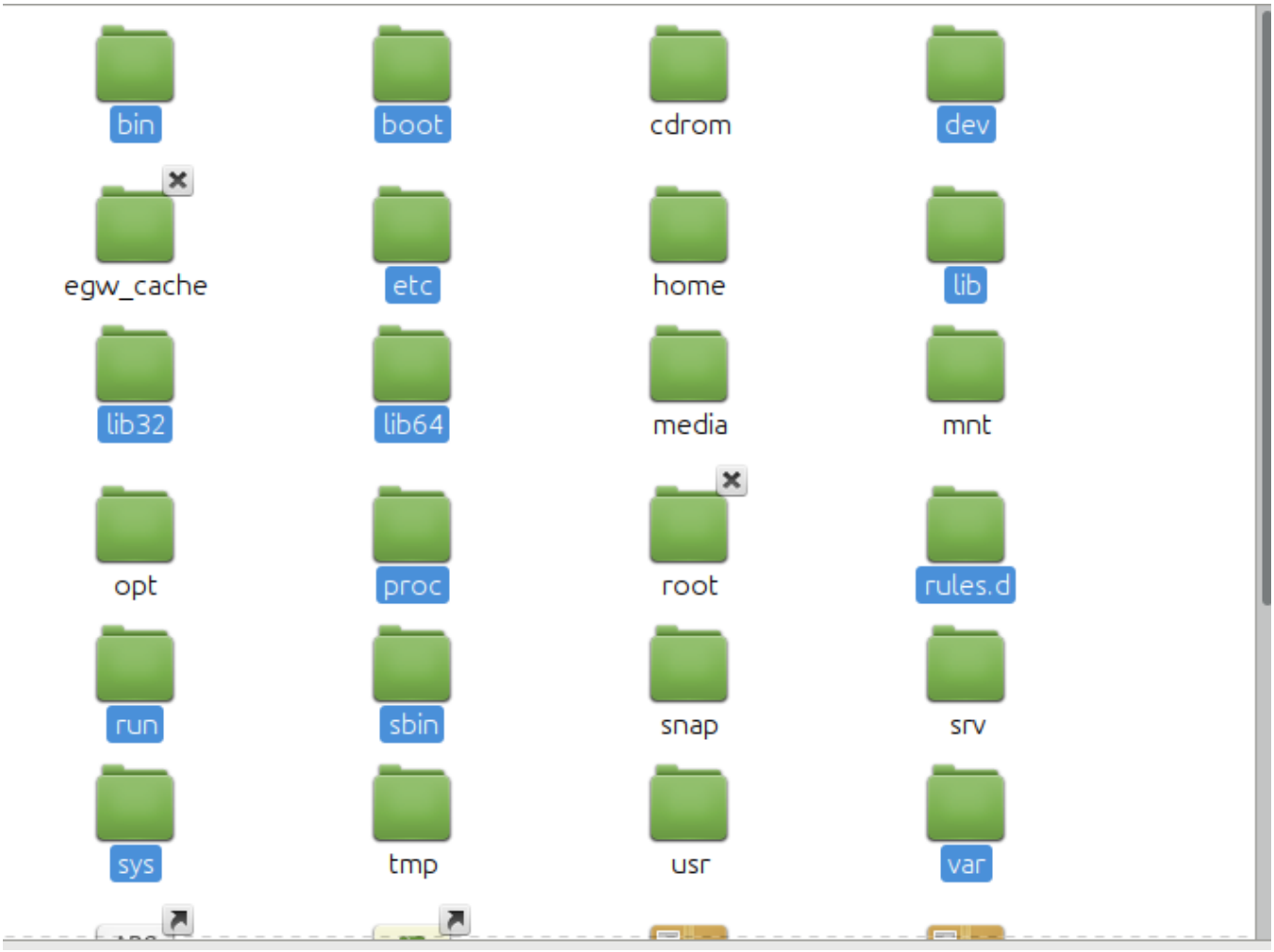

3. Candidates will troubleshoot and respond to common IT system problems and errors

3.1 I can describe common IT system problems and what causes them

Candidates should be able to describe some of the main IT related problems they might come across.

Evidence: will be provided by portfolio work.

Additional information and guidance

There are a number of common issues that occur to computers that candidates should be able to list and describe. They can create a table of issues with a brief description of what they are and how thy might be caused. For example, many computers can run out of resources and have a lock up. This is commonly known on windows machines as the "blue screen of death [5]" as it requires a complete hard reboot. Other problems will be loss of connections, corrupted drivers, forgotten passwords, no printing etc. Each of these will have its own characteristics and range of fixes.

3.2 I can describe and record IT system problems to enable effective support

Candidates should be able to create a logbook of issues for reference.

Evidence: will be provided by presentations and assessor feedback.

Additional information and guidance

In most cases, candidates will keep a paper based log or record incidents on a computer spreadsheet, but they should also be exposed to and use on-line ticketing systems to see how to manage problems encountered in systems. The following image shows the TLM tracking system with colour coded job types and status alerts.

Logged in as: *paul* (Paul Taylor - administrator)

My View | View Issues | Report Issue | Change Log |

Reporter:	Monitored By:	Assigned To:	
any	any	any	
Status:	Hide Status:		
any	new (And Above)		
Show:	View Status:	Show Sticky Issues:	
50	any	Yes	
Platform:	OS:	OS Version:	
any	any	any	
Note By:	any	Sort by:	
Match Type:	All Conditions		

⊟ Search Apply Filter [Advanced Filters] [

Viewing Issues (1 - 50 / 209) [Print Reports] [CSV Export] [Excel Export] [Graph] [XM

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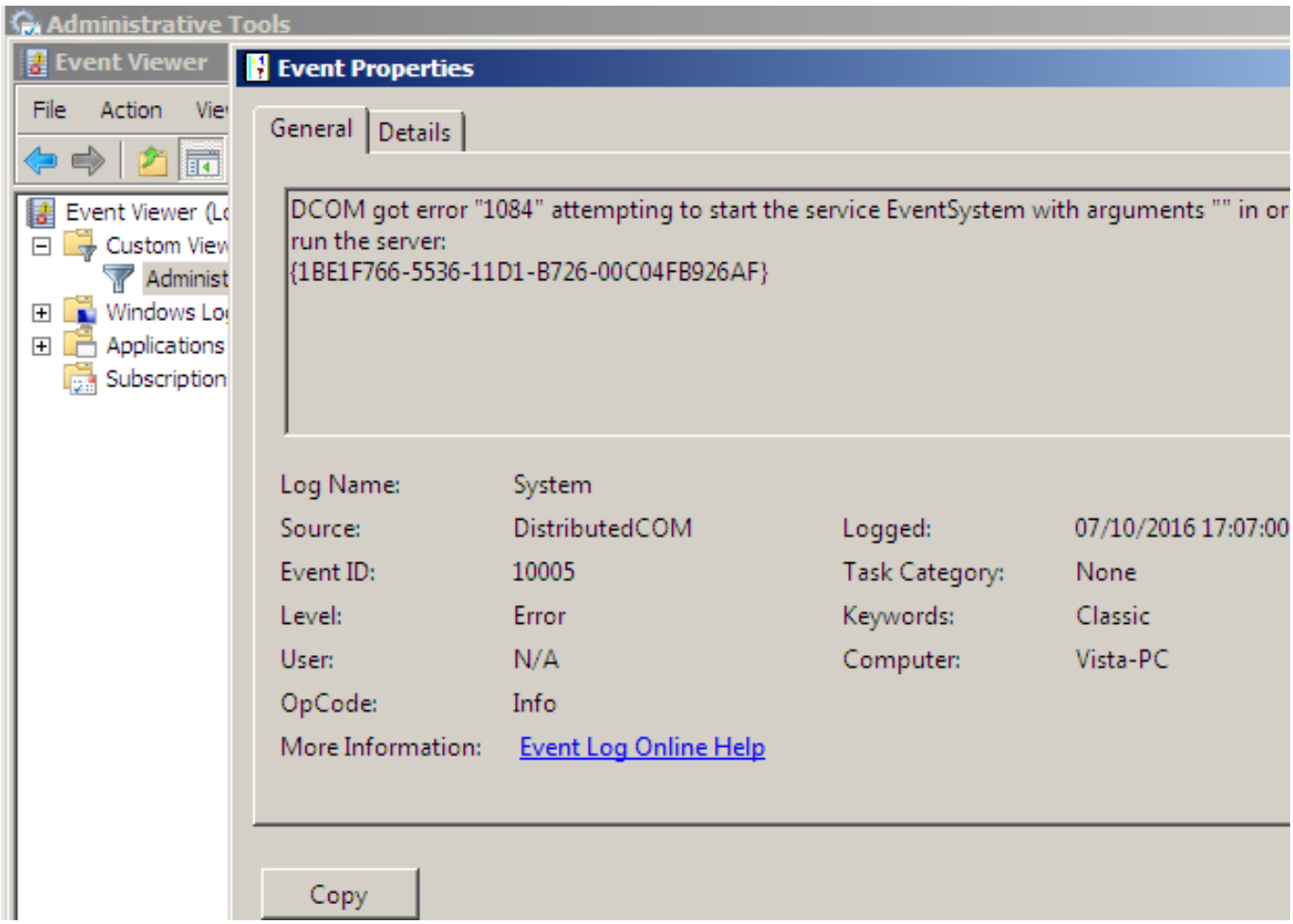
☐		–	0000215			[Learning Site] Development	minor	assigned ( )	2016-09-27	A way fo
☐		–	0000208	1	1	[Markbook Site] New feature	minor	in progress ( )	2016-09-23	Modbac
☐		–	0000050	28	2	[Learning Site] Upgrades	minor	resolved (:)	2016-09-16	eGroupw
☐		–	0000214			[Learning Site] Bugs	minor	assigned ( )	2016-09-15	Make Qu

This type of system allows problems to be managed and reported on so that the management of an organisation can make plans of required resources needed.

Candidates shoud also be able to access the system monitoring tools to look for issues that occur, even if they can't solve them by themselves.



3.3 I can describe when to try to solve a problem independently, and when to get expert advice

Candidates should be able to describe the work flow around problems and when they need help.

Evidence: will be provided by portfolios and assessor feedback.

Additional information and guidance

The evidence for this criterion will be determined by the skill set and knowledge of each candidate. Some candidates will have a wide range of experience of issues already while others may only know how to solve some basic PC issues. Some notion of their management skills is needed so that it shows that they know when they have reached their limit and call for help from someone more experienced. For an organisation, they will always say that "time is money". If a student spends too much time trying to solve an issue that someone else can solve in a few seconds, then it is probably not efficient. However, they also need to learn o the job so may have some leeway to try and solve something on their own. This sort of judgement will come with more experience, but we need to see embryonic evidence here.

3.4 I can troubleshoot and respond to IT system problems appropriately

Candidates should be able to show a methodical and timely approach to problems.

Evidence: will be provided by portfolio evidence and assessor feedback.

Additional information and guidance

This ties in with 3.3 above and as long as candidates have some system for tracking and responding to problems in a log or an online system, it will show their ability to meet this criterion.

3.5 I can check that errors and problems have been resolved satisfactorily

Candidates should be able to monitor problems and solutions.

Evidence: will be provided from ticketing systems or log books.

Additional information and guidance

Candidates will generate evidence here if they use a workable system for 3.3 and 3.4 above. It might be useful for students to be allowed to use an internal ticketing system or for the school/college network team to set up a system for them. There are a number of useful open source systems [6] that can be used and even the demo systems [7] may be enough to generate some evidence for learners.

4. Candidates will customise the working environment to optimise performance

4.1 I can describe methods that can be used to optimise system performance

Candidates should be able to describe the best ways to optimise a system.

Evidence: will be provided by portfolios.

Additional information and guidance

Candidates can create a small guide to show how a system can be optimised so that it is clear they understand how to do it and can pass on this information. The types of optimisation will vary on need, but could include making larger fonts on a desktop for older users so that they can see the icons and words better. It could be changing a computer to a lower resolution in order to improve the overall responsiveness as heavily graphical environments look good, but use huge amounts of resources. The following screen shots show the difference between a very visual desktop and a basic one doing the same tasks.

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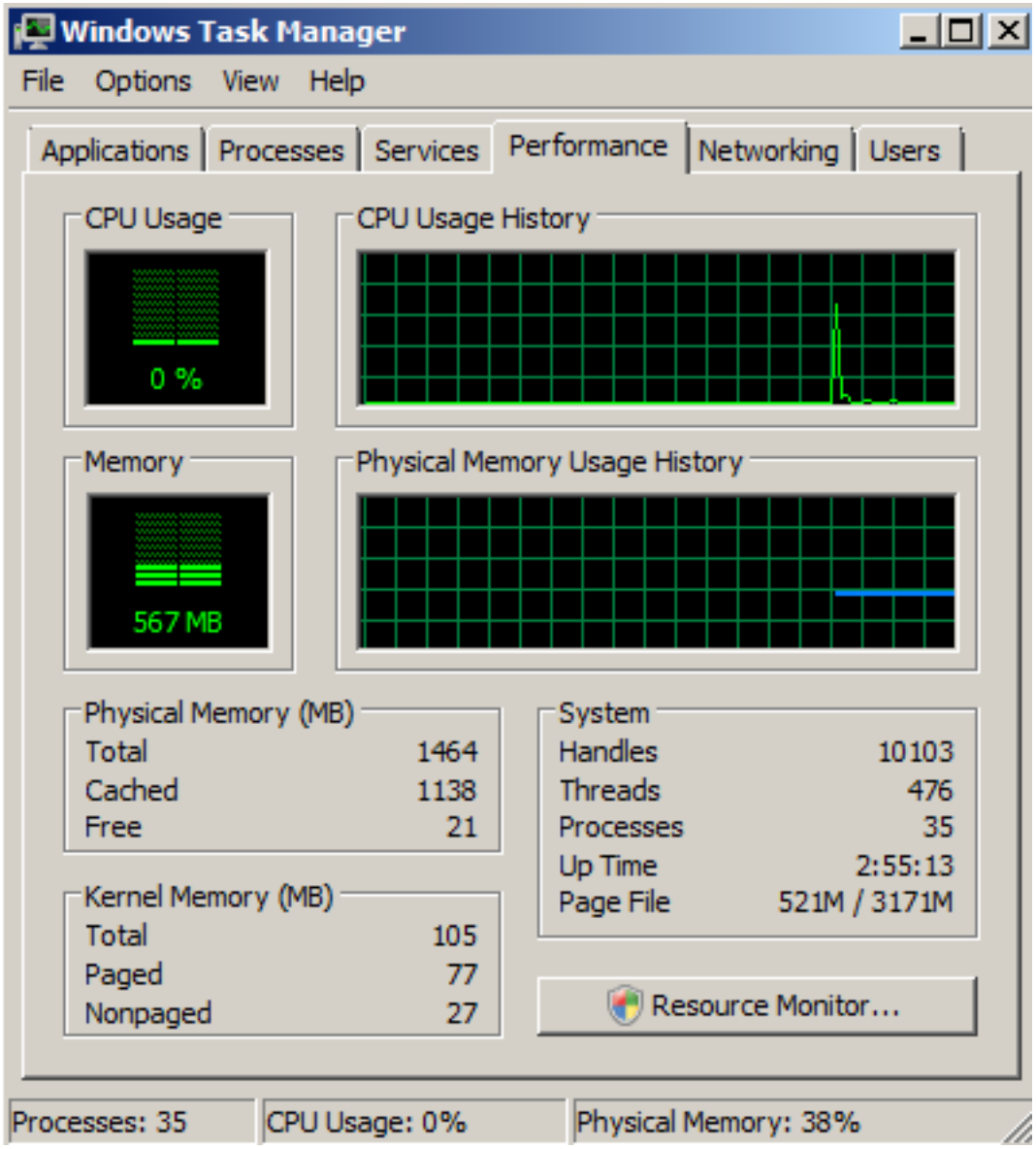
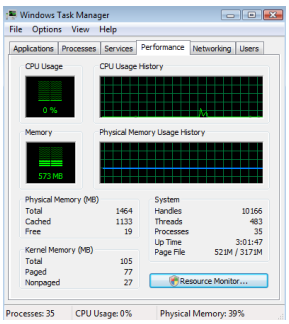




The difference is only slight, but this is with nothing running. If the user were to open up lots of windows and applications, the extra resources needed to make the transparent menus and other effects would soon escalate. If the machine has limited memory, it will soon be very slow and unresponsive. They should be able to use utilities like disk cleanup to free unused or unwanted space.

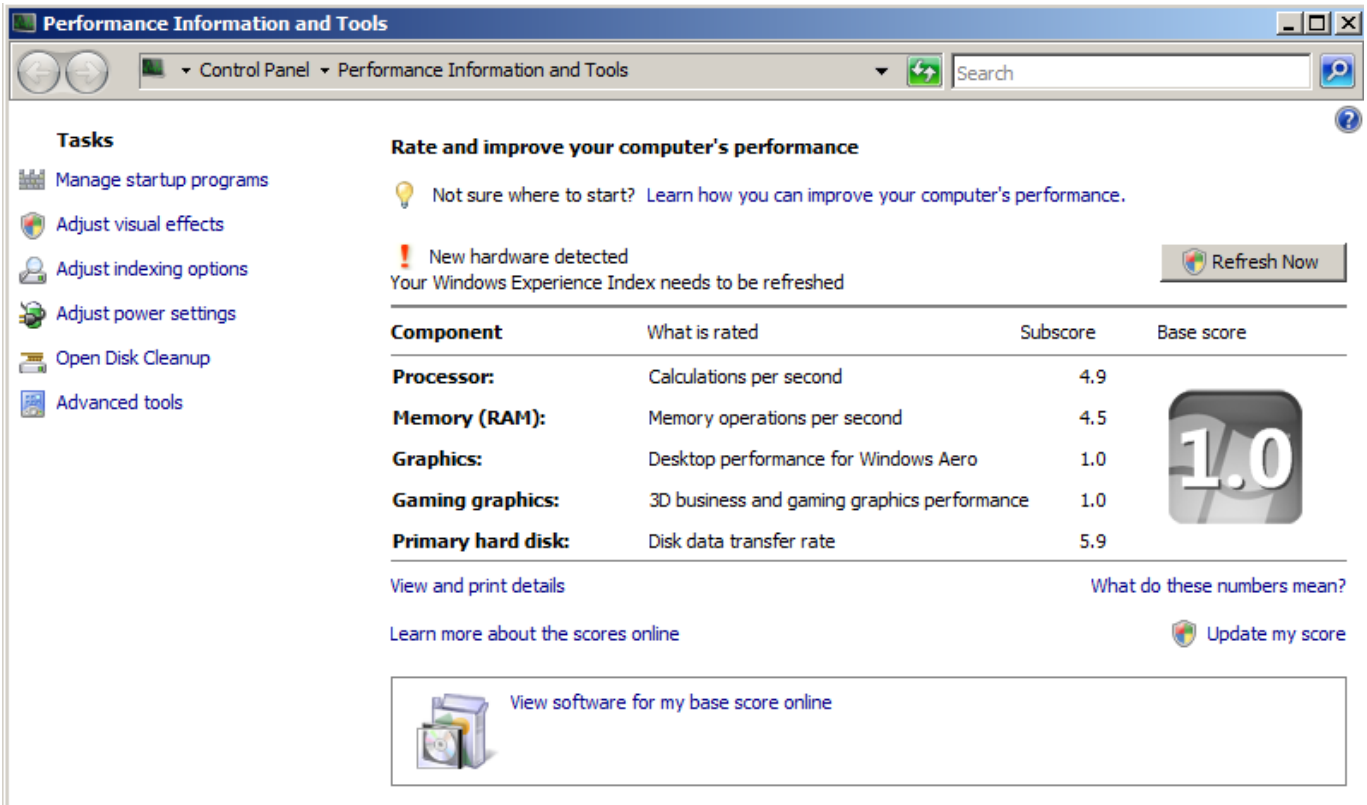
4.2 I can select and adjust system settings to optimise performance as appropriate

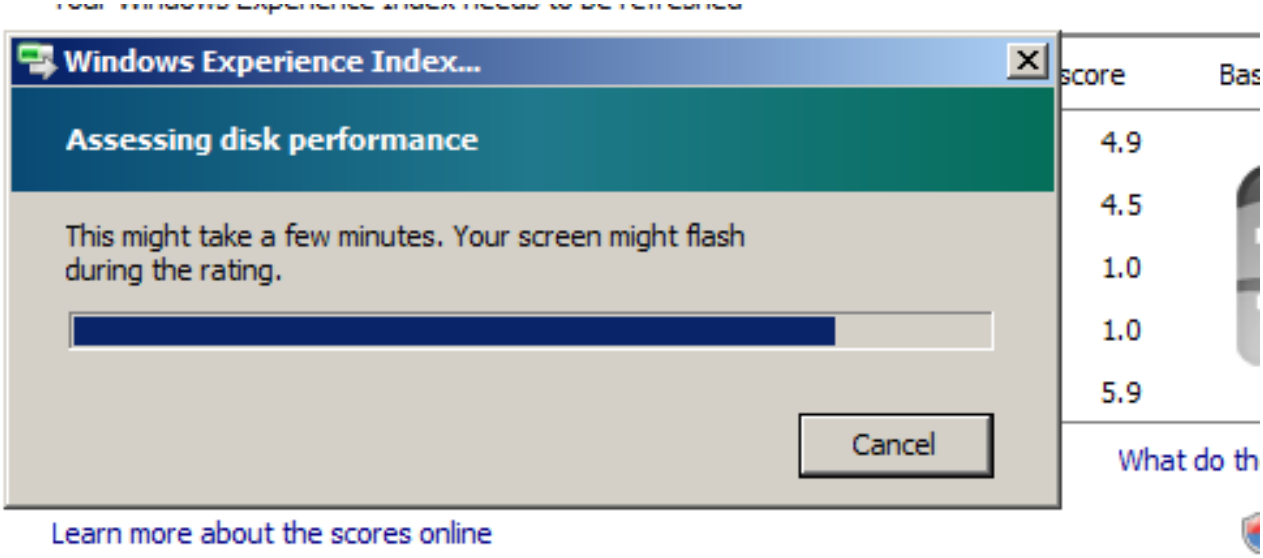
Candidates should be able to modify a system as required to make it work effectively.

Evidence: will be provided by portfolio work.

Additional information and guidance

As above, the modifications will depend on the machine and what the user needs or desires. In most cases, candidates need to show that they can make a number of adjustments that can make a difference. The difference could be comments from an end user saying that the system is more reliable or faster, for example. One key change on older Windows machines is to adjust the temporary memory known as the paging file. Candidates can use built in diagnostic software to check any changes or improvements.





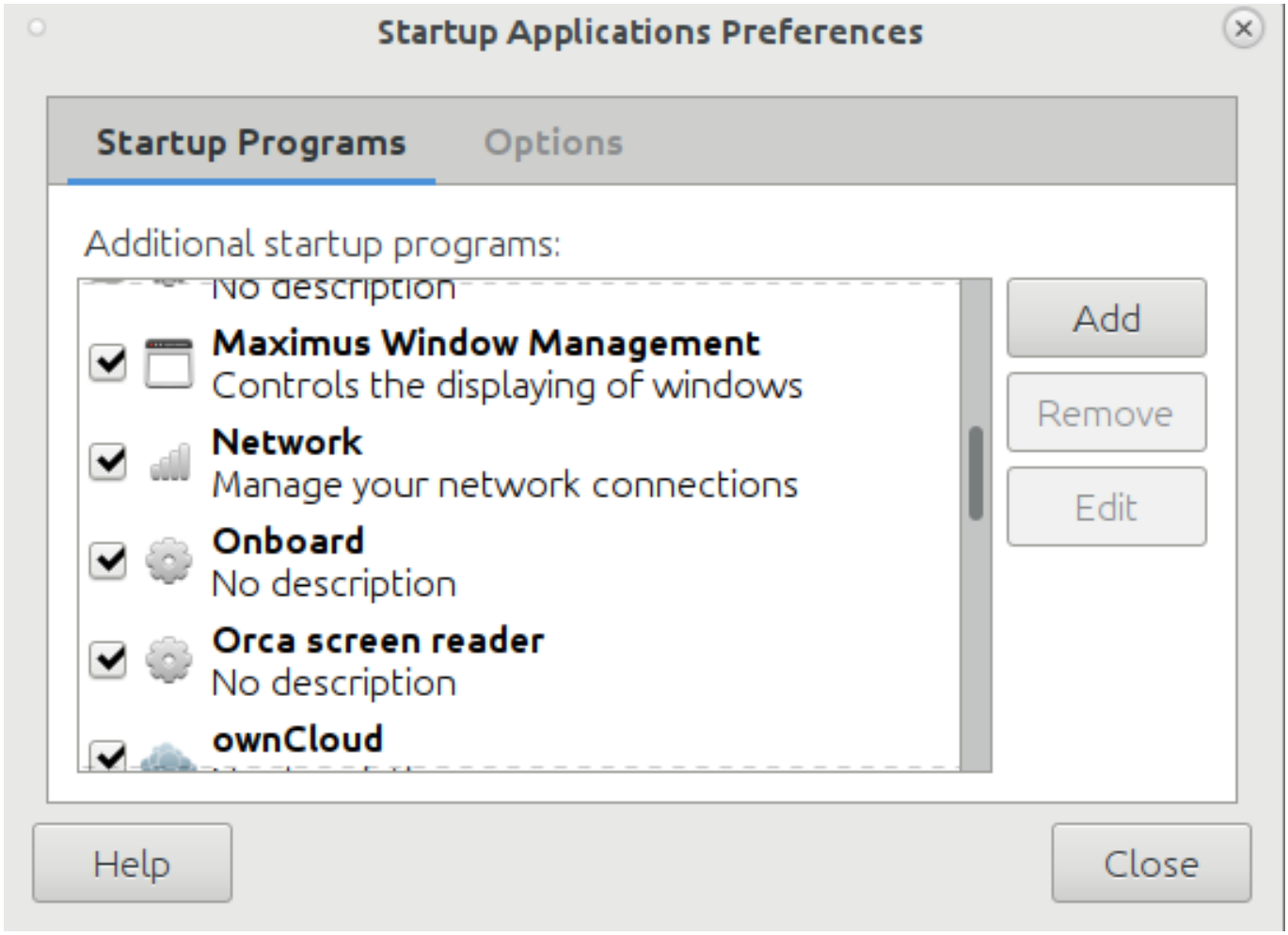
4.3 I can configure the automatic start of programs and other graphical display options

Candidates should be able to configure graphical options and other automation tasks.

Evidence: will be provided by portfolio work.

Additional information and guidance

Candidates should extend their configuration tasks to include making the desktop more efficient and create auto start programs to speed up the way the system loads. Some very heavy resource based programs, such as Office suites, can be pre-loaded on start up and be running in the background. This means that they are partly loaded for users before they click to start them. This will speed up the appearance of loading and create less load on the system.



5. Candidates will maintain software to meet performance needs

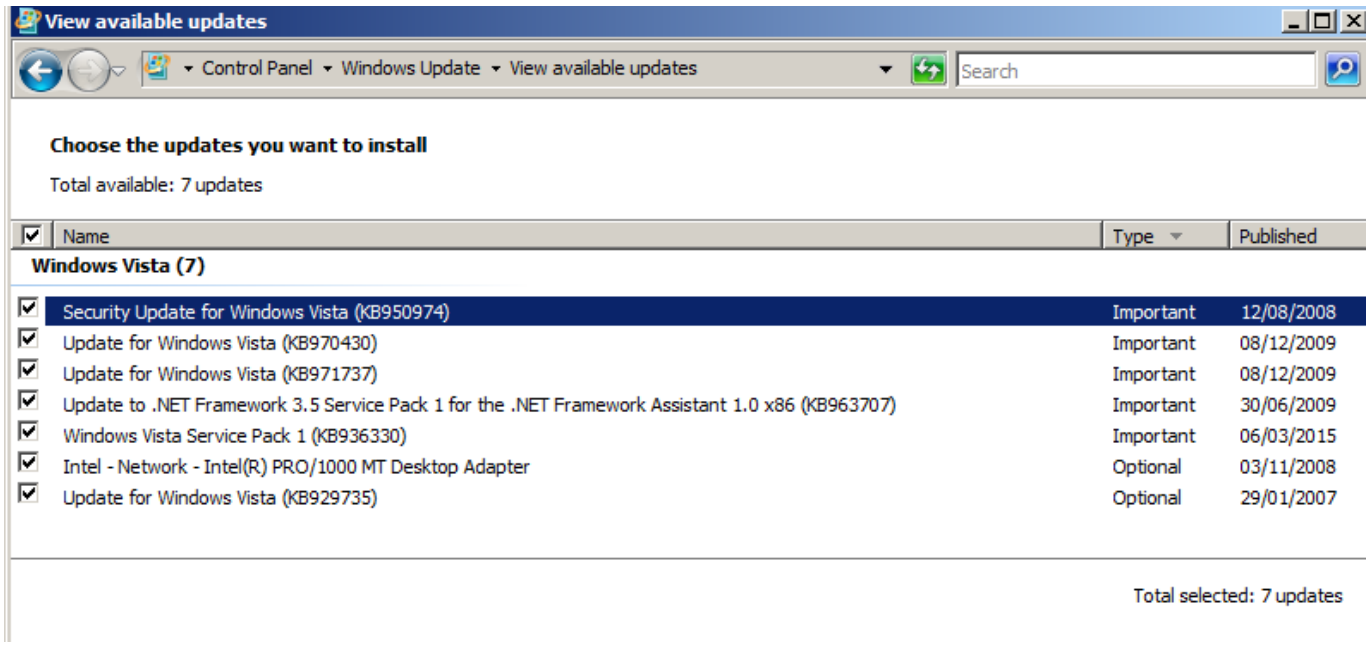
5.1 I can describe when and how to upgrade software

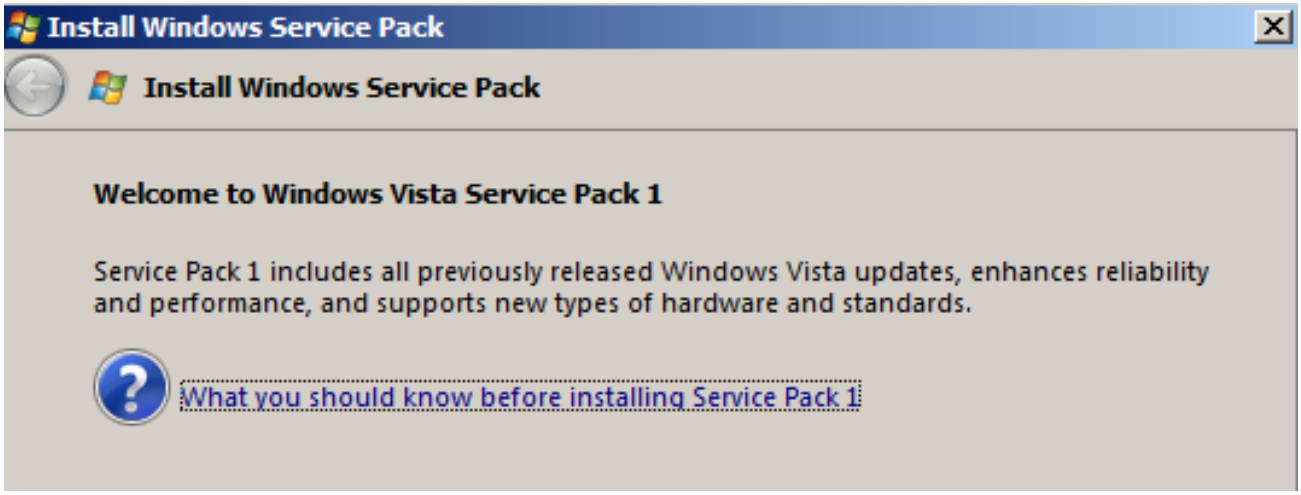
Candidates should be able to describe software upgrades.

Evidence: will be provided by portfolio work or assessor feedback.

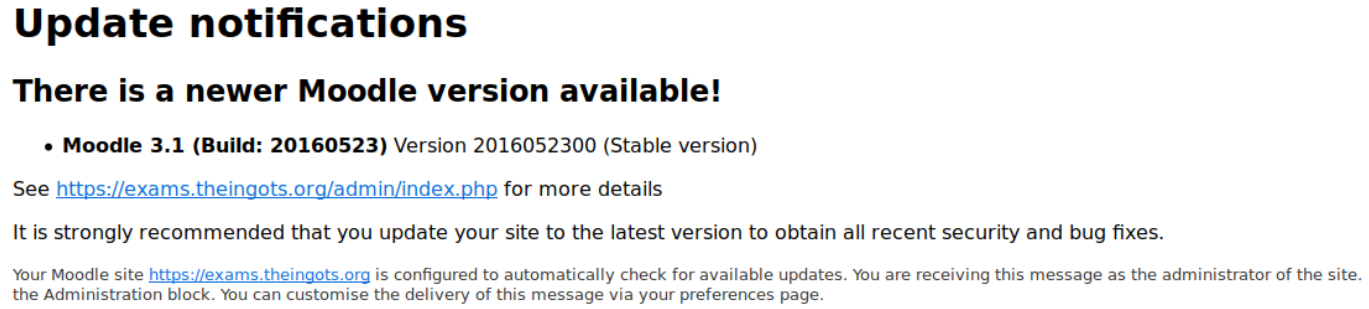
Additional information and guidance

Different systems will have various types of software. Some of the system software will have various security updates that need to be applied. Other software might need updates that make improvements or bug fixes.





Candidates might use a system of their own making, such as a reminder every month. If they sign up for some software packages, they may get alerts that a new version is available or an update is ready for download.



5.2 I can use appropriate techniques to maintain software

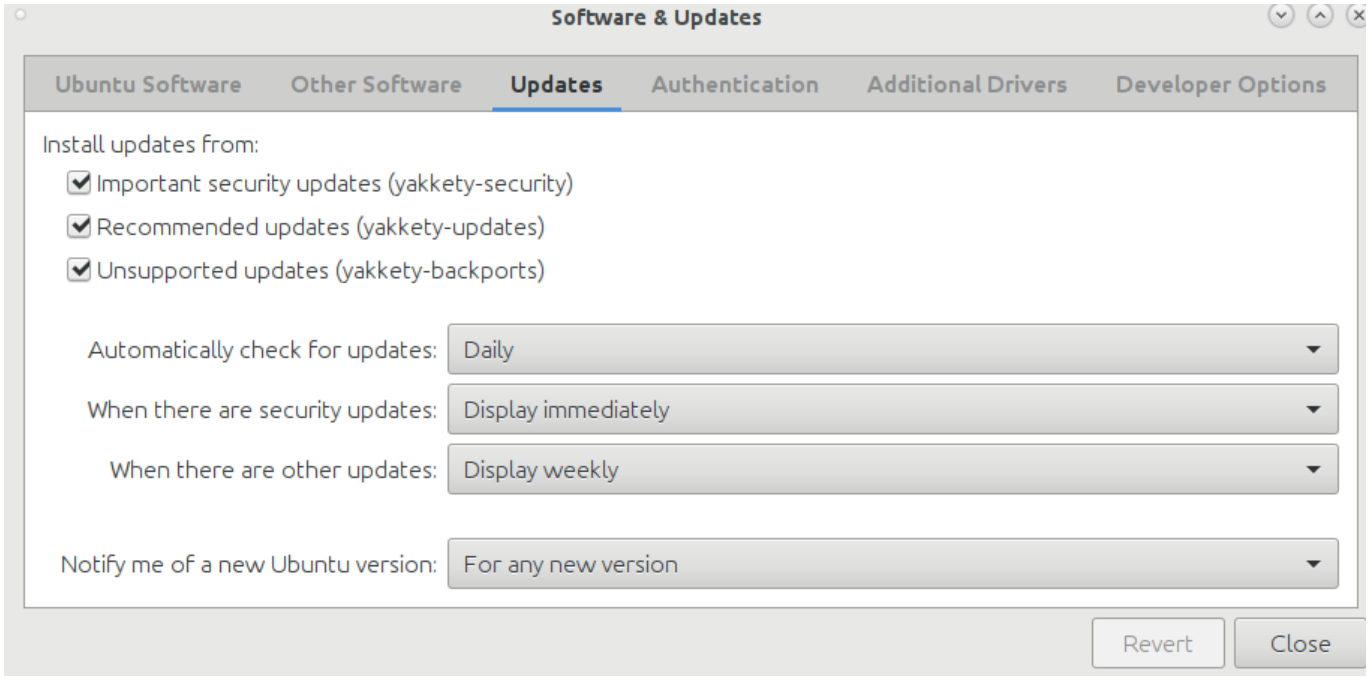
Candidates should be able to use system tools and schedules to maintain a computer.

Evidence: will be provided by portfolio work.

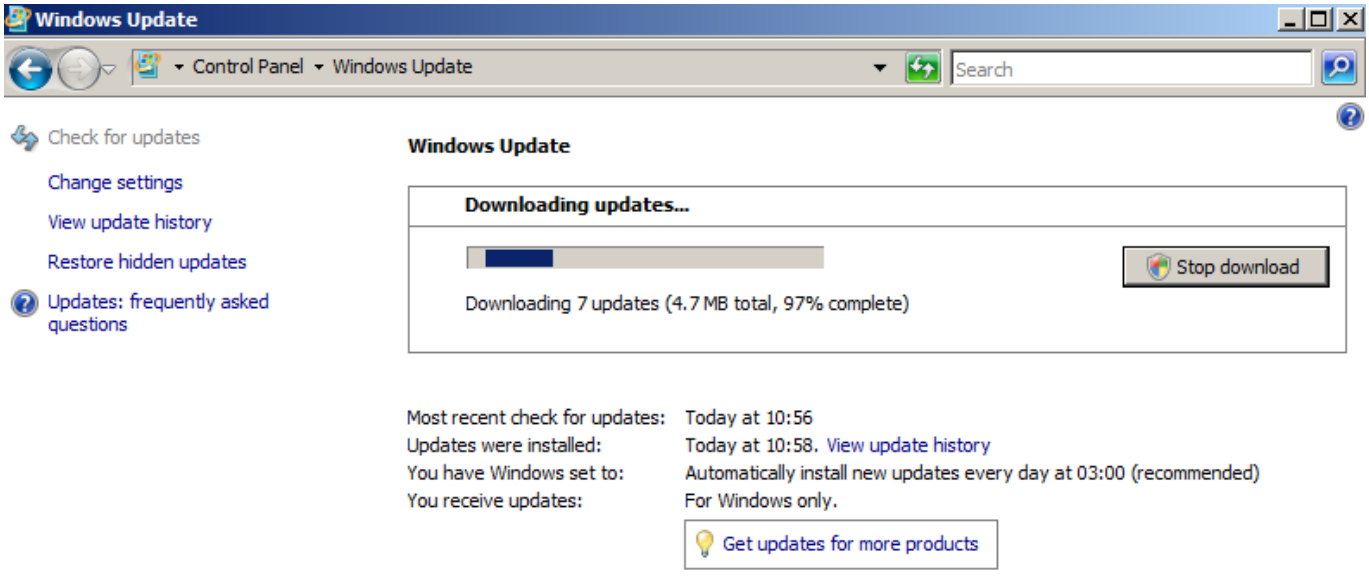
Additional information and guidance

In the above criterion, the notification is received via a designated email because the system is set

to receive notifications of updates. Most systems will allow this type of setting so that you do not need to login constantly to find fixes and updates. The following image is from a Ubuntu software update system where settings can be made to track stable or new versions of the system software and the checks can be carried out daily, weekly etc.



Once the decisions have been made and the software found by the system, it can be applied.



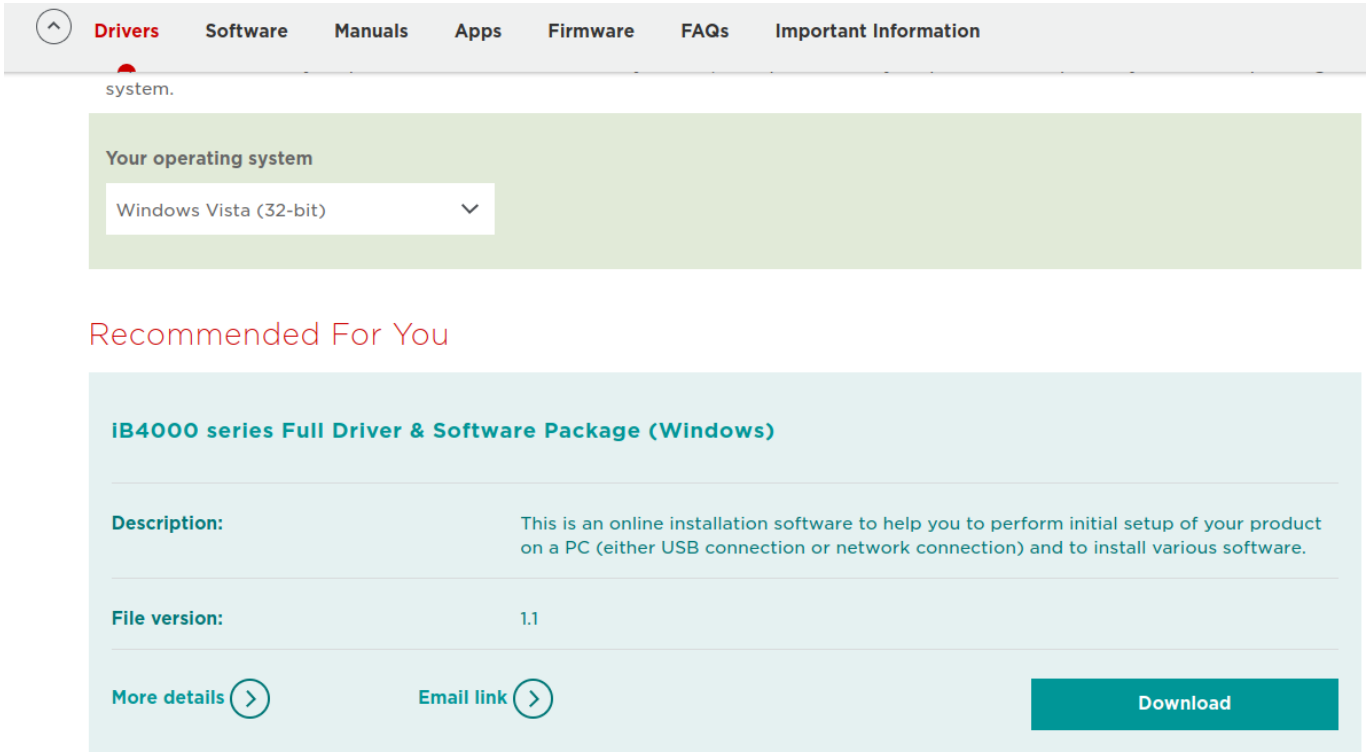
5.3 I can locate and install driver files for different devices

Candidates should be able to find and install software updates.

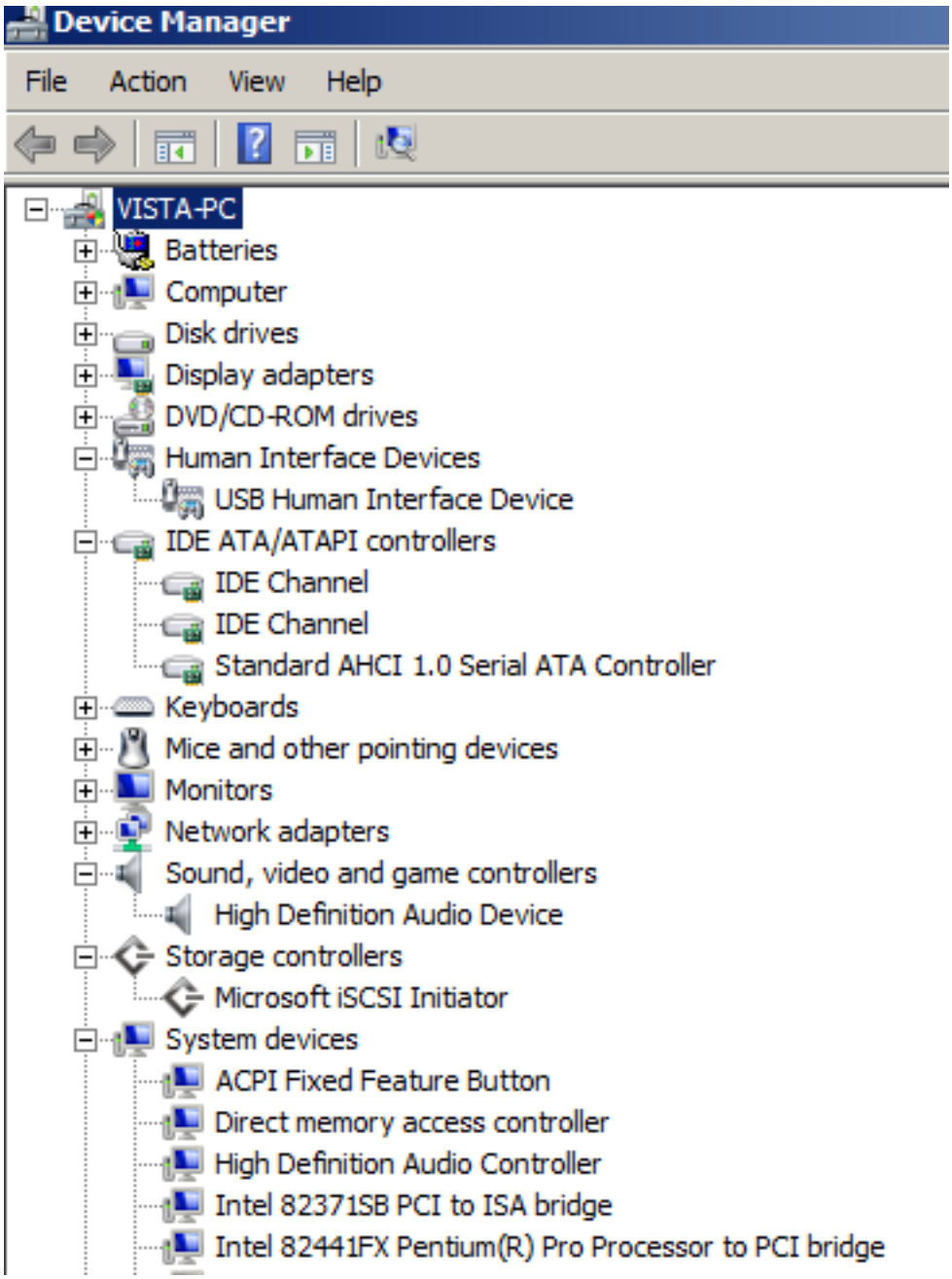
Evidence: will be provided by presentations and assessor feedback.

Additional information and guidance

Other software updates might be required by visiting company websites to see if there are newer versions of software that shipped with hardware devices, such as printer software.



On a Windows system, the device manager menu option should show anything that is not working as well as it could as well as the notifications manager window.



Moderation/verification

The assessor should keep a record of assessment judgements made for each candidate and make notes of any significant issues for any candidate. They must be prepared to enter into dialog with their Account Manager and provide their assessment records to the Account Manager through the on-line mark book. They should be prepared to provide evidence as a basis for their judgements through reference to candidate e-portfolios and through signed witness statements associated with the criteria matching marks in the on-line markbook. Before authorizing certification, the Account Manager must be satisfied that the assessors judgements are sound.

Links
[1] http://theingots.org/community/ITQ_unit_development
[2] http://thelearningmachine.co.uk/tlm-l1l2-user-skills-open-systems-enterprise/

[3] http://www.ubuntu.com/desktop/features
[4] http://www.tightvnc.com/
[5] https://upload.wikimedia.org/wikipedia/commons/thumb/a/ab/BSOD_Windows_8.png/220px-BSOD_Windows_8.png
[6] http://blog.capterra.com/the-7-best-free-help-desk-software-tools/
[7] https://on.spiceworks.com/registers/new?_ga=1.173737443.1781807161.1475843921

(function(i,s,o,g,r,a,m){i['GoogleAnalyticsObject']=r;i[r]=i[r]||function(){ (i[r].q=i[r].q||[]).push(arguments)},i[r].l=1*new Date();a=s.createElement(o), m=s.getElementsByTagName(o)[0];a.async=1;a.src=g;m.parentNode.insertBefore(a,m) })(window,document,'script','//www.google-analytics.com/analytics.js','ga'); ga('create', 'UA-46896377-2', 'auto'); ga('send', 'pageview');