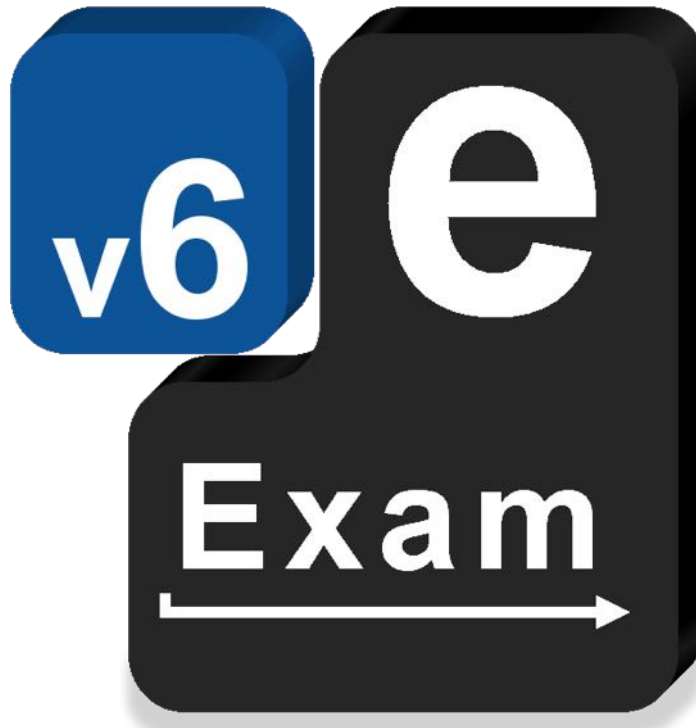


Administration Tool Guide



e-Exam System v6

This document provides:

- Administering e-Exam USB sticks:
 - Obtaining the Admin tool
 - Admin tool functions
 - Typical workflows
 - Known issues and reporting problems

Acknowledgements

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The views expressed in this document do not necessarily reflect the views of the Australian Government Department of Education and Training or participating institutions.

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This is a work in progress! Last Updated 19 June 2019

** Note some features are still under development and as such this document may contain inconsistencies.*

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Get Started

Updates/Warnings:

- This guide is for use with version 6 of the e-Exam system.
- Please read the section 'Known Issues and Troubleshooting' before proceeding.

The e-Exam System comprises these components:

- Administration tool
- Student client
- Server – for use with LMS based exams.

Both the administration tool and the client are based on Linux 'live' USB sticks. The student and administration components have different minimum computer requirements. The student part has very minimal requirements.

Computer requirements

	For Students	For Administrators
Can start up from...	Must be able to boot from a standard USB Type A storage device (rectangle plug). See 'Quick start guide'.	Must be able to boot from a standard USB Type A storage device (rectangle plug). See 'Quick start guide'.
Processor	64bit Intel	64bit Intel
USB Type A ports: rectangle plug	Port 1 (required) for the e-Exam USB stick Port 2 (<i>optional</i>) for a wired mouse.	Port 1 (required) for the e-Exam USB stick Port 2 (required) for USB Hub to administer USB sticks, add mouse etc.
RAM required	Minimum: 2GB RAM. Recommended: 4GB RAM. Note: 8GB+ RAM may be required for advanced software (e.g. CAD) and multimedia intensive exams.	Minimum 16GB RAM. Warning! Insufficient RAM capacity can result in incomplete/faulty disk images or faulty e-Exam USB stick production.
Mouse	Wired mouse recommended	Wired mouse recommended
Other	See 'Hardware compatibility' below.	See 'Hardware compatibility' below. See 'For Administrators only' below.

Hardware compatibility

- e-Exam version 6 USB sticks and Admin tool USBs only boot computers with 64 bit Intel processors that have USB Type A ports (or using a USB-C to A converter).
- These computers currently **do not work or may be unstable**:
 - Computers with USB Type C ports may not work or may only partly function, even with adapters (e.g. recent Apple MacBooks). Some models may boot but may not work with WiFi*.
 - Microsoft surface tablets/laptops. Some models may boot but may not work with WiFi*.
 - Lenovo model '100s'.
 - Computers with ARM or AMD processors.
 - Computers that have '32bit only' processors (now very old!).
- Computers with Windows 8 or 10 stickers on them may require extra steps to boot from a USB or to work properly with Admin USBs. Many such computers are configured to use Windows 'hybrid shutdown' which stands in the way of the booting of alternative operating systems. To boot from an e-Exam USB stick you must either:
 - hold down SHIFT while choosing Restart from Windows in order to obtain access to boot from a USB. OR
 - fully shut down the computer (i.e. cold shutdown) by holding down SHIFT while choosing Shutdown from Windows. Then use the boot key upon start up to select the USB stick.
- Apple computers that contain the T2 chip that were introduced from 2018 need 'secure boot' to be disabled: Hold down Command+R at power-on. Then use Utilities > Startup Security Utility. Set 'Secure boot' to 'no security' & 'External boot' to 'allow'.



* WiFi issues may be overcome by using a compatible WiFi adapter, possibly in conjunction with a small USB hub (e.g. e-Exam USB + WiFi USB dongle used together). WiFi adapters that use RealTek chipsets have been found to work (e.g. TP-Link WN725n does work) – but always test to be sure.

For administrators only

5. A USB hub (see recommended hub in the separate 'hardware guide').
6. USB sticks (blank USBs or existing e-Exam USBs).
 - Use USB storage devices at least 20% bigger than the source disk image file.
 - It is best that the USB stick is formatted as a single FAT32 partition to begin. Most new USB sticks tend to be so out of the box.
 - We strongly recommend testing different model USB sticks prior to purchasing in bulk for large-scale deployment. In particular check:
 - *True storage capacity*: Fake USBs can be present in the market that report a higher capacity than they actually have. E.g a 16GB stick may only have 1GB or less of real storage. This should not be a problem if purchased from reputable retailers.
 - *Degradation following repeated burns of full disk images*: i.e. burn a disk image to a USB, perform read/write speed tests. Re-burn an image to the USB, check read/write speeds. Repeat several times to see if speeds are maintained.
 - *Read and write speeds*: these can vary greatly between USB stick models. We have found that there can be variations on the one model. E.g. different capacities, and even between different colours of the same size!

Resources, advice and USB testing tools:

Tools for Windows: <https://www.raymond.cc/blog/test-and-detect-fake-or-counterfeit-usb-flash-drives-bought-from-ebay-with-h2testw/>

Tools for Linux and Apple OSX/MacOS: <http://oss.digirati.com.br/f3/> this latter requires command line knowledge.

Obtaining e-Exam Software

- Contact e-Exam HQ for latest versions. A demo version of e-Exam student client software files can be downloaded via Transforming Exams website <http://transformingexams.com> (follow the link to the newer version - these files are hosted by AARNET). Ask e-Exam HQ if in doubt. Available (note the client-server editions must be obtained from e-Exam HQ):
 - e-Exam Student Client (bootable live system) as a zip file (containing the disk image .img file and .md5 file). There are multiple flavours of this including fully offline and a Client version that points to a demo server (see also alternative live USB server version below).
 - e-Exam Admin Tool (bootable live system) as a zip file (containing the disk image .img file and .md5 file).
 - e-Exam Server image (demo using Moodle server on a live USB stick). This is only available upon request.
- The disk image files are quite large so to lesson the chance of broken downloads it is recommend to:
 - Use a download manager with resume capabilities. E.g: the free 'DownThemAll' add-on for Firefox <https://addons.mozilla.org/en-US/firefox/addon/downthemall/>
- Check the checksum of the downloaded disk image file with the free 'Checksums calculator' software. Get the software from <http://www.sinf.gr/en/hashcalc.html> See 'Checking downloaded files for integrity (MD5 Hash check)' for more information.
- To create a 'first' Admin USB, a simple image burning tool will be required. See Etcher (100MB) available as a cross-platform application for Windows, Apple and Linux <https://www.balena.io/etcher/>. A smaller alternative for Windows is ImageUSB (1.4MB) <https://www.osforensics.com/tools/write-usb-images.html>. Apple or Linux users may also like to use 'dd' directly by following command line steps (see Alternative admin guide).

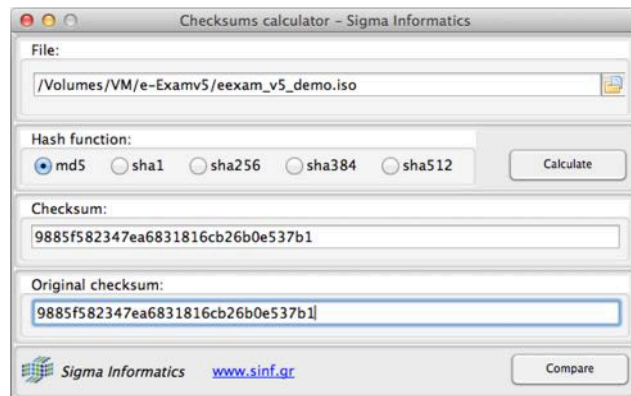
We endeavour to recommend and use free and preferably open source tools wherever possible.

Checking downloaded files for integrity (MD5 Hash check)

To ensure the large disk image file you just downloaded arrived intact (without errors), please follow the steps below.

1. Obtain the 'Checksums calculator' software to match your operating system from <http://www.sinf.gr/en/hashcalc.html>
2. Unzip the archive and run the file.
3. Download the desired version of a disk image from e-Exam HQ: locate and download the relevant zip file of the system (either e-Exam student client or Admin tool). Be sure you have plenty of spare drive space to unzip the file (at least 3x the size of the zip file).
4. Unzip the archive. Two files will be extracted:
 - a) disk image ".img" file (the system image file)
 - b) hash file ".md5" file (this will be unique for each edition of the e-exam system).
5. Open the .md5 file in a Text editor.
6. Open the 'Checksums Calculator' software.
7. In the 'Checksums Calculator' software, at the 'File' area select the newly unzipped disk image (.img) file.
8. Set the 'hash function' to 'md5' and click the 'Calculate' button.
9. Copy and paste the MD5 hash from the Text editor into the 'Original checksum' box.
10. Click 'Compare'.
11. Results: A dialog box will appear with either:

- a. If "checksums are identical" then the file is intact and correct. You can now proceed to create an e-Exam USB stick or e-Exam Admin Tools stick.
OR
- b. If the results are not identical then there was a problem in downloading or extracting the .img file. You will need to try re-extracting or downloading the file again. If it fails on a second try you may need to get in touch with e-Exam HQ.



e-Exam Administrator tool

The e-Exam Administrator tool is available as a Live USB image.

Create a First e-Exam Admin tool USB stick

You will need to burn the downloaded Admin image to a blank USB stick to create the first Admin USB. Once this is burnt to a USB stick it will turn any compatible computer into an e-Exam admin station by booting the computer from the USB stick.

Note: The process below can also be used to create a quick e-Exam student client USB from a provided client disk image.

Be sure to check the md5 hash of e-exam/admin disk image files you have downloaded.

There are several options available.

- The cross-platform Etcher software is the easiest although it is a 100MB download. It works on Windows, Apple and Linux. See instructions in this section.
- A smaller alternative for Windows is ImageUSB (1.4MB download, capable of burning multiple USBs).
- A native method for Apple or Linux is to use 'dd' via the command line (See 'Alternative admin guide' document for further information).

Etcher for all systems:

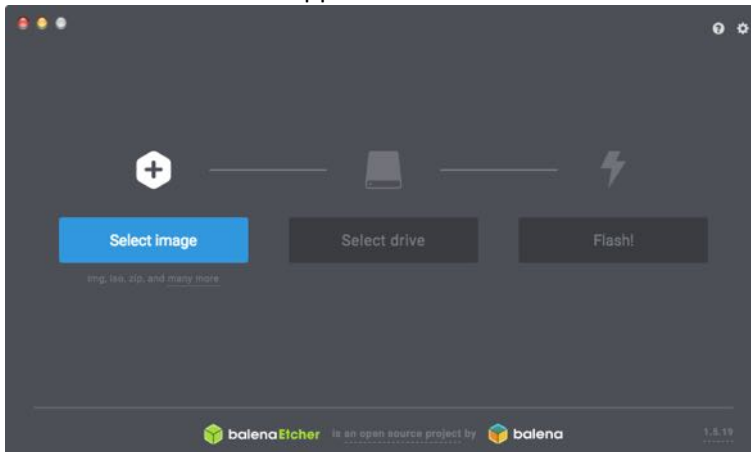
1. Obtain the "Etcher" software (100MB file) for your operating system from <https://www.balena.io/etcher/>

Note: this software can only burn 1 USB at a time.

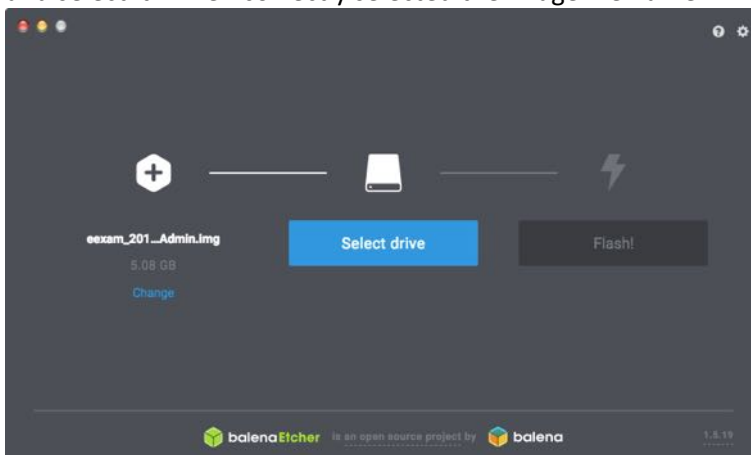
Warning! This software will overwrite (destroy) all data on the device/USB/drive that is selected as the target of the write operation.

2. Open the Etcher software (it doesn't need to be installed).

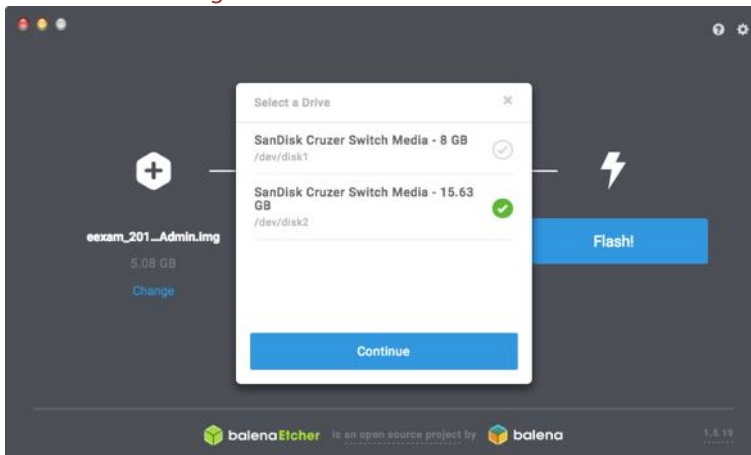
The Etcher window will appear:



3. Next, press the 'Select Image' button. Then navigate to the e-Exam Admin tool disk image file and select it. When correctly selected the image file name will appear.



- Next, Insert a blank USB. It is best that the USB is formatted as a single fat32 drive/partition. Most USBs are so when purchased new. However existing e-Exam USBs will also be detected. The software should detect the USB and update the screen accordingly. If you have multiple USBs inserted you may need to press the 'Select drive' button or 'change' link to ensure you select the correct one. *Warning – be careful you select the correct device or you will destroy data on the wrong drive!*



- When you are sure you have the correct target device, click the 'Flash' Button.



- A progress indicator will be displayed and the completion screen shown when done.



- You can now boot a computer from the newly minted Admin USB stick.

User documentation for Etcher is available at <https://github.com/balena-io/etcher/blob/master/docs/USER-DOCUMENTATION.md>

Alternative for Windows users:

ImageUSB software version 1.3 or above (1086 KB) for use on Windows 10 version 1703 (or greater) <http://www.osforensics.com/tools/write-usb-images.html>

Note: older versions of Windows or ImageUSB are not able to produce an image from e-Exam USBs or to write over the top of e-Exams USBs.

Use ImageUSB (Windows only)

1. Open ImageUSB.exe. This will request admin rights (user/pass).
2. Plug in your USB stick.
3. On the Image USB screen:
 - a. The USB stick should appear in the top part of ImageUSB. If not, click the 'Refresh Drives' button.
 - b. Step 1: select the target USB stick (all data will be lost on the selected stick/drive/device).

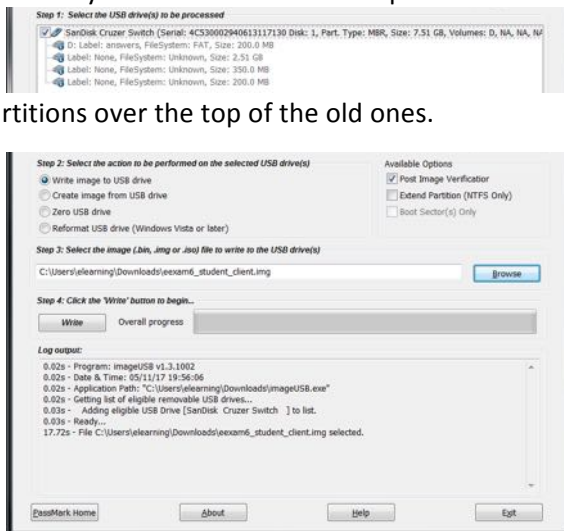


- i. If it is a new USBs then it appear with a single a drive letter (as above).
 - ii. If it is an existing e-Exam USB then you will also see the four partitions.

Regardless - ImageUSB

will still write all the new partitions over the top of the old ones.

- a. Step 2: select 'write image to USB'. Keep the 'post image verificator' ticked. Leave other options as-is.
 - c. Step 3: browse to find the downloaded disk image file (.bin or .img).
 - d. Step 4: Click 'Write' to start the process.



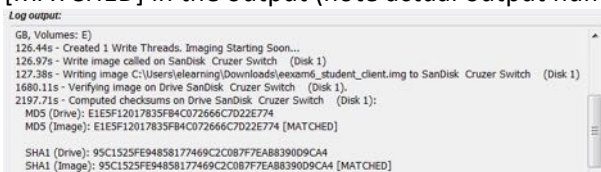
4. The process will take several minutes. Progress and write speed will be displayed in the upper portion of the window.



And a progress bar in the middle



5. Towards the end of the process it will also perform a checksum, the results of which will be displayed in the log output box at the bottom of the window. Check to ensure you see [MATCHED] in the output (note actual output numbers will be different).



6. When done it will display 'Write complete'.
7. This will give you a working e-Exam USB stick.

Apple and Linux users: see also the 'Alternative admin guide' for other methods of burning the disk image onto a USB stick (e.g. using 'dd'). This guide is available from transformingexms.com

Starting the e-Exam Administrator tool

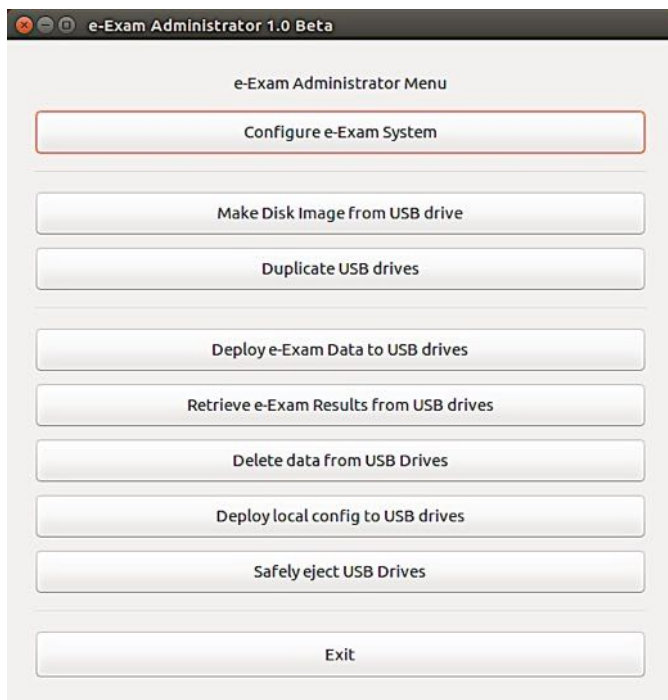
Important! Do not insert other USB sticks before opening the Admin tool software. Doing so will result in some functions failing or producing incorrect outcomes.

e-Exam Admin tool live USB:

1. Boot your laptop or computer using an e-Exam Admin Live USB (see the 'Quick start guide' for help).
2. Once at the desktop, the e-Exam Administrator tool icon is on the left side bar.
3. Click on the icon to open the software.
4. The e-Exam Administrator tool will appear.



The main screen of the admin tool is displayed below.



Managing Files

If you want to keep the files you create or obtain during a session then you will need to copy them to a writeable drive. From within the e-Exam Admin tool system you will have access to either your computer's hard disk* or the User drive of the Live e-Exam Admin USB.

An e-Exam Admin USB contains two partitions (Drives):

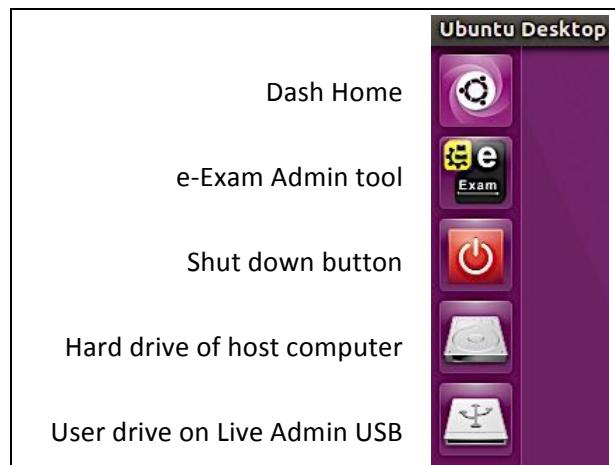
- "Admin" 2GB (Read only) and appears as "File System" in the file manager: This drive contains the live system and admin tool. The admin tool may create some files here by default (usually within Ubuntu/eexam-master/). These files will be lost upon system shut down unless copied to a physical storage location (such as the User drive or the hard drive of your computer).
- "User" 4GB (read and write): An empty file storage area. Put files here if you want to keep files or import files into the Admin system. This area is large enough to store one disk image file and/or numerous sets of e-exam files.

To access drives

Drives can be accessed by clicking on the relevant drive icon on the left side bar.

The image to the left shows the default icons upon Admin system boot. Additional icons may be visible if the host computer has additional drives or if other storage devices are attached. You will also notice drives will appear and disappear during the process of administering e-Exam USBs.

Clicking a drive icon will display the File Manager that can be used to copy, rename, delete and view 'hidden' files.



* Note: Access to the computer hard drive may not be possible on some newer Apple hardware or if the hard drive has been encrypted or if using a Windows 8/10 computer where hybrid shutdown or in sleep mode was activated.

Hidden files

Hidden files are denoted with a full stop at the start of the file name. Some of the hidden files used in the e-Exam system are:

- .config.txt and (the local configuration file)
- .background.png (the background wallpaper image)
- .net_user.txt (optional – used to allow automatic logon to WiFi networks).

These hidden files reside in the 'eexam' drive of the e-Exam USB.

You will need to enable viewing of hidden files to rename or copy such files. To view hidden files:

- Use the top menu bar of the file manager and select View > Show hidden files
or
- press 'CTRL + H' keys.

Always use 'safe eject' to remove e-Exam USBs

Each of Windows, Apple OSX/MacOS and Linux all have safe ejection tools or steps.

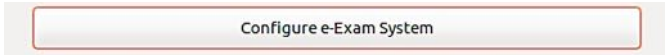
- Failure to do so may result in corrupted master e-Exam USBs (that then spreads the problem) or corruption to individual e-Exam USBs that result in failures in part or full during an exam.

Follow the guidelines for preparing exam question documents

- Failure to follow guidelines is likely to result in problematic usability, disrupted formatting, missing details etc when the document is used in the e-Exam system.

Admin tool functions

Configure e-Exam System: create or edit local setting file

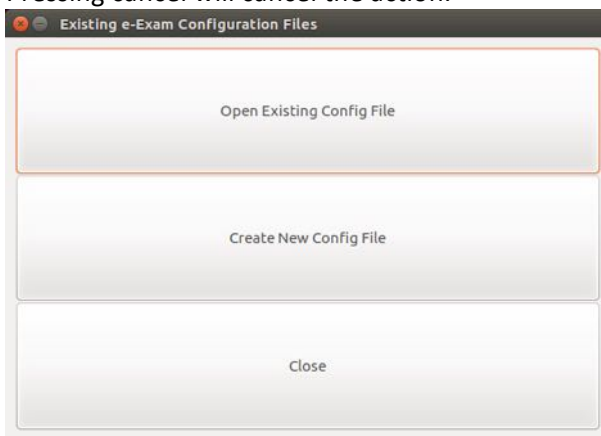


Warning: As of e-Exam client version 6.6 (approx. December 2018) the configuration file format has changed. As a result 'Configure e-Exam System' function in the Admin tool is not compatible with new format configuration files. We aim to update the Admin tool in due course. We apologise for the inconvenience. Note all other Admin tool functions are still operational.

The work-around: Configuration for newer versions will need to be done using a text editor to edit configuration files. For further instructions see the section 'Configuration file format'. See also Appendix 1: Configuration Settings for details of individual settings.

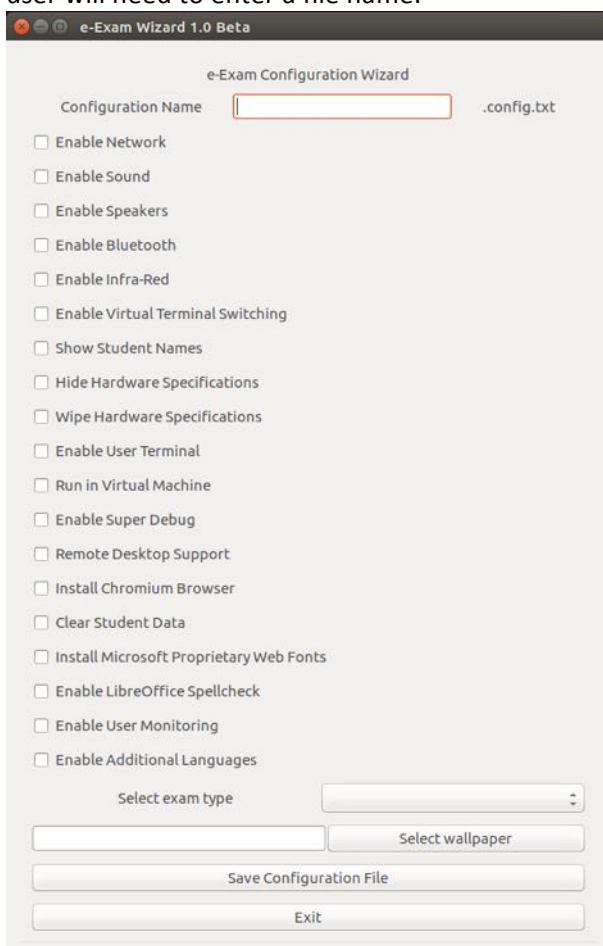
To create or edit local settings using the admin tool:

1. Press 'Configure e-Exam system'.
2. The user will be asked to make a choice: 'open exiting config file' or 'create new config file'. Pressing cancel will cancel the action.



3. Next:
 - a. If the 'open exiting config file' option was chosen, then an open dialog will appear.
 - i. Select the file and press 'open' to have it load in the e-exam wizard.
 - ii. The wizard will populate the wizard settings according to the selected file.

- b. If the 'create new config file' option was chosen, the wizard will load directly and user will need to enter a file name.



4. Refer to the 'recommended settings' and Table 1 in Appendix 1 for details of each setting.
- The 'configuration name' will be automatically appended with '.config.txt' when the file is saved.
 - To set the exam type use the drop-down.

Note: For document mode exams use 'paper', for Client-server to Moodle use 'seb'
 - Press the 'select wallpaper' button and then navigate to the image to be used (see also 'Prepare exam materials'). Select the file and then click 'open'. This will add the file name to the box.
 - Note: Images need to be PNG and at least 1920 pixels wide by 1280 pixels high.
 - Save configuration file – commits the changes to the file as listed in the configuration name box. If no name is given then ".config.txt" will be used.
 - If you change the file name and press the 'save configuration file' button again, a new copy of the file will be saved.
 - Note: if you exit the window using the red X on the title bar and have unsaved changes, then the notice to 'save unsaved changes' may appear behind the window. This issue doesn't occur when using the 'Exit' button.
 - Exit will return the main screen.

Note: If you want to keep the file config.txt file after shutdown you need to first copy it to the User drive or the hard drive of your computer.

All configuration files that the admin tool creates use the name format <filename>.config.txt. These files are placed in Ubuntu/eexam-master/configs/

Configuration file format

Configuration files are plain text files. These are placed onto the eexam drive of an e-Exam client USB and must use the file name .config.txt

The .config.txt file can be manually edited using a standard plain 'text only' editor such as Notepad (Windows) or TextEdit (OSX/MacOS). Care must be taken to abide by the internal syntax of these files or settings will not be applied correctly by the e-Exam system.

Warning: do not use a Word processor to edit configuration files because formatting characters will be saved into the file and this will break the system.

Internally configuration files are structured into [Sections] and individual settings. Individual settings may have variables that are:

a) Binary:

- Y = Ticked = ON / Enabled / Yes
- N = NOT ticked = OFF / disabled / No

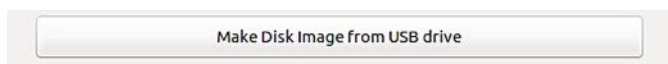
b) Single string – e.g. exam type = seb

c) Numeric value = 5

d) List separated by commas or spaces. E.g. list of language names. Or list of domain names.

Refer to the section 'Recommended Configuration Settings' for different use cases and 'Appendix 1: Configuration Settings' for further information on individual configuration settings.

Make disk image from USB drive



In order to duplicate additional USB drives you first need a disk image. A disk image is a file that contains an exact bit level copy of an entire storage device (e.g. a USB stick, including all partitions/drives on that device).

The disk images containing the base system obtained from e-Exam HQ are unlikely to be configured to exactly match your local needs. In particular you may like to:

- Configure the system with desired settings and collate the required files, including a custom wallpaper image (see 'Preparing exam materials').
- If for 'offline' use also:
 - Add your own practice exam material or,
 - Add the first real exam for direct deployment (See 'Deploying exam materials to e-Exam USBs')

Once you are satisfied that your 'master' USB is working. Then use the 'Make Disk Image from USB drive' function to create your own master disk image. You can then use the customised master disk image as the basis for duplicating your own e-Exam USB sticks.

Important! Do not insert your source USB stick yet – follow the steps below.

To create a disk image from USB drive using the e-Exam Administrator tool:

1. Press 'Make disk image from USB drive'.
2. The user will be asked "Please insert your USB drive now and press OK".
3. Insert the source e-Exam USB. When four e-exam partitions (drives) appear on the side bar, press OK. (note; if creating an image of another e-Exam Admin USB then two drives will appear).
4. The system will notify the user that it has identified the USB "Found /dev/sdx. We will try to work with that". Press OK. (note the exact designation sdx will vary. It could be sdb, sdc, sde, depending on the configuration of the computer).
5. The system will ask "are you ready to make the disk image? – Yes, No". Click Yes to proceed (or No to cancel the process).
6. The system will ask you to select the destination directory to place the finished disk image file (eexam_disk.img). Notes:
 - a. Any subsequent disk images you create in the same folder will overwrite files with the same name without warning. To avoid this problem, it is best to create separate

- folders to keep each disk image. You can use the 'new folder' button to do so (You can also rename the file after it has been created).
- b. It is best to direct image files to be saved to physical storage such as your computer hard drive or the User drive on the Admin USB. Note: Saving it under 'eexam-master' will write the file to RAM only and thus it will be lost upon shutdown.
7. Click the 'open' button to select the directory. This will also start the imaging process.
 8. The system will take a few minutes (typically 3 to 5 minutes) to generate the disk image file.
 - a. A small window will display progress in bytes, GB copied and speed.
 - b. You can also monitor progress by opening a file manager window to view the chosen destination folder and periodically refresh the view. You will see the file size increase over time.
 - c. Note: The cursor will initially spin. The 'select directory' window will remain visible throughout the process. You will notice other background windows will go dark grey during this period.
 9. When complete the data progress window will disappear and a notice will be displayed "Disk image creation complete". This process will take several minutes (Note: if the process appears to complete within seconds then something went wrong!)
The terminal will display the number of bytes written to file (eexam_disk.img). The number of *bytes* for '*records out*' should match the input source (if these numbers do not match it indicates a problem and likely broken/incomplete image file). Some examples (actual numbers will vary):
 - For e-Exam client image, '*records out*' = "3459252224 bytes" (3.6 GB, 3.2 GiB) copied, <number seconds>, <speed in MB per second>.
 - For Amin tool image, '*records out*' = "6443499520 bytes" (6.4 GB, 6.0 GiB) copied, <number seconds>, <speed in MB per second>.
 10. The file will be written to the selected directory.

Note: If you want to keep the disk image you need to copy it to the Admin USB 'User' drive or the hard drive of your computer.

Deploying exam materials to e-Exam USBs



This function is used to deploy (copy) a selected folder of files (e.g. question document and materials, config file and wallpaper image) to the e-Exam drive of one or more attached e-Exam USB sticks.

e-Exam USB sticks need to be in a 'clean' state e.g. following a reset. See also 'Deleting data from e-Exam USBs (Resetting e-Exam USBs)'.

Typically this would occur when recycling e-Exam USBs between exams or when setting up a 'master' e-Exam USB. A master USB can also be created by manually copying files to the 'eexam' partition.

To deploy data to USBs using the e-Exam Administrator tool:

1. Press 'Deploy data to USB drives'.
2. The user will be asked to select the folder containing the exam materials (see 'Preparing exam materials').
3. By default the system will deploy data to the 'eExam' drive of all attached e-Exam USBs.
4. The system will take from a few seconds to few minutes to complete the task. You will notice the background window will turn dark grey. During this time the terminal will display progress completion of each USB stick in sequence. At the end it will display the number of USBs processed.
5. When complete a dialog box will be displayed "Exam data now transferred".

Note: This is a file operation and not a full 'image burn'. This function is faster and is not the same as the much slower 'Duplicate USB drives'.

Deploying local config to e-Exam USBs

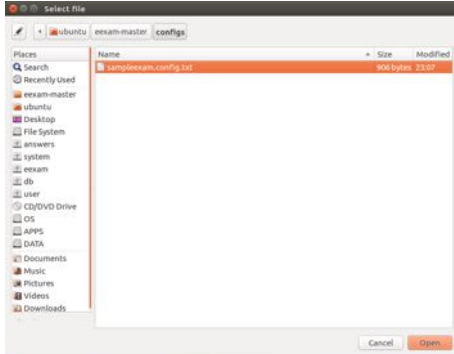
Deploy local config to USB drives

This function is used to deploy (copy) a selected local config file from Ubuntu/eexam-master/configs/ to one or more attached e-Exam USB sticks. This is useful if you just want to update the local .config.txt while leaving all other data untouched.

Any existing local config files on the USBs will be overwritten (replaced).

To deploy the local config to USBs using the e-Exam Administrator tool:

1. Press 'Deploy local config to USB drives'.
2. The user will be asked to select the local config file. If created using the Admin tool then these are created in Ubuntu/eexam-master/config/. Otherwise you may need to select the file from elsewhere. Select the file and click 'Open' (to action the selection).



3. By default the system will deploy the selected local config file to the 'eExam' drive of all attached e-Exam USBs.
4. The system will take from a few seconds to a minute to complete the task. You may notice the background window will turn dark grey. During this time the terminal will display progress completion of each USB stick in sequence. At the end it will display the number of USBs processed.
5. When complete a notice will be displayed "e-Exam configuration updated".

Deleting data from e-Exam USBs (Resetting e-Exam USBs)

Delete data from USB Drives

This function allows you to delete selected data types from one or more e-Exam USB drives.

You can:

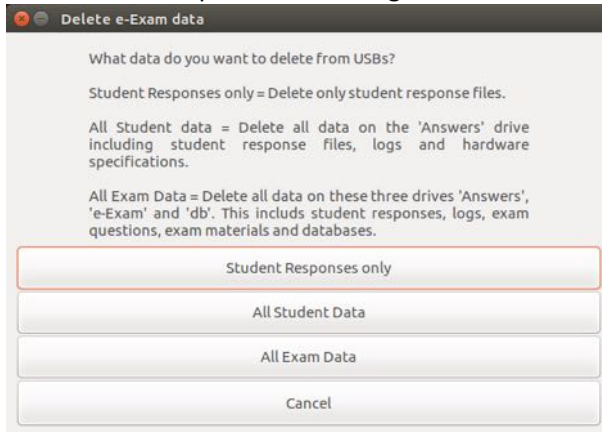
1. Reset practice mode e-Exam USBs for the next user = Delete student responses only.
2. Prepare a 'master USB' for duplication following exam 'quality control' testing = Delete all student data.
3. Recycle e-Exam USBs between exams (following retrieval of response data) = Delete all exam data.

Each of these actions is explained in more detail below.

To delete data from USB drive using the e-Exam Administrator tool:

1. Press 'Delete data from USB drive'.

2. A choice will be presented asking what data to delete.



3. The choices are as follows:

1. **Delete 'student responses only'.**

- This deletes: only the student response file and the user_info.txt file from the Answers drive.
- This keeps: system log data on the answers drive, exam materials/questions on e-Exam drive, and it will keep databases (as applicable). As such it will not touch the eExam or db drives. The base system itself is untouched.
- Best used for: resetting practice mode e-Exam USBs for the next user. It retains logging / hardware spec data for later analysis.

2. **Delete 'all student data'.**

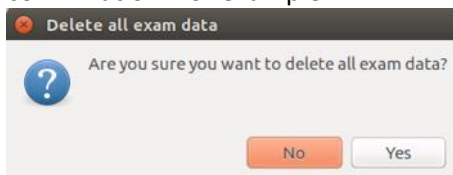
- This deletes: everything on the Answers drive. Including student response file, the user_info.txt, system session logs, collected hardware specification logs.
- This keeps: exam materials/questions and databases (as applicable). As such it will not touch the eExam or db drives. The base system itself is untouched.
- Best used for: preparing a master USB for duplication following exam quality control testing. This will ensure all session/user data is removed.

3. **Delete 'all exam data'.**

- This deletes everything related to student responses, system logs, exam materials and databases on the three drives – Answers, eExam and db. It resets the e-Exam USB to a 'clean slate'.
- It keeps: the e-Exam system itself and the drive partitioning. As such the base system itself is untouched.
- Best used for: recycling USBs between exams (after student responses have been retrieved!). It cleans the USBs ready to load the next lot of exam materials.

4. **Cancel** – cancels the action and returns to the main screen.

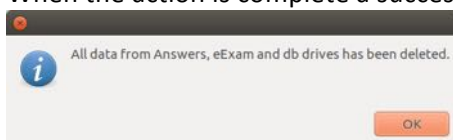
4. For each of the delete actions 1 to 3 above, a notice will be displayed asking for confirmation. For example:



Pressing 'No' cancels the action. Pressing 'Yes' starts the deletion process.

5. During the time the terminal will display progress completion of each drive and USB stick in sequence. At the end it will display the number of USBs processed.

6. When the action is complete a success notice is displayed. For example:



Duplicating USB sticks

Duplicate USB drives

This function writes a disk image (IMG) file to one or more attached USB sticks. Note: This function replicates software such as Etcher that will burn to a single USB or ImageUSB that will burn to multiple USBs.

Use this function to:

- a) Turn new 'bought from the shop' USB sticks into e-Exam USB sticks.
- b) Refresh/update the operating system on existing e-Exam USB sticks.
- c) Create a live USB from any live disk image (e.g. Admin Sick, Server, Ubuntu).

You will need:

- A prepared disk image (IMG) file.
- One or more USB sticks (all existing data will be lost on these).

Note: this can be a lengthy process so please do this well in advance of when the e-Exam USBs will be needed. Each USB may take from 2 to 5 minutes each to create – depending on device and system speed (we have averaged 30 minutes for a batch of 20 USBs). The good news is that once an e-Exam USB is created it can be quickly 'recycled' for use over multiple exams.

To run the duplication process using the e-Exam Administrator tool **please read these steps completely before proceeding.**

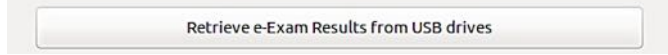
Important! Do not insert any USB sticks yet.

1. Remove any non-target USB storage devices such as other USB sticks, USB Hard drives, portable hard drives.
Any non-boot disk attached USB storage devices will be permanently overwritten with new data. As such, **DANGER! All existing data on any attached USB storage devices will be lost.**
 - a. *Note this exception!* If you have booted your computer from a 'Live USB stick' then that USB stick needs to remain in place (it won't be over written).
2. Go to the main screen of the e-Exam Administrator tool.
3. Next, connect a hub and the target USB sticks to your computer.
 - a. It is best to insert the USBs one by one and watch the side bar to ensure it is mounted properly.
4. When you are ready to proceed, press 'Duplicate USB drives'.
5. The system will display a dialog "I found x attached drives", where x = the number it found. This number needs to match the number of target USBs that you inserted (note; if the number does not match you will need to cancel the operation as the next step).
6. Click OK to go to the next step.
7. The system will ask "how many copies do you want?" Enter the number of attached USBs as displayed on the previous dialog.
 - a. Note: **this number needs to match the number of USBs attached/mounted or the process will fail.** If the number you type or the number displayed at the previous step does not match the actual number of target USBs you inserted then you need to press 'Cancel' to abort the process. Try again by 'safely ejecting USB drives' and start again at step 1. (see also 'known issues and troubleshooting').
8. The system will ask you to select the source disk image file (e.g. eexam_disk.img). Select the file and click the 'open' button.
9. The system will ask "Duplication ready? Do you want to proceed?" Press yes to start the duplication process.
10. The system will take from a few minutes to an hour complete the task – depending on the number of target USB sticks and the speed of your equipment. You will notice the background window will turn dark grey.
 - a. During this time the system will display a small window with progress.
 - i. In the case of 1 or 2 USBs they will be burnt in sequence. Data copy progress and speed will be displayed for each in turn.

- ii. In the case of 3 or more USBs a parallel process will be used. The display will show an aggregate and provide an estimated time (Note! the ETA time will become more accurate about 1/3 the way through).
11. When complete a notice will be displayed "Drives are now ready". The terminal should display the number of bytes written to each USB. The number of *bytes* for '*records out*' should match the input source (if the input and output numbers do not match it indicates a problem and the likely result will be a faulty USB system). Examples are (yours may differ):
 - For e-Exam client, the '*records out*' = "3459252224 bytes" (3.6 GB, 3.2 GiB) copied, <number seconds>, <speed in MB per second>.
 - For Amin tool, the '*records out*' = "6443499520 bytes" (6.4 GB, 6.0 GiB) copied, <number seconds>, <speed in MB per second>.

If any unexpected errors or messages occur please refer to 'known issues and troubleshooting'.

Retrieve exam results (responses) from USBs



This function will copy the student response files and optionally, other log data from the 'Answers' partition of all connected e-Exam USB sticks to the selected local system drive.

To retrieve exam responses from USB drives using the e-Exam Administrator tool:

1. Press 'Retrieve exam results from USB drives'.
2. The user will be asked to what they want to copy. The choices are:
 - a) 'Responses' - retrieves response files only (includes doc/x, xls/x and pdf files only). The files will be placed into a folder called 'responses'. Note this does not retrieve moodle '.attemptdata' files.
 - b) 'All Data' retrieves the contents of the answers drive including response files, backup files and all logs collected during session, Each student's collection of files placed into a folder named with their studentID. Useful for retrieving all other file types such as backup Moodle attempt data files and videos of screen recordings.
3. The user will be asked to select the destination folder. By default the dialog will show the Ubuntu/eexam-master/ folder so be sure to select an alternative location such as the User drive. Click 'open' to start the retrieval copy process.
4. The system will take a couple of seconds to a minute to complete the task (this may take longer if video screen recording was enabled). The background window may turn dark grey for longer copy processes. During this time the terminal will display progress completion of each USB stick in sequence, showing the student id and name (if applicable). At the end it will display the number of USBs processed.
5. When complete a notice will be displayed "Data successfully retrieved".

Safely Ejecting e-Exam USBs



When you are finished with the e-Exam USBs you should use the 'safe eject' function.

This is important because it forces the system to finalise any pending 'write' operations and will 'unmount' the USB's from the system. Only then is it safe to physically remove the USBs.

Warning: *not using this function may before removing USBs result in faulty e-Exam USBs!*

To safely eject e-Exam USBs using the e-Exam Administrator tool:

1. Press 'Safely eject USB drives'.
2. The user will be asked to confirm the action.
3. During this time the terminal will display progress completion of each USB stick in sequence.
4. When complete a notice will be displayed "You can now remove the USB drives: OK". Pressing OK will return to the main window.

Recommended Configuration Settings

The layout of the configuration file includes [sections] and individual settings.

Particular settings are grouped and described below according to the intended use of the e-Exam USBs.

Refer to 'Appendix 1: Configuration Settings' for details of each setting.

Please also read the additional advice in the sections on 'User monitoring' and 'Configuring networks'. These functions are complex and warrant focused consideration.

Offline exams

The following are the recommended settings for exam type set to 'paper' or 'office' being run offline. The following has a near complete list of all settings in a typical configuration file and assumes a real exam. See also advice for 'practice' exam setting if applicable. Comments are in brackets. Comments must not appear in a configuration file.

[Default] – these settings are recommended for most use cases.

enable_bluetooth = N (Disable Bluetooth because it is a security risk. However this prevents Bluetooth keyboards and mice being used – wireless devices will still work).

microsoft_fonts = Y (includes common Microsoft fonts in the system. These are recommended for exam papers prepared in Microsoft word to avoid unpredictable font substitution. This is safe to leave enabled for all exam types).

Keyboard = us_104 (Recommended for Australia or the US where 104 keyboards are more common than the default European layout that would otherwise be applied).

[Languages]

system=English (Note currently only English is available as the primary system interface language).

lote_select= <according to need> (set to Y for multi-language, language translation, LOTE exams to enable use of additional language input options).

multi_select= N (i.e. only one LOTE selection possible).

dictionary= <according to need>. Setting this to N removes dictionaries and disables spelling. See also [office] spellcheck setting.

list= <according to need> (A space separated list of single-word language names. Available languages are: Arabic Bangla Chinese Chinese-Pinyin Dari Indonesian French German Greek Hindi Italian Japanese Korean Nepali Portuguese Punjabi Russian Spanish Urdu Vietnamese).

[Security] – these settings are recommended for most use cases.

regen_sec= Y (leave this as Y).

virtual_terminal= N (Set to N to prevent access to terminal shortcut keys).

terminal=N (Set to N to prevent access to terminal applications).

virtual_machines=N (Set to N to prevent booting within Virtual Machines).

remote_desktop=N (Set to N to prevent use of remote desktop applications).

hide_hardware_specs=Y (Set to Y to hide the log file containing collected hardware specifications).

super_debug=Y (Set to Y to enable more extensive system logging).

[Monitor] – Monitors and captures user activity. Set these according to need. Please carefully consult section 'User monitoring' before using.

enable=Y (This enables monitoring – but each function also needs to be enabled).

firewall=N (Logs all network traffic).

network_dns=N (Logs all domain name system requests).

capture_screen=N (Takes JPG snapshots of the screen according to the capture_interval).

capture_webcam=N (Takes JPG snapshots from the webcam according to the capture_interval. Note this does not work on Apple computers).

capture_quality=10 (JPG capture quality in percentage).

capture_interval=5 (Capture interval in seconds).

video_recorder=Y (Records a AVI video of the screen from the time the desktop appears until the video_length expires or the system is shut down).

video_length=14400 (Specifies the maximum duration in seconds the video recording will run. System shut down will halt the recording. Changes screen resolution will cause the recording to stop and restart in a new file).

video_fps=1 (Specifies the frames per second used for the video recording. Note changing this to 2 will double the file size for little increase in quality.)

session_audit=Y (Records keystrokes and cursor movements to a log file. This requires specialist software to interpret and read).

[Cleanup] – These settings recommended for general use cases for both offline ('paper' or 'office') and online client ('seb' Moodle) exams.

enable = Y (For use when exam type = 'seb' Moodle. This starts a local server to accept submission confirmation events. For other exam types this setting is ignored). This feature works best of quiz 'form only' type exams. Note: if the SEB mode exam involves the editing and submitting of third party software files then it is best to disable this feature.

keep_logs = Y (Keeps system and monitoring logs when cleanup is run).

user_prompt = N (Prevent the display of an option for the user to clear their data at system shutdown. See advice for 'practice' sessions).

[Wine]

enable=y

[Java]

enable=y

[SPINE]

enable=y

[Displays]

adjust_hd_screens=Y (Attempts to adjust high definition screens properly).

brightness=80 (Attempts to set screen brightness to balance brightness and power saving).

[Sound]

enable= <according to need> (Set this to n if sound is not required. Disable all sound).

speakers=N. (Disable loud speakers. Note headphones will still work even of this is set to n and while 'enable' is set to y.)

[Network] – configuration for offline use. See also the section 'Online exams with Safe Exam Browser'.

enable=N (When set to N this will disable all network functionality, therefore remainder of settings will be ignored).

security=

ssid=

moodle_server=

moodle_path=

whitelist=

exam_url=

web_browser=

watchdog=

firewall=

proxy=
timeout=

[Office]

spellcheck= <according to need> (Setting to n will disable automatic spell check in Libre Office. However if the setting [Languages] 'dictionaries' is still enabled then manual spelling will still be possible. Therefore to disable all spell checking, both need to be set to n).

fullsave=Y (This triggers a full 'file save' each time autosave is triggered).

generate_pdf=Y (This creates a pdf when the document is closed).

protect=N (This is used for debugging. Set to n for normal exam use).

[Exam]

show_student_names= <according to need> (Setting this to n will hide the name fields on the e-Exam Starter Dialog).

type=office (This will trigger the loading of STUDENTNO_something.doc file in the eexam drive. Note 'paper' also works).

background_image=.background.png (If this is not set then the default internal background image will be used with a 'please configure the system' notice on it).

Note: Your institution may have policies that require anonymous marking. This can still be facilitated when the 'Show_student_names' setting is enabled. The key is to omit the collection of the student name in the exam response document or online quiz. There can still be a separation of the user information collected via the e-Exam Starter and the user's exam response. In the case of offline exams, the user_info.txt file serves as a back-up in case the student accidentally enters the wrong student id. Only the response document need be forwarded to the marker while the user_info file can be kept for auditing.

Online exams with Safe Exam Browser

In addition to the settings mentioned in the previous section, the following are the recommended adjustments to settings for when using Safe Exam Browser and Moodle i.e. when [Exam] type = 'seb'. See also advice for 'practice' exam setting as applicable. Comments are in brackets.

[Network] – Please consult the section on 'Configuring networks' for details on using the system in different infrastructure contexts. See 'Appendix 1: Configuration Settings' for detailed descriptions of each setting.

enable=Y (Required for use of networking. Note – set to N will disable all network functionality, in which case the remainder of settings will be ignored).

security=ethernet auth (Priority of network type. Space separated one or two values. Try Ethernet first, then authenticated WiFi).

ssid=eduroam (Specify SSID for WiFi. If blank, the user is asked to enter this value. Case sensitive).

domain=@monash.edu (domain for user name string to be used for eduroam. If blank, the user must enter the complete eduroam user name format: user@domain).

moodle_server=mmm.transformingexams.com (domain for Moodle server for use with exam type 'seb'. This must be changed to your Moodle server domain).

moodle_path=/moodle/login/index.php (path for Moodle server for use with exam type 'seb').

whitelist=http://mmm.transformingexams.com,https://www.austlii.edu.au (A comma separated list of domains to allow access. Change these to include domains for all resources required during the exam including the server hosting the exam. Note: If left blank then there will be no limits to network access – this is a security risk!).

exam_url= (specifies starting URL for exam type 'online').

web_browser=firefox (specifies default browser for exam type 'online'. Note for 'seb' exams Safe Exam Browser will always be used).

watchdog=N (Under development - Not used – will monitor network connection and attempt to reconnect upon dropout).

firewall=Y (Under development – if set to N whitelist values will be interpreted as domain names and filtered at the DNS. If set to Y then whitelist values will be translated into IP addresses and placed into the system IP tables).

proxy=N (Under development - Not used – will monitor network connection and attempt filter/log URLs. However SSL 'https' resources will not be captured).

timeout=10 (Time out in seconds when attempting to connect to Ethernet. Note: set this to a high number such as 60 if expected use is only on wired networks where 'security' is set to 'ethernet' only).

[Exam] – Note other settings in this section to be as per 'offline' exams.

type=seb (This will trigger Safe Exam Browser open the location specified domain and moodle_path).

Practice exams

Practice exams are run in order to test that student's laptops are compatible with the version of the e-Exam system to be used and to familiarise students with the process.

The following settings adjustments will allow the re-use of an e-Exam USB by the next student whilst keeping logging data for later analysis.

The following setting adjustments should be used in conjunction with advice for offline exams or online exams given previously. Comments are in brackets. Comments must not appear in a configuration file.

[Cleanup] - Will run a process to remove student data from the USB allowing the e-Exam USB to be re-set for the next user.

enable = Y (For use when exam type = 'seb' Moodle. This will be triggered by successful Moodle quiz submission on e-Exam Moodle server).

keep_logs = Y (Keeps system logs, monitoring logs, recordings etc when cleanup is run).

user_prompt = Y (This displays an option for the user to clear their data at system shutdown. This is intended to be used for offline mode practice sessions (not recommended or necessary for online exams if enable=Y is used). Note this may result in confusion for students – they will need to be told that the option will not appear in their real exam. Alternatively leave the setting disabled, but USBs will need to be reset using the Admin tool following the practice session).

User monitoring

The user monitoring features provide multiple methods for capturing data about user actions in the system. The user monitoring methods when used in conjunction with system logs can provide a degree of non-repudiation and user action auditing. However these settings come with some risks.

Warning! Inappropriate settings can lead to system failure. Please read the following advice on appropriate monitoring configuration.

The monitoring functions are NOT intended to replace invigilation of exams.

Some monitoring functions such as video recording can generate a lot of data or large files. Without appropriate configuration and management of USBs there is a risk that the drive may become full leading to a system failure during use. Therefore there are trade-offs to be made between detailed and high quality monitoring, data size, drive capacity and frequency of clean up.

The optimal mix of settings will depend on the circumstances under which the system will be used. Several variables need to be considered:

- Duration of exam sessions
- Number of sessions between USB clean up
- Granularity of desired auditing/monitoring
- The available storage space

- Quality of images/videos
- Frequency of image capture
- Duration of video capture
- Nature of data sought

Some information and recommendations for each user monitoring setting are outlined below.

enable=y	Y=on N=off	Enable user monitoring functions. Individual monitoring functions also need to be enabled. If disabled then very little data will be available to audit user actions in the system. Operating system and application event logs will still be kept but these provide little detail about what the user did.
firewall=y	Y=on N=off	Experimental feature. Enable logging of IP request type of each packet going in or out of the system. The log entries are placed into the syslog file at answers/logs/var/log/syslog Note: this only records IPs not full URLs. Depends on [Network] "enable=y". I.e this will only work if network is enabled. Warning: this generates a large volume of log traffic but provides a comprehensive record of all network transactions using all protocols.
network_dns=y	Y=on N=off	Log domain name requests. Only relevant if network is enabled). Enable logs of domain name requests (DNS - i.e. translation from domain to IP) into system log file at answers/logs/var/log/dnsmasq Note: this only logs domain names not full URLs. Also, it will not log instances of an IP address being requested directly. Recommendations: This function is very light in terms of data used so is safe to enable whenever networks are being used. It can provide some information on network resources that were requested.
capture_screen=y	Y=on N=off	A screen capture function that produces jpg images of the screen according to the quality and interval settings. This captures all connected screens into a single large image. Large screen resolutions will result in larger files. This will use much less data than video recording. Recommendations: This function is limited in its ability to capture user actions. It provides a sparse sampling and therefore will provide limited evidence of user actions during a session. Disable this when video recording is used but enable it if video recording is not being used.
capture_webcam=y	Y=on N=off	A webcam capture function that produces jpg images from the web cam according to the interval settings. Note: Webcam capture doesn't work on Apple laptops due to unavailability of proprietary drivers for redistribution. An external web cam can be used. Screen angle, camera angle, room lighting and obstructions such as web cam covers can interfere with image quality. Recommendation: This function is limited in its ability to capture user actions but can be helpful to audit the identity of the student sitting at the computer. Enable this feature. Ensure that web cam covers are open.

capture_quality=10	0 to 100?	<p>Sets capture image quality. Lower numbers for lower quality and smaller file size.</p> <p>Recommendation: Using 10 is probably optimal. Numbers below 10 produce blurry/pixelated images such that text on the screen cannot be read. If small text is likely to be used or a higher quality images are desired then 15 to 20 can be used. Numbers greater 20 will increase the file size considerably but do not produce more usable data.</p>
capture_interval=5	0 to ???	<p>Sets capture interval in minutes. Lower numbers produce more frequent captures (more files).</p> <p>Recommendation: Using 5 minute intervals is probably optimal. If video capture is being used then the interval could be increased to 10 minutes.</p>
video_recorder=y	Y=on N=off	<p>Record a screen video to an 'avi' file according to quality (fps) and duration settings. This provides an easy to use and complete record on on-screen actions (i.e. just play the video to see happened). The video captures the primary screen only. Note: Secondary/external screens are not recorded.</p> <p>Recording starts when the desktop is displayed.</p> <p>The video will take on the resolution of the screen. Larger resolution screens produce larger size video files.</p> <p>If the user changes the screen resolution then the video will stop and be restarted in a new file (using the new resolution).</p> <p>Recommendation: enable this feature provided the available storage space is 20% greater than the expected file size for the largest expected screen resolution (e.g. UHD or Retina screen). Spare space should be kept for other uses. If video monitoring is used be sure to regularly check USBs for available space remaining following exams to refine settings. Consider retrieving data and resetting USBs after each exam.</p>
video_length=14400	0 to max?	<p>Maximum video length in seconds.</p> <p>Larger numbers will produce longer videos and thus larger files. However it is advisable to ensure the duration exceeds the expected exam duration. If not then the latter part of the session will not be recorded.</p> <p>The video will be recorded for the length defined or until the system is shutdown. Video files will still be readable even in the event of a sudden system shutdown. A reboot will reset the duration counter and a new recording file will be started.</p> <p>Recommendation: Define a duration 20% longer than the longest expected exam. Remember to include any extra time due to special conditions. Note that video files take up a large amount of storage space and therefore using video recording will increase the frequency at which USBs will need to be cleaned up (files retrieved/deleted).</p>
video_fps=1	1 to max?	<p>Video frames per second. Larger numbers will produce larger files.</p> <p>Recommendation: 1 FPS is about optimal given the nature of activity to be observed during an exam. Setting this to 2 will nearly double the file size and is probably not required for most exams.</p>

session_audit=y	Y=on N=off	Logs user keystrokes and cursor movements/clicks to a text file. However the file is not directly human readable. A macro recorder application is required to interpret the file. Requires "cnee" macro recorder/player to interpret the file. See https://linux.die.net/man/1/cnee Note the file produced is relatively small thus does not present a risk to filling the drive/system failure. Recommendation: enable this feature for all exams. It uses only a tiny amount of storage space but provides detail of all keystrokes and therefore a means to re-construct a great deal of the user's session.
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Longer duration exams that use video recording will necessitate more frequent data retrieval and the deletion of files from USBs. In the worse case this may require action after each exam. However this produces the highest quality and easiest to access auditing information – i.e. you just need to play the video.

The session audit function can produce a stream of data adequate for most auditing requirements for very little cost in data. E.g to determine exact text entered during a session or if the user just sat there doing nothing. However it is less easy to interpret the data.

Be mindful that monitoring data is currently stored in the log/ folder on the answers drive. This means that student users will have access to it. We plan to move this to the db drive in future versions lessen the chance it will be accessed or tampered.

Configuring networks

The e-Exam client has the capability to use both Ethernet and WiFi networks.

This section assumes you are familiar with managing and configuring e-Exam USBs.

Refer to appendix 1 for details of each network setting and its possible settings.

It possible to utilise a range of network types including Ethernet (DHCP only) and WiFi: open, WPA and authenticated (The latter currently assumes Eduroam).

Pre-configuration of the network type is possible, including if Ethernet will be tried prior to attempting a WiFi connection.

Ethernet versus WiFi

Mixed Ethernet and WiFi use: if it is desirable that a given e-Exam USB could be used via Ethernet (DHCP) or via WiFi (e.g. authenticated via Eduroam) then set [network] security=ethernet auth. This provides a sequenced connection attempt. First the system tries Ethernet DHCP. If no connection is achieved within the timeout period, it then tries WiFi. A 'timeout' value to of 5 to 10 seconds will serve most instances well (but always test in your context before deployment).

Ethernet only use: If it is certain that the e-Exam USB will only be used via Ethernet – then set [network] security=ethernet. Also increase the 'timeout' value to a large number e.g. 100. Note the e-Exam network manager can be used via Dash to re-start the connection attempt.

WiFi only use: If the system will only be used in a WiFi environment (e.g. authenticated via Eduroam), then do not set Ethernet as an option. Instead set [network] security=auth (or another suitable value –see WiFi options). This will speed up the connection sequence by 5 to 20 seconds. Note: the timeout value is ignored when WiFi only use is configured.

WiFi options

WiFi can be set to use different network types by setting the [network] security= setting. The options are:

- 'open' – for open unencrypted networks or for networks where a captive portal may be used to progress further. This is not recommended for real exams but may be useful for practice or demonstrations.

- 'wpa' – for networks where an SSID and common passphrase are used. This includes WPA and WPA2. This is not recommended for real exams but may be useful for practice or demonstrations.
- 'auth' – for encrypted networks where an individual user and password are required. This is the preferred type of real exams. Note: Eduroam has been assumed, however other authenticated networks may work provided they utilise the same security and encryption protocols. Details of Eduroam connection settings is provided below.

Wireless Security	WPA-Enterprise
EAP Method	PEAP
Key Type/Encryption Cipher	TKIP or AES-CCMP
Phase2 Type	MSCHAPv2
Username format	user@domain or username
Password	network account password
Anonymous Identity	Leave blank
CA Client Certificate File	Choose No CA certificate is required for initial eduroam connectivity. Download the QuoVadis Root CA2 for increased security in Step 3
CA Certificate File	Leave blank

Note: WEP is not supported.

WiFi pre-configuration also makes it possible to:

- have the user manually enter the WiFi network SSID. In this case leave the SSID setting value blank.
- use a pre-configured (stored) SSID value.
- have the user manually enter their username and password for a WiFi network (this is the default when using authenticated networks).
- use automatic WiFi network logon with a pre-configured (stored) username and hashed password.

Items a to c can be achieved using the .config.txt file. For item d see the section for 'automatic WiFi logon'.

Automatic WiFi logon

An automated WiFi network logon can be enabled by placing a net_user.txt file containing the user name and hashed password onto the eExam drive of an e-Exam client USB. To establish this file follow the steps.

This has been tested and found to work with EduRoam WiFi.

Step 1: Configure an e-Exam USB ready to capture the password hash. It is best to use a clean e-Exam USB that has not previously been used for an exam.

- Set up an e-Exam USB by editing the following settings in the .config.txt file (An example using Eduroam at Monash University and the e-Exam demo server is shown):
 - [network] enabled = Y
 - [network] security = auth
 - [network] ssid=eduroam
 - [network] domain=@monash.edu
 - [network] moodle_server=eexam.transformingexams.com
 - [network] moodle_path=/moodle/index.php
 - [exam] type = seb
- Ensure there is no existing .net_user.txt on the eexam drive.
- Ensure there is no existing .user_info.txt file on answers drive of the USB.

Note the "domain=" setting can be left blank (if so, you will need to enter the full eduroam username as username@domain at step 2 below.) or use your own institution's EduRoam domain in place of @monash.edu (if so, just enter the eduroam 'user' at step 2.)

Step 2: Capture the password hash.

1. Boot a laptop using the e-Exam USB in an area with WiFi coverage (i.e. Eduroam).
2. Follow the steps at start up.
3. At the WiFi login dialog enter your:
 - a. eduroam username (or username@domain format if you left [network] domain= blank in step 1) AND
 - b. eduroam password.
4. Wait until the network 'successfully connected' notice appears.
5. Progress until the browser opens to the LMS login page (just to make sure the WiFi is working!).
6. The password will now have been captured.
7. Shut down the e-Exam system.

Step 3: Find the captured user credentials.

1. Mount the e-Exam USB in another operating system
2. Navigate to the answers drive.
3. Find the user_info.txt file.
4. Open the file in a text editor and look for bottom most pair of lines that look something like this (the values after = will be different to those shown below):
 - WIFI_USER=blogsj
 - WIFI_PASS=ddfa343bdde88d3e986d4f500d7f91c1
5. Copy these two lines.

Step 4: Place the user credentials onto the e-Exam USB for re-use

1. Create a new blank text document.
2. Paste the above two lines into the text document.
3. Save the text document with the file name ".net_user.txt" (without quotes) and place the file onto the eexam drive of the e-Exam USB.
4. Safely eject the e-Exam USB.

Step 5: Test the automatic WiFi configuration works.

1. Boot the computer with the e-Exam USB.
2. It should now automatically log onto the WiFi network using the stored credentials.

The .net_user.txt file can be placed on multiple e-Exam USBs for automatic WiFi network logon.

You may need to confirm your institution does not have restrictions on the number of simultaneous logons or you may consider setting up a generic logon for this use.

The password is stored using a one-way hash and cannot be reversed to reveal the original password. However unauthorised users may get hold of the net_user.txt file and could use it on unauthorised copies of an e-Exam client USB to access the WiFi network. It is advisable change the password on a regular basis.

Using robust Moodle for online e-Exams

To utilise the 'robust' features of the e-Exam client-server mode, the Moodle server component must have the specific versions of the additions/plugins developed by e-Exam HQ. Please contact us if in doubt. Similarly e-Exam HQ have made modifications to the browser component of SEB to run under Linux and for it to work with the customised components in Moodle.

Features of the robust Moodle e-Exam system are:

- Quiz content is cached to the client upon loading of the quiz (i.e. after the 'Attempt quiz now' button in Moodle. Cached content includes embedded media and up to the first 10 minutes of each playable media file.
- Autosaves are resistant to network outages. In the event of a network outage autosave events are redirected to an encrypted file on the answers drive of the USB. This happens transparently to the user and as such does not require any user intervention. These backups appear as "*.attemptdata" files on the Answers drive. This file contains responses

entered into quiz form fields (i.e. text or numerical responses) and form field selections (i.e. multiple choice selections, hot-spot selections etc).

- e-Exam USBs automatically clean-up following successful submission of the quiz to Moodle. This resets the USB ready for the next user.

Warning: If the standard versions of SEB, Moodle and SEB plugins are used instead, this will mean extended caching, network outage protection and automatic USB clean-up will not be available.

Note the following:

- All standard quiz question types in Moodle have all been tested with robust e-Exam client-server mode.
- Embed media (images, video and sound) instead of using links. Embedded media is cached. Playable media files are cached up to 10 minutes in length at quiz load time. Any 'linked' files or resources are not cached. We recommend that each embedded video or sound is less than 10 minutes in duration. Consider placing longer media files and linked files onto the USB stick in the Materials folder.
 - Audio files should use .ogg format.
 - Video files should use .ogv format.
 - Image files should use .png format, but other common web image formats are acceptable (gif,jpg).

Warnings:

- The hot spots of 'drag-and-drop-into' questions are not defined correctly if these questions appear on secondary pages in the quiz. The symptom is that the hotspots reduce to a single pixel in size. Reloading the page fixes the issue however this would not be successful in the case of a network outage.
- Third party quiz question plugins have not been tested.
- Files linked in questions are not cached at quiz load time (consider placing these on the student client USB).
- Avoid embedding playable media files that are greater than 10 minutes in duration (consider placing longer duration media files these on the student client USB).

e-Exams that use Safe Exam Browser (SEB) and Moodle quiz require specific settings for each quiz.

Having already created an exam using the Moodle quiz – apply the following settings:

a) Set availability of the quiz to match the time for the exam. This could be also be done manually by hiding/showing the quiz to users. Set the duration (timer) if desired.

b) Under 'Extra restrictions on attempts':

Require password = whatever you like (recommended for a unified start time and to help prevent unauthorised access from outside the exam room).

Require network address = <IP range> (recommended if the IP address range of candidates is known e.g. in a computer lab or WiFi subnet. This increases security by preventing those from outside this range from accessing the quiz. However take care to get this correct otherwise it will prevent legitimate candidates from accessing the quiz).

Browser Security = Safe Exam Browser (this is required otherwise any browser can be used!).

Experimental fault tolerant mode = yes (this allows work to continue in the event of a network outage or WiFi dropout. The e-Exam system will store responses in an encrypted "*.attemptdata" file on the USB in the event of network failure). This file contains responses entered into quiz form fields (i.e. text or numerical responses) and form field selections (i.e. multiple choice selections, hot-spot selections).

Allowed browser keys = the key used for SEB that is part of the e-Exam USB sticks – this key should be different! Do not leave this blank or anyone with a copy of SEB will gain access!

▼ Extra restrictions on attempts

Require password ? Unmask

Require network address* ?

Enforced delay between 1st and 2nd attempts* Enable ?

Enforced delay between later attempts* Enable ?

Browser security* ?

Experimental fault-tolerant mode* ?

Allowed browser keys* ?

[Show less...](#)

Move a Moodle quiz between servers

Use this procedure uses Moodle backup and restore to move a yet-to-be-used e-Exam (Moodle Quiz) from one server to another. The steps below aim to move only the quiz and its questions inclusive of any embedded media, but excluding all other data types including user account and response data.

Step 1: backup and export the course containing the quiz.

1. Go into the course that contains the exam (quiz).
2. Go to '*Course administration*' > '*Backup*'.
Note you must back up an entire course.
3. Next we will exclude most of the default items and remove any unwanted activities (this can also be done when importing). On the *Backup settings* screen, deselect everything except for two things: "Include activities and resources" and "Include question bank".

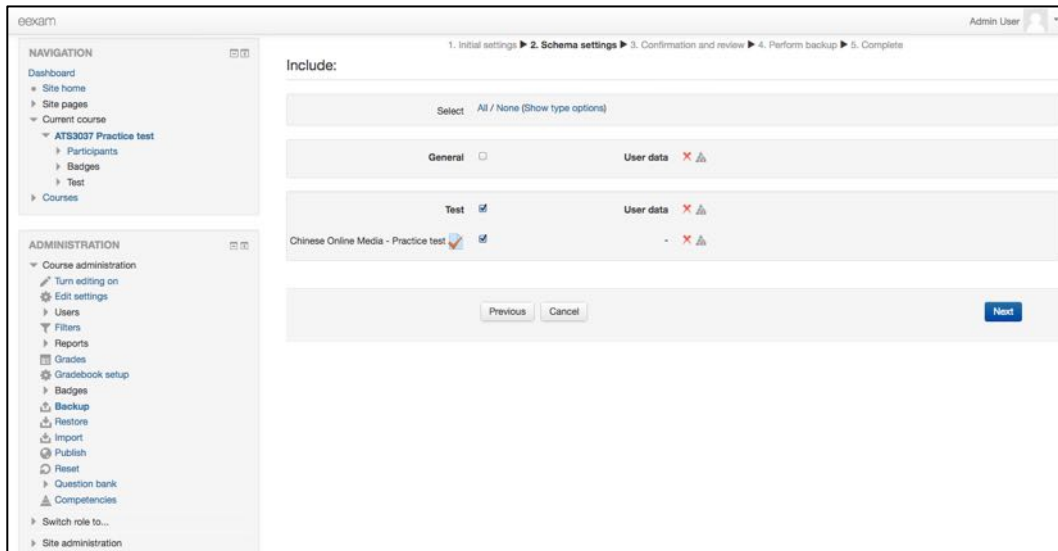
The screenshot shows the 'Backup settings' interface in Moodle. On the left is a navigation menu with 'ADMINISTRATION' > 'Backup' selected. The main area contains a list of backup options with checkboxes:

- IMS Common Cartridge 1.1
- Include enrolled users
- Anonymize user information
- Include user role assignments
- Include activities and resources
- Include blocks
- Include filters
- Include comments
- Include badges
- Include calendar events
- Include user completion details
- Include course logs
- Include grade history
- Include question bank
- Include groups and groupings
- Include competencies

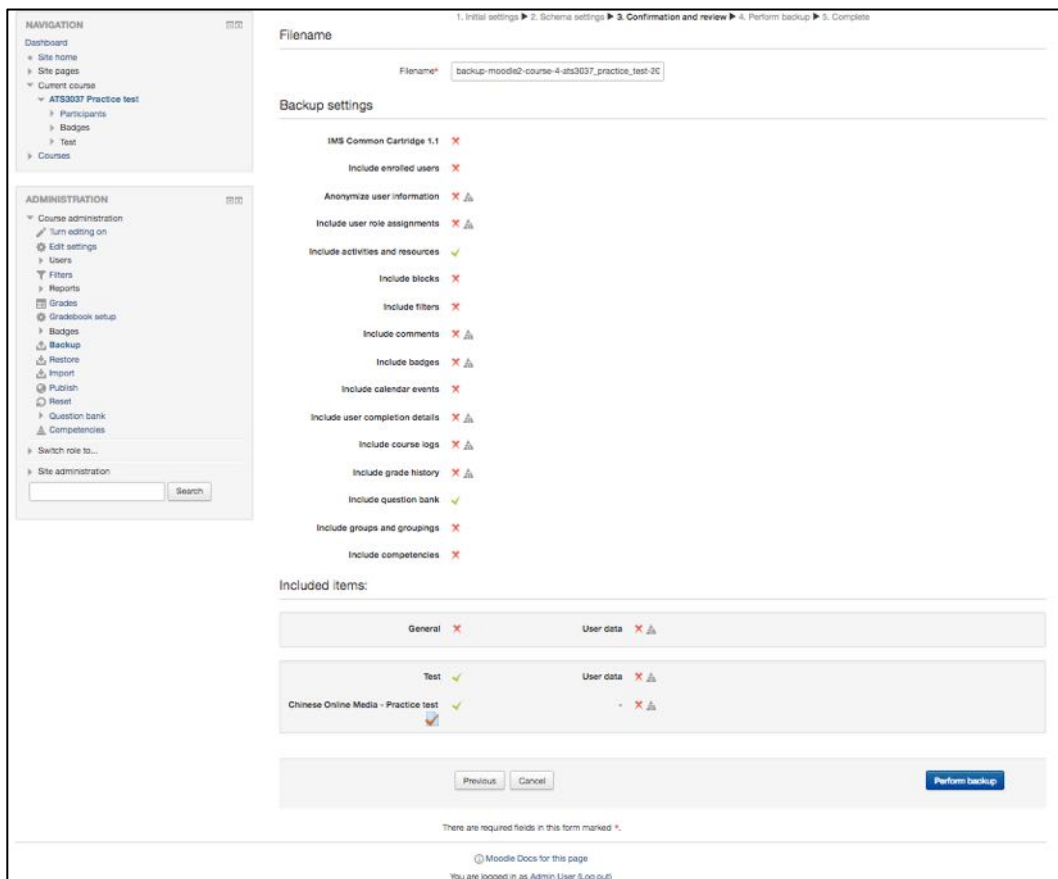
At the bottom, there are 'Cancel', 'Jump to final step', and 'Next' buttons.

4. Press Next.
5. On the *Include* screen, choose only the specific quiz(s) and their containing sections. Everything else should have red crosses on them. If the exam contains multiple quiz activities then include each one. Note the 'User data' column must have all red crosses next

to them. The example below shows that only the section 'Test' and the Quiz 'Chinese online media - practice test' have ticks. Untick any other sections/items such as news etc.



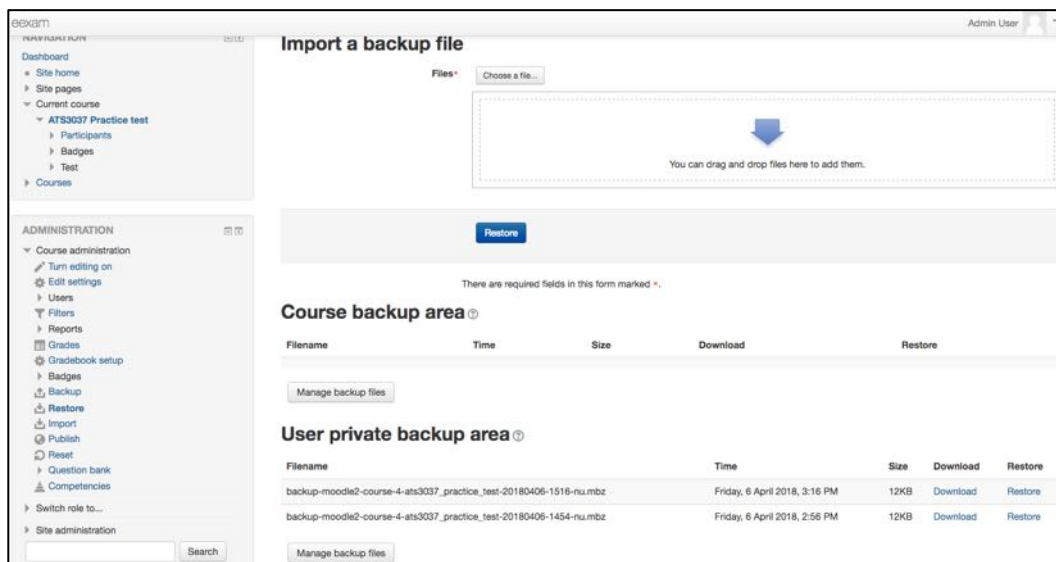
6. Press Next.
7. On the confirmation screen ensure that the settings are correct. Note all the red crosses next to enrolled users etc. Note that you can change the name of the file if you have backed up previously, however if you scroll across you should notice that Moodle has date and time stamped the latter part of the file name. Therefore no two backup files should end up with the same name.



8. If it is correct then press 'Perform backup'.
9. Moodle will show a confirmation when the backup is ready.



10. Press 'continue'
11. Download the backup file (mbz):
 - a. Scroll down and refer to the 'User private backup area' subsection.
 - b. A list of all backup files you have made will be there. Note: Moodle will set the latter part of the filename with the current date and time. No two runs of the backup process should yield the same file name. .
 - c. Be sure to select the most recent file. Click the adjacent Download link to obtain the file.



12. This 'mbz' file is ready to be imported ('restored') to another server. The file will contain embedded images, audio or video files.

Step 2: Follow standard Moodle 'restore' procedure to restore the backup file into the other Moodle server.

- See Moodle Documentation https://docs.moodle.org/36/en/Course_restore (use the version to Match your Moodle server).

Note: if you find the backup file contains data types other than the quiz data you can choose to exclude the unwanted data types as part of the restore process.

Upload attempt data files to Moodle (following a network outage)

In the event of a network outage that lasts until the end of an exam, the e-Exam system will have saved student's responses in one or more "*.attemptdata" files. These can be found on the Answers drive of the e-Exam USB.

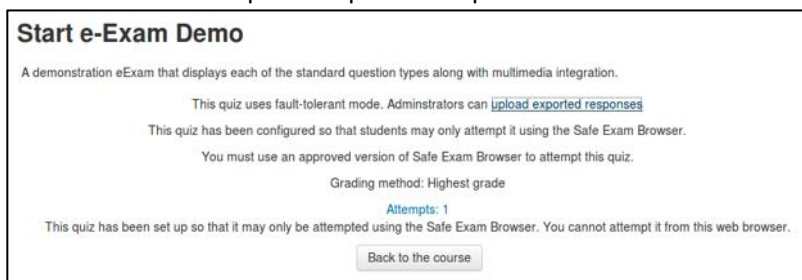
- Note: If the exam involved editing and uploading third party software documents to the quiz (i.e essay question using file upload) then these files may not have been included in the attemptdata file. Third party software document files must be retrieved and submitted separately. Caution must be exercised when running such exams especially where automatic clean-up upon quiz submission is enabled - it is recommended to disable automatic clean-up in this circumstance.

The responses of impacted students will need to be manually uploaded to Moodle.

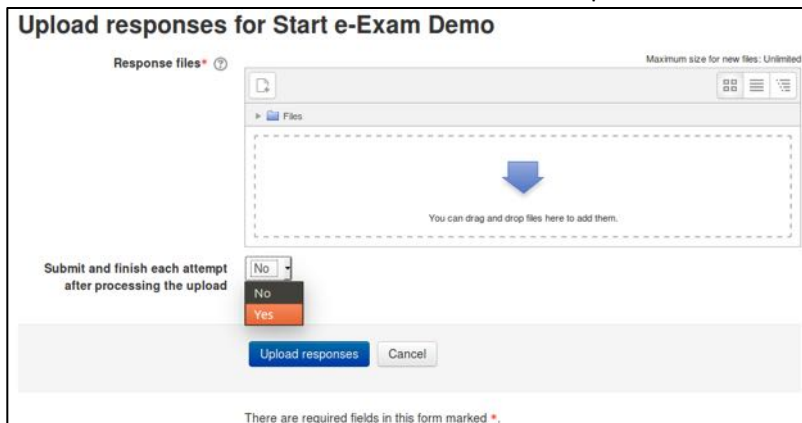
- a) If this has occurred for multiple students, see 'Retrieve exam results (responses) from USBs' to retrieve files in batches.
- b) If this occurred for one student, then the file can be retrieved directly from the USB in question.

Once the attemptdata files are in hand, the task is to then upload this data to the Moodle quiz so that the responses can re-join the assessment workflow. To upload one or more attemptdata files to the Moodle quiz:

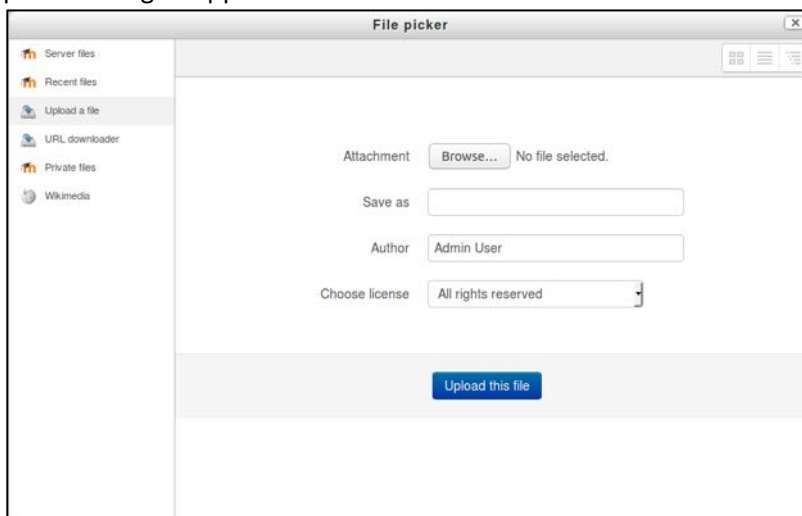
1. Using a teacher account on Moodle, go to the quiz page using a standard web browser.
2. Follow the link for 'upload exported responses'.



3. Choose 'Yes' under 'Submit and finish each attempt...'

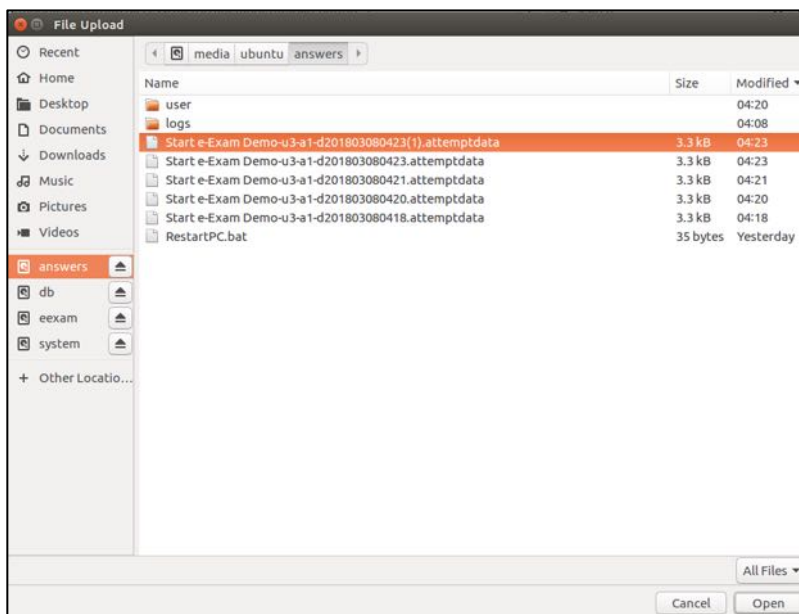


4. You can use drag-and-drop to upload files. Or, Press the 'add file' button to get the file picker dialog to appear.

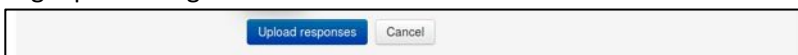


5. Press 'Browse' button and then select the most recent attemptdata file(s).

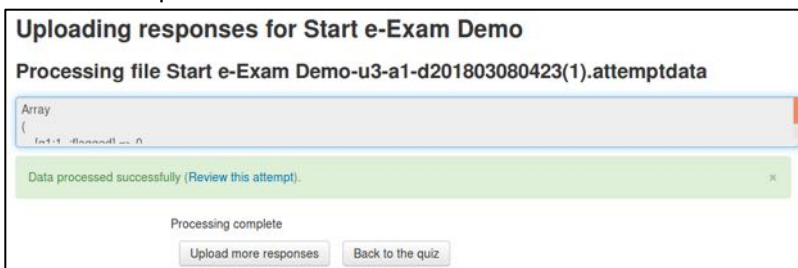
- a. If there is only one student in this case, the file could be obtained directly from the Answers drive of the e-Exam USB:



- b. If there are attempt data files from multiple students then multiple files can be selected and uploaded at once.
6. Back on the 'Upload responses...' page, when ready, press 'Upload responses' button to begin processing.



7. If successful the result of the processing will be displayed. A link to review the attempt is also available. The responses can now be evaluated just like any other responses submitted to the same quiz.



- a. If unsuccessful, an error message will be displayed. Errors can occur if duplicate response files or response files that are older than existing data are uploaded. Response files from a different quiz will also produce an error.

Moodle server on a stick

A live Ubuntu USB containing a Moodle server is available as a disk image from e-Exam HQ. The server on a stick is not intended for large scale exam use but will suffice for smaller groups of 20 candidates.

The provided disk image contains a 'blank' Moodle instance that requires some updates.

Setting up and updating a USB server.

1) Create backup files from a source server. Three files will be created by the "backup.sh" script (obtained from e-exam Moodle server repository in bitbucket). These will contain Moodle web/php code, the database and module data directory.

Place the script on the server in a suitable folder where you want the backup files created. Run the script as root or sudo. e.g:

```
$ sudo ./backup.sh
```

This will create three files:

- Moodle_data.ta.gz
- Moodle_db.ta.gz
- Moodle_web.ta.gz

2) Place the three back ZIP files on the server USB stick on the mooddata partition with in a folder named 'restore': /mooddata/restore

3) Place a Moodle backup file (.mbz) containing the quiz or exam content into /mooddata partition on the USB (i.e. in the root of the drive).

4) The server is now ready to start. Unmount the USB and boot it.

Using the server

The server must be used on the same subnet as the clients – Example given for EduRoam Wifi.

Boot a suitable computer with the server USB. After reaching the Ubuntu desktop:

1) Use manual network set up to connect to Wifi.

Eduroam:

- WiFi security =WPA & WPA2 enterprise
- Authentication = Protocol EAP (PEAP)
- Anonymous identity = blank
- Tick 'no certificate required'.
- PEAP version = auto
- Inner authentication = MSCHAPv2
- User@domain
- Password

2) Wait until WiFi is connected.

3) The click 'proceed'.

4) Note the network address given e.g. 49.127.107.119. This needs to be given to client users to enter when promoted – but not yet!

Note: if a server code update was done then the moodle config.php file needs to be updated.

5) Open terminal and use this command

```
$sudo gedit /var/www/html/moodle/config.php
```

6) update the line \$CFG->wwwroot to use the new IP address. E.g.

```
$CFG->wwwroot = http://49.127.107.119/moodle
```

Save and exit.

7) Navigate to the new URL in the browser.

8) The server is now ready for use by clients. Give users the IP provided at step 4. E.g 49.127.107.119

Configuring Client USBs

Clients must be set up with particular network configuration to work with this server:

- a) [network] enabled = Y
- b) [network] moodle_server = dynamic
- c) [network] whitelist = is blank
- d) [exam] type = seb

Note it is likely that client USBs will need to be set up well in advance of the server being used. For this reason it is unlikely that you will be able to pre-configure them with the correct IP address for the Server-on-a-stick.

Using Clients.

Boot user laptops as normal using the configured e-Exam client USBs. Network connection steps will be followed according to configurations.



The user will be prompted to enter the IP address the first time they start the e-Exam client system. Following the example above they will use 49.127.107.119

Standard procedure can then be carried out – e.g. SEB will open to the server login page.

Upon subsequent re-boots the IP will be pre-filled in the dialog box (it can be changed).

Typical workflows

Creating the first e-Exam USB

This procedure is to set up a first e-Exam USB stick. You will take a blank USB and burn a disk image to the USB. This will turn it into a working e-Exam USB stick. This can subsequently be customised for your local requirements to serve as a 'master' e-Exam USB.

This process is made up of a series of steps. The steps below assume you have:

- a) A single blank USB stick (i.e. bought from the shop), and
- b) A working e-Exam Admin USB stick (or you may instead use Etcher or ImageUSB).

Follow the steps below, referring to the details of each in their respective sections.

- 1) Obtain the e-Exam software (download the student client disk image from e-Exam HQ).
- 2) Check the integrity of the downloaded file (MD5 hash check).
- 3) Burn the disk image to a USB stick.
 - a) You may use Etcher or ImageUSB (the later is Windows only) to burn the image to the USB stick (See 'Create a First e-Exam Admin tool USB stick' but be sure to use the student client disk image!).
 - b) Otherwise you may use the e-Exam Admin tool to perform the task.
 - a. If you are unable to access your computer's HDD from within the Admin tool (otherwise skip to step b): Use your native operating system (Windows or Apple OSX/MacOS) to copy these files onto the 'User' drive of the Admin USB stick:
 - i. The e-exam student client disk image,
 - ii. and for latter use, a folder containing a set of exam materials (see 'preparing exam materials').
 - b. Boot the computer using the Admin tool USB and open the Admin tool.
 - c. Burn one e-Exam USB:
 - i. On the main screen of the Admin tool, select the button 'Duplicate USB drives'. See section "Duplicating USB sticks" for further instructions.
 - ii. Be sure to select the downloaded student client disk image, insert 1 blank USB and set the number of USBs to 1.
- 4) You now have one e-Exam student client USB stick.
- 5) When complete use 'Safely eject USB drives' to remove the USB from the system.
- 6) You can now boot a computer with it and try it, or you can re-insert the USB to further configure it for local requirements – See 'Setting up a master USB'.

Preparing exam materials

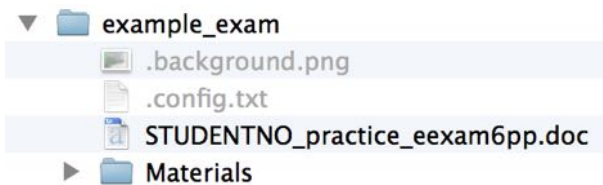
To prepare materials for a particular exam, it is recommended that you create a new folder to store the materials on your computer hard drive and/or User drive of the Admin USB. In the exam specific folder place:

1. **The security background wallpaper image.** This should be unique per exam sitting in the case of offline mode exams.
 - Note: Images need to be PNG and at least 1920 pixels wide by 1280 pixels high. (see 'Configuring e-Exam system').
 - Note: To have the background image file recognised by the system, either:
 - a. Select the image file using the 'Configuring e-Exam system' function, which will have it referenced in the configuration file.
 - OR
 - b. Manually rename a background image file to ".background.png" (without quotes).
2. **A local configuration file.** See 'Configuring e-Exam system' to create or customise a configuration file. Configuration files created using the Admin tool will be placed in Ubuntu/eexam-master/configs/. Obtain the config file from there.
 - Note: if you used the configuration button, the conf fig files will be named "something.config.txt" (without quotes).

- Note: To have the config file recognised by the system, either:
 - a. Copy your config file directly from Ubuntu/eexam-master/configs/. Then, manually rename the config file to ".config.txt" (without quotes).
OR
 - b. Use 'Deploy local config to USBs' function to place a selected config file from Ubuntu/eexam-master/configs/ onto a batch of USBs. This process will automatically rename config file as required.
- 3. **For offline modes*: An exam question document** that will be opened upon e-Exam start. Do not put spaces in file names, instead use dash or underscores. The file name must be prefixed with "STUDENTNO_" (without quotes).
 - Word document example: STUDENTNO_myexamfile.doc (Also see 'guidelines for preparing exam question documents' below).
 - Spreadsheet example: STUDENTNO_myexamfile.xls
- 4. **For online modes (optional): .net_user.txt** – containing user and hashed password to automatically log onto a WiFi network. See 'Automatic WiFi logon' for further information on how to create this file.
- 5. **Optional: A 'Materials' sub-folder.** Place all other materials related to the exam itself into this sub-folder. It is advisable to setup links from the question doc file to each of the materials. (See the example exam disk image for an example of a document with links to local files.)
- 6. **Optional: An 'apps' sub-folder.** Place any additional app zip files here. This includes patches or scripts designed to remove standard apps upon system start. These apps must be specifically designed to work with e-Exam system.

* Note: this applies to any circumstances where a file from the USB will be opened at exam start.

The finished exam folder should look something like this (example shown of an off-line, word doc based exam):



Note: an exam folder for a 'seb' mode exam only needs to have the files: .background.png, .config.txt and net_user.txt (if the latter is not provided then users will need to manually connect to a network).

To put the contents of this folder onto e-Exam USBs, use the 'Deploy exam materials to e-Exam USB drives' function. You will be asked to select the folder that contains the exam material. The tool will then copy the entire folder contents to the 'eexam' partition of each attached e-Exam USB stick.

Guidelines for preparing an exam question document

When running an off-line mode e-exam a word processor document is typically used for the exam question and response environment.

1. File format:
 - Use ".doc" format files rather than ".docx". The latter are not as well supported by Libre office, particularly when using complex formatting such as multiple columns, nested tables, drawing objects with boxes, text boxes, arrows etc. If the file is .docx then use 'Save As' and select the .doc format when saving a copy.
 - i. The use of Math editor / formulae or special characters may not carry over when the document is opened in the e-exam system. Preparing the document in Libre Office and using .odt may be advised in this case.
 - Use .odt (open document format) if preparing exam files directly in Libre Office.
 - i. Note, if using Libre Office on Windows or OSX/MacOS to create the e-exam document please note that the same fonts may not be available as in the e-Exam system (See advice regarding use of fonts below).

2. File naming:

- Do **not** use spaces in file names. Instead use underscores _ to separate words in the file name. The e-Exam system may fail to open or correctly save the document if the file name contains spaces.
 - Prefix the file name with "STUDENTNO_" (without quotes). The e-Exam system requires this text string in order to find and open the correct exam question file.
3. Document editing and layout:
- Use plain generic/common fonts. Font substitution is likely to occur when moving from Windows or OSX/macOS to Linux (e-Exam system). The use of generic/common fonts will minimise any disruption to formatting because the equivalents on each platform are very similar.
 - i. Setup the default 'normal style' in the document to use 'Times New Roman', 11 or 12 point font.
 - ii. It is best to use Times New Roman for questions and Ariel for response areas. Set response areas to dark blue text. This helps students easily identify their own text (See example exams for ideas on question formats/layouts).
 - iii. Non-roman character fonts (e.g Chinese, Arabic, Korean etc) are likely to experience greater degree of changes when font substitution occurs because the fonts used are less consistent/common across different systems. Care must be taken to select the correct font for Japanese and Chinese respectively to ensure characters and punctuation are displayed correctly. It is best to set fonts within the e-Exam System, Libre office itself.
 - Use tables instead of columns when a multi-column page layout is required.
 - Avoid using drawing objects/text boxes to hold or position key information or create diagrams or layouts because these are not very 'stable' when opened in LibreOffice / e-exam system. i.e. the positioning of these is likely to change unpredictably. Instead it is best to insert images that contain diagrams or to use tables to create more complex layouts.
 - Do not insert multimedia/video/audio files into a document. Instead store multimedia or reference files in a separate 'Materials' folder and create a link to the file (see demonstration/example exams).
 - Avoid changes in page orientation within the same document e.g. Avoid having some pages portrait and others in landscape. Portrait orientation is recommended. It has been observed that mixed orientation documents may revert all pages to one orientation when the file is opened in Libre office. Using portrait only also means text sizes will be larger when the zoom is set to 'page width'.
 - Set the zoom to 'page width'. Maximise the document window and set the document view size as 'page width'. Then save the document. This will mean the document will open full width on most screen sizes. This maximises the readability of text on the screen by default. Students will still be able change the zoom.
 - If you require anonymous marking then omit collection of the student name inside the question/response document (see also the 'Admin Guide' document section 'recommended settings > student names').
4. Always test the document in Libre office within the e-Exam system.
- As outlined above, the font set and configuration of the e-Exam system is likely to vary from the word processor you used to prepare the original document.
 - If adjustments are needed then perform the changes in LibreOffice within the e-Exam system. Save the updated file to the answers partition. Then remount the USB (in OSX/macOS/Linux) and copy the updated file to the eexam partition. Be sure to prefix the updated file name with "STUDENTNO_" (without quotes).

Setting up a master e-Exam USB

This process will take an existing e-Exam USB and set it up as a 'master' configured to local requirements.

This process is made up of a series of steps. The steps below show an offline word document exam (online only exams omit the doc file but may add a .net_user.txt file). To start, please have:

- a) An e-Exam USB.
- b) An exam document (STUDENTNO_something.doc) and an optional 'Materials' folder.
- c) A background wallpaper image (.background.png).

Follow the steps below, referring to the details of each in their respective sections.

Phase 1: Configure a master e-Exam USB stick.

- 1) Boot the computer to the Admin tool USB and open the Admin tool.
- 2) Back-up the contents of the USB stick 'eexam' drive to the User drive (e.g. to keep/reuse the config file). To do so use the file manager to navigate to the eexam drive of the USB stick. View hidden files (CTRL+H), then copy the contents of the eexam drive to a folder on the Users drive. See also "Managing files".
- 3) Clean the e-Exam USB of any pre-existing data. See 'Resetting e-Exam USBs (deleting data)', selecting the option to delete '*All exam data*'.
- 4) Create new or edit an existing config file. See 'Configuring the e-Exam system'.
- 5) Collate the exam document, materials and background image into a single folder on the Users drive of the Admin USB. See 'Preparing exam materials'.
- 6) Deploy the exam file, materials, config file, background image to the USB. See 'Deploying exam materials to e-Exam USBs' and 'Deploy local config to e-Exam USBs'.
- 7) If you have yet to test the exam document and your configuration within the e-Exam system, it is recommended that you test boot the newly set-up e-exam USB.

Phase 2: Create master disk image.

- 8) When you are satisfied that the exam is working properly, clean the USB of any junk files from the test booting process. To clean the e-Exam USB of any pre-existing student data, see 'Resetting e-Exam USBs (deleting data)', selecting the option to delete '*All student data*' (Note: do not use "All exam data" or you will remove the exam files you previously placed!).
- 9) Create a disk image of your master e-Exam USB. See 'Create disk image from USB'. Be sure to save a copy of the disk image to your computer hard drive or the Users drive.

Setting up a batch of blank USBs for e-Exam

This process is used to turn a batch of blank USB sticks into e-Exam USB sticks that will contain your locally configured e-Exam student client system.

Note: the process could take a considerable length of time because you are burning a large volume of data to multiple USBs at once.

The process is made up of a series of steps. The steps below assume you have:

- a) A set of blank USB sticks (i.e. bought from the shop) that you want to turn into working e-Exam USB sticks. Note, if the USBs have exiting data on them, the data will be lost.
- b) A master e-Exam disk image configured with your first set of desired exam content (see 'setting up a master e-Exam USB').

Follow the steps below, referring to the details of each in their respective sections.

- 1) Boot the computer to the Admin tool USB and open the Admin tool.
- 2) Select 'Duplicate USB drives'. Follow the steps. Be sure to select your e-exam master disk image. Ensure the number of attached USB sticks matches the number you enter.
- 3) When complete use 'Safely eject USB drives'.

Recycling e-Exam USBs between exams (retrieve responses and set-up new)

This process is for recycling existing e-Exam USBs that have previously been used for an exam. Note the process does not require you to burn a new disk image to the USBs so should be relatively short in duration.

The process is made up of a series of steps. The steps below assume you have:

- a) A set of working e-Exam USB sticks, potentially containing student exam responses.
- b) A set of new exam files (e.g. document, materials, background image file – see 'Preparing exam materials').



Follow the steps below, referring to the details of each in their respective sections.

- 1) Boot the computer to the Admin tool USB and open the Admin tool.
- 2) If the USBs contain student responses then use 'Retrieve exam responses from USBs'.
- 3) If applicable - You should back-up the contents of the USB stick 'eexam' drive to the User drive (e.g. to keep/reuse the config file). To do so use the file manager to navigate to the eexam drive of the USB stick. View hidden files (CTRL+H), then copy the contents of the eexam drive to a folder on the Users drive. See "Managing files".
- 4) Clean the e-Exam USB of any pre-existing data. See 'Resetting e-Exam USBs (deleting data)', selecting the option to delete '*All exam data*'.
- 5) If required, 'Configure e-Exam system' or you can reuse an existing config file.
- 6) If required, prepare new exam files (see 'Preparing exam materials').
- 7) Deploy the exam files to the USB. See 'Deploying exam materials to e-Exam USBs' and 'Deploy local config to e-Exam USBs'.
- 8) When complete use 'Safely eject USB drives'.

Ancillary Processes

Returning e-Exam USB sticks to standard format (re-initialise)

This section explains how to return an e-Exam USB (containing four 'drives') or Admin USB (containing two drives) back to a regular file storage USB stick.

Warning: be very careful with disk partition tools because there is a risk of complete data loss on your computer or other storage devices if you select the wrong drive/device!

Currently this process (re-partitioning) can't be done from within the e-Exam Administrator tool itself but it can be done individually within Ubuntu when using the Live USB version of the Admin tool, or using OSX/MacOS or Windows tools.

Using Linux (Live Admin USB stick):

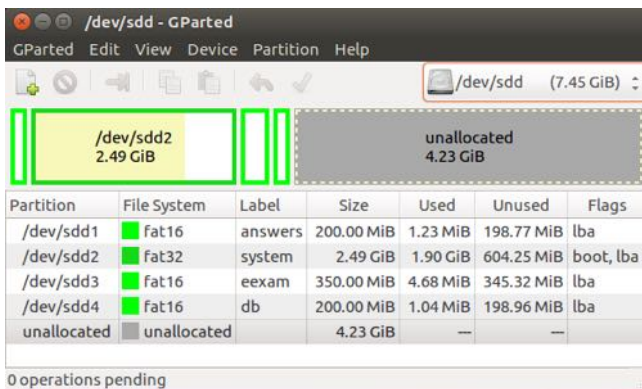
Click the 'Dash' home button (the swirly icon on the top of the left side bar).

In the search field type "Gparted" (without the quotes). Press Enter.



The Gparted software will open.

Select the USB from the drop down list on the far right of the Gparted window. *Be very careful that you select the correct device.* After selecting the device the display below will change. See the example below. An e-Exam USB will have four partitions (green) and some unallocated space (grey).



Note: the dev/sdx may be different and the sizes/data on each drive may also be different depending on which version of e-Exam you are using.

When you are sure you have the correct device:

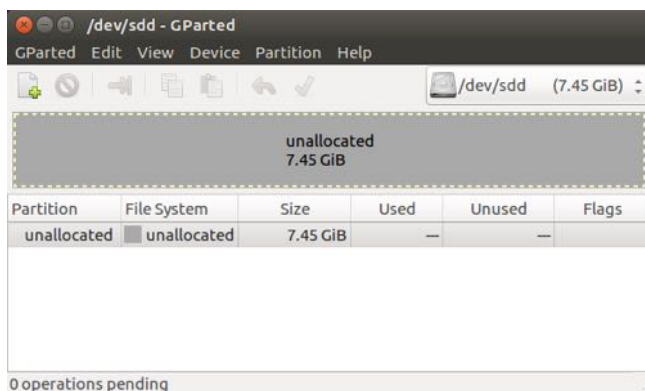
Use 'Device' menu and select 'Create partition table'.

The system will warn you that it will destroy all data. Ensure 'msdos' is selected as the partition table type. Click 'Apply' to commit the changes.



All data is now gone, replaced with empty space!

The display will change to show a single grey block of unallocated space.



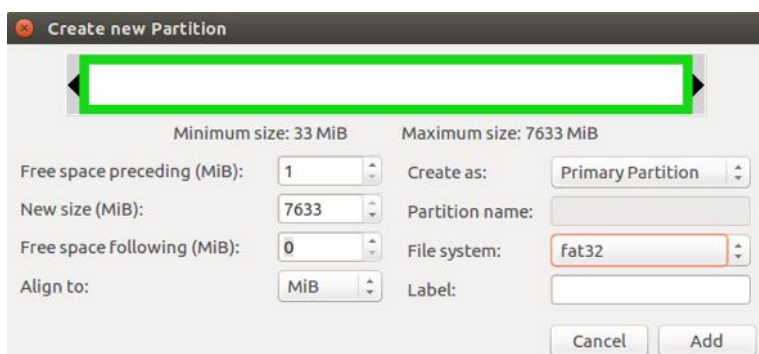
Next create a FAT32 partition (returning the USB to standard format).

Use the 'Partition' menu and select 'New'.

The 'Create new Partition' dialog will appear.

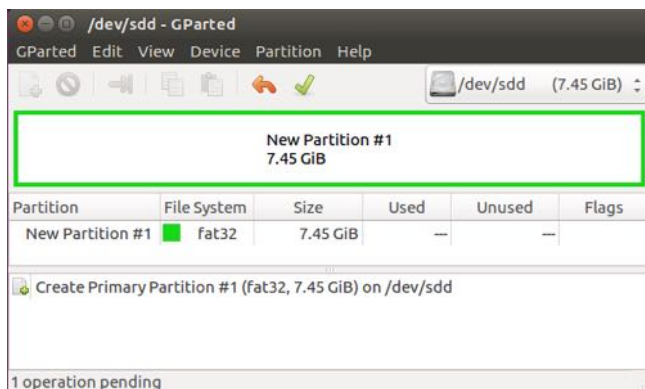
Be sure to select 'fat32' for the File system setting.

All other settings can remain at their defaults.



Click 'Add'.

The display will update to reflect the planned changes (these are not yet written to the drive).



You now need to commit the changes to the drive by clicking the green 'tick' (upper centre).

Then click 'Apply' on the warning dialog to write the changes to the drive.

Gparted will then apply the changes to the drive, showing progress. It should take less than a minute.

When done the display will update showing the finished, now standard, USB drive layout.

You may now exit Gparted and eject/remove the USB stick.

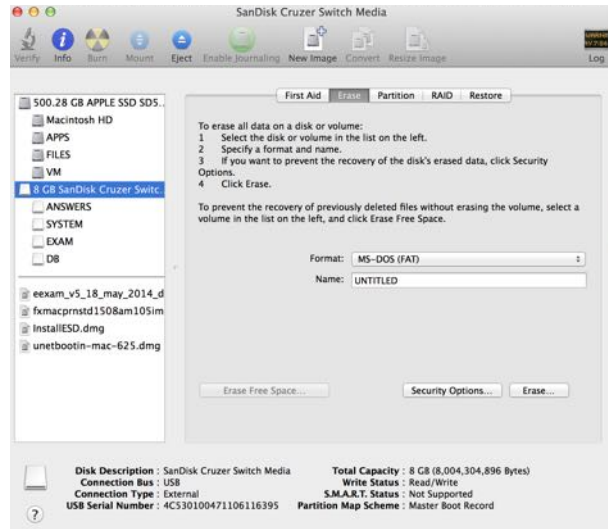
You can now use the USB as a regular storage device.

Refer to the Gparted website for further information. <http://gparted.org/>

Using Apple:

Follow the instructions below to use Disk Utility to re-format a USB device back to a single MS-DOS (FAT) partition. Note different versions of Disk Utility will present a different screen, but the functionality is essentially the same. You need to do each USB stick one by one.

1. Open disk utility.
2. Click on the device name (not one of the drives).
3. Click 'erase' on the tab.
4. Ensure Format says 'MS-DOS (FAT)'
5. Click 'Erase...' button (lower right corner).
6. The USB will be erased.
7. You can now use the USB as a regular storage device.



Using Windows

See this SuperUser article for some options <http://superuser.com/questions/382242/how-do-i-fix-my-usb-drive-to-get-its-original-8gb-size-back>

Alternatives to e-Exam Administrator tool

If for some reason the GUI Admin tools are not working for you there are some manual and command line options.

A combination of Windows and Apple OSX/MacOS can be used to image and burn e-Exam USBs. Refer to the document 'Alternative Admin Guide' available from transformingexams.com

Etcher

This is a simple cross platform tool that will burn a disk image file to a single USB. Versions are available for Windows, Apple and Linux. The download is approximately 100MB in size. Obtain Etcher from <https://www.balena.io/etcher/>

Windows (disk image operations only)

A small software application is available for Windows. Note that these tools CANNOT be used to:

- copy/delete individual files or groups of files – these only handles full disk images.

ImageUSB software version 1.3 or above for Windows 10 version 1703 or above. This tool can be used for:

- a) Creating e-Exam USBs (burning a disk image to one or more blank USB sticks)
- b) Creating a disk image from a USB.

This free tool from OS Forensics has been found to be highly reliable for this task. The download is approximately 1.4MB in size. Obtain it from: <http://www.osforensics.com/tools/write-usb-images.html>

Linux and Apple OSX/MacOS

1) **A set of command line scripts** for Linux or OSX/MacOS is available from e-Exam HQ that will perform batch data retrieval, deployment and deletion operations on multiple e-Exam USB sticks.

Note: the 'copy-from' Python script currently does not work with e-Exam v6. A replacement bash script is available.

Please contact e-Exam HQ to obtain these scripts.

2) **Apple Disk Utility** is *no longer recommended for use in creating disk images*. Older OSX versions (e.g. Mountain Lion OSX 10.8) could be used to image an e-Exam USB. However newer versions from Mavericks OSX 10.9 onwards result in disk images that can only be booted via EFI thus some laptops that require BIOS/legacy boot method will be excluded from use.

An alternative is to use Etcher (mentioned above) or command line using 'dd' to create the disk image. See the 'Alternative Admin guide' available from transformingexams.com for details.

Known Issues and Troubleshooting

The following section lists known issues and some common problems we have observed.

Known issues will be fixed in due course. If you encounter an issue not listed below please report it to e-Exam HQ: See 'Reporting Issues'.

Trouble shooting advice and where applicable, workarounds are provided.

General Advice

Always use 'safe eject' methods to remove e-Exam USBs from the operating system. Each of Windows, Apple OSX/MacOS and Linux all have safe ejection tools or steps.

- Failure to do so may result in corrupted master e-Exam USBs (that then spreads the problem if used to duplicate other USBs) or corrupted individual e-Exam USBs that result in failures in part or fully during an exam.

Follow the guidelines for preparing exam question documents. The section covers advice on how to prepare exam question documents and collections of files for the e-exam system.

- Failure to follow guidelines is likely to result in problematic usability, disrupted formatting, missing details etc when the document is used in the e-Exam system.

Configuration files cannot be created or edited using Admin tool (Dec 2018)

As of e-Exam client version 6.6 (approx. December 2018) the configuration file format has changed. As a result the 'Configure e-Exam System' function in the Admin tool is not compatible with new format configuration files. We aim to update the Admin tool in due course. We apologise for the inconvenience.

The current work-around is to edit newer version of the configuration files using a plain text editor (e.g. Notepad or Text Edit). See the section 'Configuration file format' for more information on how to do so.

See Appendix 1 for details of configuration file settings.

Note that all other admin tool functions including bulk copy and retrieval of data are still operational.

Windows 10 Old versions

Windows 10, Version 1703 (Creators Update, issued October 2017) onwards can create and properly mount multi-partition removable devices/USB sticks.

Older versions of Windows prior to this can only mount the 'Answers' partition of e-Exam USBs. The other partitions cannot be seen preventing a range of Admin tasks from being done.

Note: Apple OSX/MacOS and Linux have always been able to mount multi-partition removable devices/USB sticks.

e-Exam Admin system

General:

- *The admin tool currently does not perform hash check for every operation.* It is best to manually check the outcomes of each operation to ensure it happened correctly. Adding hash check for everything is on the 'to do' list.
- *Check the MD5 hash of disk images you download to ensure the file was not corrupted.* Using a corrupted disk image may result in errors during system operation (if it boots at all). See 'Checking downloaded files for integrity (MD5 Hash check)'.
- *"Gtk-CRITICAL" errors in the Terminal.* These can be safely ignored. These messages relate to the package that runs the graphical user interface for file and folder selection and how it outputs status messages to terminal windows.
- *Some USBs did not mount correctly when plugged in.* It is recommended to plug USBs in one by one and observe that an icon is added to the side bar. However sometimes a USB doesn't mount properly. Go file manager and click the USB for the improperly mounted item. This

should mount the drive. If the incidence of improperly mounted USBs increases try restarting the computer to clean up the USB allocation (we have observed that a lot of plugging and unplugging batches of multiple USBs during a session can cause issues).

New/Editing config file:

- *Incompatible configuration files* - Note as of e-Exam client version 6.6 (December 2018) the Admin tool is not able to create/edit new version configuration files. It is on the 'to do' list to update the tool. Configuration files can still be manually edited using a text editor.
- *If you exit the Configuration Wizard editing window using the red 'X' on the title bar* and have unsaved changes, then the notice to 'save unsaved changes' may appear behind the window. This issue doesn't occur when using the 'Exit' button.

Make Disk Image:

- *Currently the user cannot specify the name of the disk image file prior to its creation.* The Admin tool will name the created disk image file "eexam_disk.img" by default. Future enhancement will allow the file to be named by the user. The current work-around is to create separate folders for each disk image or to rename the file after it is created.
- *Invalid images and e-Exam USBs.*
 - A computer with insufficient RAM or insufficient storage space will cause disk imaging to fail in a way that will result in incomplete disk images. If such images are used they will produce invalid/broken e-Exam USBs. Please be sure to check the minimum system requirements. A possible work-around for low RAM 'borderline' cases is to direct the disk image to be created on physical storage (e.g. the User drive or computer hard drive).
 - Check the MD5 hash of disk images you download to ensure the file was not corrupted. Using a corrupted disk image may result in errors during system operation (if it boots at all). See 'Checking downloaded files for integrity (MD5 Hash check)'.
 - If an improperly removed USB was used to create a disk image, this may result in errors finding their way into the subsequent disk image.

Duplicate:

- *It has been found that a small minority of laptops do not allow disk images to be burnt to USBs.* The Admin tool process will appear to proceed and finish as normal without errors. However when remounting or booting the USB it will be found to be untouched. Be sure to confirm that USBs are indeed created successfully by checking the contents of exam and answers drives and test booting the newly created USB. A work around is to try burning to another USB port or to use another computer.
- *Ubuntu displays a message "System program problem detected. Do you want to report the problem now?"* Just press cancel. This can occur when the operating system 'sees' the newly created USB partitions in a way it did not expect.
- *Duplication process ended almost instantly.* This indicates a failed process. The burn of a single USB stick generally takes a couple of minutes. Possible causes of failure:
 - The number of USBs detected and the number typed into the request box was different.
 - It is best to insert USBs one by one, watching the left side bar to ensure each appears in turn. This will help ensure each USB is properly detected. If a USB is not detected, remove it and try again or see 'A bad USB in the batch'.
 - Note, typing in a lesser number may still work but you will not be able to reliably know which USB sticks were and were *not* written.
 - A bad USB stick in the batch. This may have occurred as a result of a previously failed duplication attempt or improper removal (i.e. not 'ejected' properly). Try:
 - Inserting USBs one by one, looking out for the USB(s) that does not appear on the left side bar.
 - If a USB is not detected, remove it and try again.
 - Try re-initialising the USB prior to trying the duplication process again – see 'returning USBs to standard format'. Note: a bulk 'USB factory reset' feature will be developed in due course.
- See also 'Invalid images and e-Exam USBs' above.

Managing files:

- *Access to the computer hard drive may not be possible where:*
 - a) Using some newer Apple hardware.
 - b) If the hard drive has been encrypted.
 - c) The Hard drive has Windows 8 or 10 installed. Windows 8/10 users will need to perform SHIFT > Shutdown to ensure the system is fully shut down prior to booting the machine with an e-Exam Admin tool USB. By default Win 8/10 uses 'hybrid shutdown' that sends the core OS to 'sleep' even though Shutdown is selected – this can prevent other operating systems from accessing the drive.

e-Exam Client system

General:

- 1 *Autosave is limited in scope.* The e-Exam system has autosave features but this functionality is specific to particular software applications. It is not a system-wide feature. The contexts that have autosave are:
 - a) Libre Office suite applications within the e-Exam system where documents are part of an 'offline' exam. Word processor documents and spreadsheets are covered when these are edited in Libre Office. Autosave has been set to 2 minutes by default. Autosave may not work in cases where downloaded files are being edited as part of an online exam.
 - b) Moodle quiz form content where this setting has been enabled in the Moodle server Administration settings AND where 'fault tolerant' mode has been enabled in the Quiz settings. Auto save is typically set to every 1 minute.

In all other contexts and using all other applications auto save may not be available. E.g Python IDLE, Scratch, Mathematics applications etc. Consult the documentation for individual applications to determine if autosave can be enabled.
- 2 *The local setting for 'Disable sound' feature does not work on some Apple Mac laptops.* However, the system alert sounds have been turned off by default. Therefore the issue should not impact most exams.
- 3 *Screen brightness adjustment via native Ubuntu settings my not work. Or the screen is too dark / dim.* This is likely due to hardware driver incompatibility.
 - a) Try Dash > 'Adjust Brightness' tool.
 - b) If this occurs on an Apple computer, try adjusting brightness up from within OSX/MacOS before rebooting to a USB.

If screen brightness cannot be adjusted satisfactorily then a different model computer will need to be used.
- 4 *Screen resolution adjustment via native Ubuntu settings my not work. Or High-definition / Retina screens show tiny text and icons.* This is likely due to hardware driver incompatibility. Try Dash > 'Adjust Display' tool. Try to choose a ratio close to the original. E.g. MacBook Pro uses 16:10.

If screen resolution cannot be adjusted satisfactorily then a different model computer will need to be used.
- 5 *Failure to open exam document upon press of 'Start Exam'.* Things to check/causes:
 - c) Be sure the exam file name begins with STUDENTNO_
 - d) Be sure the exam file name does NOT use spaces in file name.
 - e) Missing exam file or file not placed in the root of the eexam partition.
 - f) An invalid configuration file e.g. mistakenly set to a different mode to the one intended.
 - g) See also 'The Answers drive is read only'.
- 6 *The Answers drive is 'read only'.* This can occur when the e-Exam USB was not 'safely ejected' from Windows, Apple OSX/MacOS or Linux resulting in a 'dirty partition'. Care must be taken to safely eject USB sticks. Administrators need to boot test e-Exam USBs, especially when it is to be used as the source of a master disk image (because a dirty partition will be carried forward to any subsequently duplicated drives). Checking a random sample of duplicated USBs is also advised.
- 7 *Upon start up the desktop shows only the shutdown and the Dash (search) buttons on the side bar.* This is a deliberate side effect in the case of a 'broken' system. This could be due to:
 - a) An invalid or missing configuration file.
 - b) An invalid/corrupted burn of the disk image to a USB stick.

- 8 *Upon start up the desktop appears but shows no background image or the wrong or default background image.* This could be due to:
 - a) A wrong, missing or misplaced background wallpaper image. The file needs to be named .background.png (the dot at the beginning of the file name indicates this is a hidden file) and located in the root of the eexam partition.
 - b) An invalid or missing configuration file.
 - c) An invalid/corrupted burn of the disk image to a USB stick.
- 9 *System appears to start up normally (i.e. e-Exam logo appears etc) but then it results in black screen.* The most common cause is:
 - a) Incompatibility with the hardware on which the system running (e.g. graphics card drivers). If this is the case then another computer will need to be used.
- 10 *The touchpad is interfering with typing whilst using a USB mouse.* The solution is to disable the touchpad. This will prevent accidental touches whilst typing.
 - 1) Plug in a USB mouse and make sure it is working.
 - 2) Go to Dash home (top most button of the left side bar) and in the search box type 'mouse'.
 - 3) Select the 'mouse and touchpad' icon (or hit enter).
 - 4) The 'Mouse and touchpad' control panel window will appear.
 - 5) At 'Touchpad' section, turn the switch to 'OFF' (located on the right-side of the window).
- 11 *The touchpad is too sensitive / fast / slow.* Possible solutions include:
 - a. Adjust the touch pad settings
 - 1) Go to Dash home (top most button of the left side bar) and in the search box type 'mouse'.
 - 2) Select the 'mouse and touchpad' icon (or hit enter).
 - 3) The 'Mouse and touchpad' control panel window will appear.
 - 4) Make adjustments:
 - a) To the 'speed' of the device (bottom slider).
 - b) Un-tick 'tap to click'. This may help prevent accidental taps.
 - c) Un-tick or tick as required the 'natural scrolling' setting. This will reverse the two finger scrolling direction.
 - b. Use a wired USB mouse – this is recommended if during pre-exam practice you were not able to make the system work satisfactorily with your touchpad.
 - c. See also 'The touchpad is interfering with typing'.
- 12 *The WiFi is not connecting after multiple tries:*
 - a. Check the configuration settings for WiFi networks (refer to 'Configuring networks')
 - 1) If using EduRoam AND IF the @domain has been specified in the .config.txt file then the user name = username only. Otherwise the username = user@domain
 - b. It is possible that the WiFi hardware in the laptop is not compatible with the e-Exam OS. Please see 'report a problem' to let us know the details of your computer.
 - 2) You may try using a USB WiFi dongle (you will need an extra USB port or small hub) – we have found models with a Realtek chipset are normally compatible. We have tested and included drivers for this device: TL-WN725N <https://www.tp-link.com/us/home-networking/usb-adapter/tl-wn725n/>
These are typically available for about \$12 (2019) from computer parts retailers.
 - c. Try Dash > e-Exam WiFi manager to initiate the connection again.

Libre office writer:

- 1 *Fonts / text / non-roman text does not appear correctly* within the Libre office word processor. Any missing fonts will be 'substituted' with a closely matching font. However this can cause formatting disruption or for non-roman text such as Japanese, Chinese and Korean it may lead to the incorrect display of characters and punctuation. The workaround is to finalise the formatting of the document inside e-Exam system before it is used for duplication. Select only named fonts from the list provided in the e-Exam system. For non-roman languages, be sure to select a font specifically designed for that language.
- 2 *Microsoft fonts do not appear in the Font list* within the Libre office word processor. Check if this is disabled in the e-Exam system configuration (.config.txt). If these are disabled then such fonts will be 'substituted' with a closely matching font.

- 3 *Spelling is not working.* Check if this is disabled in the e-Exam system configuration (.config.txt). Two settings are relevant: [Languages] dictionaries and [Office] spelling.
- 4 *Mathematical symbols may not appear correctly* if inserted when using Microsoft Word. This is a limitation with using .doc format files in Libre office. The work around is to save the file as .odt (open document format) in Libre office and to re-edit symbols. Use the .odt version on the eexam partition. This may also work if using .docx format files (untested – and see the following point).
- 5 *After opening a '.docx' file, the formatting of some elements such as embedded or complex tables is messed up.* This problem stems from the differences in Microsoft Word and Libre Office handling of docx files. The workaround is to 'Save As' whilst in Microsoft Word using the .doc format. Then use the .doc file in the e-Exam system/Libre office. Alternatively use .odt files when creating exam question documents directly in Libre Office.
- 6 *Lost the ability to select text* (after some indeterminate period of typing the cursor suddenly loses the ability to select text). This is a known and random bug. It seems to occur more often when swapping repeatedly between language input methods. The work-around is to save the document, close the document and re-open the document (e.g. by going to the 'A' button on the left side bar and double clicking the document file).

Languages other than English:

1. *I can't type the desired language correctly.* Be sure to select a suitable input method from the Language menu. Some languages have multiple input methods available (e.g. for Chinese) or may have multiple options to cater for the specific keyboard you have on your computer (e.g. US or European keyboards where an accented language such as French is to be typed). Some input methods also require additional configuration. Non-roman scripts require the use of specific fonts in order to be displayed correctly on the screen.
2. *Arabic: input does not work correctly.* Be sure to select a suitable Arabic keyboard from the Language menu, select right to left in Libre office and choose a suitable Arabic font before typing.
3. *The wrong character appears when I type a back tick ` on my Apple laptop.* Some Apple laptops map the back tick key incorrectly. We have applied a fix to catch such instances on models where we know this to be a problem, however there may be laptop models where the problem persists for which we are not aware – please get in touch with us and tell us the 'serial number' printed on the underside of the laptop case. We may request further information to help us fix the problem. In the meantime a different laptop model will need to be used. Also, please check 'I can't type the desired language correctly'.
4. *Spelling is not working for my language in Libre Office.* Be sure to select the correct language within Libre Office for the text you want to type. E.g Select the text then apply the correct language to the selection in order for the correct dictionary to be applied.
5. *Non-roman text (Chinese, Japanese) characters or punctuation is displayed incorrectly.* Be sure to select a font specifically designed for that language.
6. *Chinese: A character can't be found when using the input method.* Try typing a longer phrase containing the character and then edit resulting text.
7. *Chinese: Intelligent PinYin - The 'more' character arrow buttons don't work.* This seems to randomly impact Intelligent Pinyin input method. Try moving the input window and try the button again.
8. *French: I can't type accents in the same way as on my normal computer.* Select the input language menu option to match the keyboard on the computer being used (US or European, QWERTY or AZERTY). The options are:
 - English (US international with Dead Keys) = US QWERTY keyboard on 'windows' laptops (Identical short cut keys to the US International keyboard in Windows).
 - English (Macintosh) = US QWERTY keyboard on Apple laptops (Identical short cut keys to the standard US/Australian keyboard in Apple OSX/MacOS).
 - French = EU AZERTY keyboard on 'windows' laptops.
 - French (Macintosh) = EU AZERTY keyboard on Apple laptops.

Note: The accent short-cut method used in MS Office on windows (only) is not available in e-Exam due to the very limited scope of this method.

Reporting a problem

If you encounter an issue not listed above please report it to e-Exam HQ.

Send an email CCed to both:

m.hillier[AT]unsw.edu.au AND m.coleman[AT]unsw.edu.au

Note! -> replace [at] with @

In the email please provide as much information as possible to help us diagnose the problem. For example:

A) Details of the computer / equipment on which you are experiencing the issue (or used to create the USB stick):

1. Operating system you are running: e.g. Apple OSX/MacOS 10.x, Microsoft Windows 10, 8, 8.1, 7, Vista, XP or Linux distribution/version.
2. Make/Brand of the laptop: e.g. Apple, Acer, ASUS, Dell, HP, Lenovo, Toshiba, Sony, etc.
3. Model designation:
 - **For 'Windows' laptops:** examples are: E6230, EeePc Sea Shell Series, Satellite P70-A07T, G750, Pavilion 15-N045TX, VAIO E Series SVE14A27CGH, Flex 14 i3-4010U. This is often printed near the keyboard or around the edge of the screen. This might also be on the bottom of the machine. A recent trend has been to hide this information inside the battery compartment.
 - Note: do not confuse this with the serial for Microsoft windows. We don't need the Windows serial/key.
 - **For Apple laptops:** Look for the 'Serial' printed on the bottom. These look similar to this: C02K30T6DKQ4.
 - Note: do not provide the 'Model No' (e.g. A1398) because a given model number may have several iterations containing different hardware.
4. If for Admin tool: the USB hub(s) used (if applicable) such as Make/model of the Hub. The type/brand/model of USB sticks used and the number of USB sticks attached. A photo of the admin station set-up will help too.

B) A description of the problem that includes:

1. All the steps you took /and settings you used/changed.
2. What happened (or didn't happen).
3. Any error messages that appeared on the screen (take photos if possible).
 - If for Admin tool: please take photos of the Terminal output. Also note the number of bytes written for disk image creation or disk duplication (See the relevant section of this guide).
4. If possible take photos or if the issue is repeatable – take a clear video of the screen showing the sequence of events leading up to and including the error. Send us the video!

C) Attach log files.

- For e-Exam client USBs: The log files are located in the 'answers' drive in a series of one or more folders (depending on the number of times it was booted).
To create the zip of the e-Exam client USB log files:
 1. Enable 'View hidden files' (see managing files).
 2. Select all files/folders.
 3. Create the ZIP file.
- For Admin tool USB: there is a single "status.log" file on the 'User' drive.

D) If for e-Exam client USBs: a copy of the local '.config.txt' file from the eExam drive.

In addition:

Please keep any problematic e-Exam USBs or Admin tool USBs aside – do not recycle or overwrite these USBs. We may need to request the USB be sent to us or we may ask you to create a disk image of the USB for upload to us for further diagnosis.

Thank you for your assistance.

Appendix 1: Configuration Settings

The supplied base e-Exam student/client system image contains a number of settings. The configuration file is .config.txt and located on the 'eexam' drive of an e-Exam USB.

There are two types of settings:

- a. Base system settings. Some specific 'states' of base settings can only be changed at the time of building the base system image. These are denoted by 'locally changeable = no'.
- b. Local configuration settings. These can be changed on a per-exam basis. Changes are implemented via a local .config.txt file located in the 'eExam' partition. These are denoted by 'locally changeable = Yes'.

The scope of base and local settings are outlined in table 1.

Note: As of version 6.6 (December 2018) the structure of the configuration file was changed. The version as at 6.8.1 is shown in table 1.

Configuration files are plain text files. Configuration files can be edited using a 'text only' editor such as notepad (Windows) or TextEdit (OSX/MacOS) Warning: Do not edit using a word processor because this will insert unwanted formatting characters that will break the file.

Configuration files must be named .config.txt and placed onto the eexam drive of an e-Exam USB. Configuration files can be deployed to USBs by:

- a) manually placing the file onto the eexam partition of an e-Exam USB and ensuring it is named ".config.txt" (without quotes) or
- b) using the Admin tool in which case just select the file. The Admin tool will rename the file if necessary when it copies it to the USBs.

Table 1: Configuration settings

Config Setting	Base setting	Locally changeable?	Notes
[Build]			
VERSION=	6.8.1	No	Note changes to these settings in local config are ignored. However these are useful for problem diagnosis so please do not change.
NAME=	EasyRead	No	As above.
ISO= ubuntu-16.04-desktop-amd64.iso	File.iso	No	As above.
URL= http://mirror.aarnet.edu.au/pub/ubuntu/releases/16.04/ubuntu-16.04-desktop-amd64.iso	URL	No	As above.
override=n	Y=Tickd/on N=Unticked/off	No	As above. Debug development setting.
[System]			
IPTABLES=/sbin/iptables	Path	No	
LOC_EXAM=/mnt/eexam	Path	No	
LOC_ANSWERS=/mnt/answers	Path	No	
LOC_DB=/mnt/db	Path	No	
BM_LOG=/mnt/answers/logs/bm.log	Path/file	No	
BUILD_NO= BUILDDATE	variable	No	
LIVE_CFG=/tmp/.live.cfg	/path/file	No	
hardware_test=n	Y=Tickd/on N=Unticked/off	No	Currently not used.

Config Setting	Base setting	Locally changeable?	Notes
hardware_collect=n	Y=Ticked/on N=Unticked/off	Yes Yes	Experimental. Enables user hardware test wizard.
show_survey=n	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Local setting.</i> Experimental <i>Placeholder – work in progress – not yet active.</i> Presents a web based form to collect user feedback via localhost web server.
mode=locked	full locked	No No	Base setting only. Determines if specified settings under [network] 'security', 'whitelist', 'proxy' and [cleanup] enabled are locally changeable in .config.txt. If 'full' then allows changes to the specified settings in local .config.txt. <i>Note: this presents a security risk.</i> If 'locked' (anything other than 'full') then network settings set at system build time prevail and local changes are ignored. Recommend 'locked' be used for production/real exams.
[Default]			
enable_bluetooth=n	Y=Ticked/on N=Unticked/off	Yes (can be disabled) No	Local one-way override possible only when enabled in base. Warning! Bluetooth represents a security risk – recommend setting is No / disabled.
microsoft_fonts=y	Y=Ticked/on N=Unticked/off	No No	Base build time only. Note: Potentially subject to copyright restrictions.
keyboard=us_104	us_104	Yes	Local only. Sets default keyboard map. E.g us_104 = US 104 international keyboard. A valid list of keyboard layouts can be found via Ubuntu command line: \$man -P cat Xkeyboard -config Or via GUI. Select the desired keyboard then use terminal to find the current keyboard setting: \$Setxkbmap -query Then find the model.
timezone=	Australia/NSW	Yes	Use single value in the form of 'Area/Location' from the list of 'tz database' time zone labels. See https://en.wikipedia.org/wiki/List_of_tz_database_time_zones http://www.timezoneconverter.com/cgi-bin/tzc.tzc This value is used to adjust system time at boot. If blank, then default to time zone zero (Universal coordinated time/ Greenwich mean time). Note: This assumes the BIOS time is set to GMT / universal standard time. Note: If networking is enabled and timeserver (ntp.ubuntu.com) is whitelisted or otherwise accessible then system time will be correctly adjusted to local time when the time server is contacted (normally within seconds of successful network connection). This in turn may result in BIOS time being updated. As such the time displayed within Windows may be wrong until updated manually or automatically. See also [network] 'whitelist'.
[Languages]			

Config Setting	Base setting	Locally changeable?	Notes
system=	English	?	<i>Not implemented yet.</i> Sets system interface default language. English only at this time. Unofficial setting. If blank, Default EN.
lote_select=	Y=Ticked/on N=Unticked/off	Yes Yes	Enables the LOTE language selector dialog at start-up and adds language input menu (top right corner).
multi_select=	Y=Ticked/on N=Unticked/off	Yes? Yes?	<i>Not implemented yet.</i> Enables the selection of multiple languages in the LOTE language selector dialog.
dictionary=y	Y=Ticked/on N=Unticked/off	Yes (can be disabled) No	Local one-way override possible only when enabled in base. No = Remove dictionary files. This disables spell check.
list=	Arabic Bangla Chinese Chinese-Pinyin Dari Indonesian French German Greek Hindi Italian Japanese Korean Nepali Portuguese Punjabi Russian Spanish Urdu Vietnamese	Yes	Sets the list of languages to appear in the LOTE selector dialog. Must be on one line in the config file. Each must be separated by single space. Each must be a single word only (do not use multi word names). Each must have a matching language module installed (either at base build time or at boot time via the apps folder on eexam partition).
[Security]			
regen_sec=y	Y=Ticked/on N=Unticked/off	No No	Re-generate low level security keys. Base build time only. This is a security risk - Disable by default.
virtual_terminal=n	Y=Ticked/on N=Unticked/off	No No	Enable Virtual Terminal Switching. CTRL+ALT+F1 Base build time only. This is a security risk - Disable by default.
terminal=n	Y=Ticked/on N=Unticked/off	No No	If 'no' then deletes terminal applications. Base build time only. This is a security risk - Disable by default.
virtual_machines=n	Y=Ticked/on N=Unticked/off	No No	Enable boot within a virtual machine. Base build time only. This is a security risk - Disable by default.
remote_desktop=n	Y=Ticked/on N=Unticked/off	No No	If 'no' then deletes Remote desktop support (Remina, RDP, VNC, Vno WinPR). Base build time only. This is a security risk - Disable by default.
hide_hardware_specs=y	Y=Ticked/on N=Unticked/off	No No	Hides the hardware spec files (as a .dot file). Default is 'Y' (hidden). Note: only if it is desirable that users can easily find the file then set this to 'N'. Base build time only.
super_debug=y	Y=Ticked/on N=Unticked/off	No No	All system generated log files will be placed into answers/logs e.g. var/log. Sys log. Base build time only.
[Monitor]			<i>Experimental feature.</i> User monitoring and logging features. Warnings! a) Inappropriate settings can lead to system failure! b) User monitoring data currently requires manual retrieval using the Admin tool. c) Therefore monitoring data will be lost if full auto cleanup for 'seb' exam type is used (a keep logs option is available). Note: these are local settings only! We plan to convert these to base system settings in due course.

Config Setting	Base setting	Locally changeable?	Notes
enable=n	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Experimental feature.</i> Enable user monitoring function. Individual monitoring functions also need to be enabled. Disabled by default due to large amount of data produced.
capture_screen=y	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Experimental feature.</i> Enable screen capture (screen shot/image) as jpg files. Depends on 'enable'. Requires capture_quality and capture_interval All attached screens are captured. Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.
capture_webcam=y	Y=Ticked/on N=Unticked/off	Yes Yes	Enable webcam capture as jpg files (Webcam capture doesn't work on Apple). Capture quality for webcam is set to 85 by default. Depends on 'enable'. Requires capture_quality and capture_interval
capture_quality=10	Whole integer 0 to 100	Yes	Sets capture image quality (capture_screen only). Sets jpg compression quality. Lower numbers for lower quality and smaller file size. Using 10 is probably optimal. Validity check: Numbers below zero result in zero being applied. Values greater than 100 result in 100 being applied. Invalid (non number) values result in 10 quality being applied. Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.
capture_interval=5	Whole integer 1 to 59	Yes	Sets capture interval in minutes. Lower numbers produce more frequent captures (more files). If less then 1, defaults to 1. If greater then 59 then default to 59. If empty or invalid then default to 10. Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.
video_recorder=y	Y=Ticked/on N=Unticked/off	Yes Yes	Record a screen video as avi file. Recording starts when desktop is displayed. Video captures the primary screen only. Secondary screens are not recorded. The video will take on the resolution of the screen. Larger resolution screens produce larger size video files. Note: changes in screen resolution will result in the recording stopping and restarting in a new file. Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.

Config Setting	Base setting	Locally changeable?	Notes
video_length=14400	Whole integer 1 or greater.	Yes	<p>Maximum video length in seconds. Lower numbers for short duration of recording. Larger numbers will produce longer videos and thus larger files.</p> <p>Be sure the duration matches the expected exam duration including any 'extra time' permitted. The recording will stop if the system is shutdown. Files will still be readable.</p> <p>If less than 1, defaults to 1. No upper limit.</p> <p>If empty or invalid then default to 14400. Invalid input causes log entry in answers/logs/bm.log</p> <p>Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.</p>
video_fps=1	Whole integer 1 to 10	Yes	<p>Video frames per second. Valid values 1 to 10. Larger numbers will produce larger files. 1 FPS is about optimal. Setting this to 2 is also possible but unlikely adds much value.</p> <p>Less than 1 defaults to 1. Greater than 10 defaults to 10. Invalid input defaults to 1 fps with log entry in answers/logs/bm.log</p> <p>Warning! Inappropriate settings can lead to system failure. Please read advice on appropriate monitoring configuration.</p>
session_audit=y	Y=Ticked/on N=Unticked/off	Yes Yes	<p><i>Work in progress.</i> Logs user keystrokes and cursor movements/clicks to a text file. Requires "cnee" macro recorder/player to interpret the file. The file is not very 'human readable'.</p> <p>See https://linux.die.net/man/1/cnee</p> <p>Note the file produced is relatively small thus does not present a risk to filling the drive/system failure.</p>
firewall=y	Y=Ticked/on N=Unticked/off	Yes Yes	<p><i>Experimental feature.</i></p> <p>Enable logging of IP request for type each packet going in or out of the system. The log entries are placed into the syslog file at answers/logs/var/log/syslog</p> <p>Note: this only uses IPs not full URLs. Depends on [Network] "enable=y". I.e this will only work if network is enabled).</p> <p>Warning: this generates a large volume of log traffic but provides a comprehensive record of all network transactions using all protocols.</p>
network_dns=y	Y=Ticked/on N=Unticked/off	Yes Yes	<p><i>Experimental feature.</i></p> <p>Enable logging of domain name requests (DNS). The log file is at answers/logs/var/log/dnsmasq</p> <p>Note: this only logs domain names not full URLs. Depends on [Network] "enable=y". I.e this will only work if network is enabled).</p>
[Cleanup]			Clean up drives by deleting files.

Config Setting	Base setting	Locally changeable?	Notes
enable=y	Y=Ticked/on N=Unticked/off	Yes* Yes*	<p><i>Experimental setting – see warning! If system mode = 'full' then locally changeable. Otherwise clean up enable is burnt-in.</i></p> <p>Enables/disables cleanup functionality. This must be Y to enable other settings in this section.</p> <p>This feature essentially enables a cleanup script to be used but is only run if a trigger event occurs. See 'trigger' event settings later in this section. Alternative methods are possible to trigger the cleanup – contact e-Exam HQ for further information.</p> <p>Note: The clean-up script checks the 'keep_logs' setting. If 'keep_logs' is set to 'yes' then will keep the contents of any 'logs' folders when cleanup runs. (see warnings under 'keep_logs' setting). Otherwise when cleanup runs it deletes all contents of answers drive (i.e. *.*).</p> <p>Warning! Take great care in using this feature due to risk of data loss!</p>
keep_logs=y	Y=Ticked/on N=Unticked/off	Yes Yes	<p><i>Experimental setting – see warning! Local setting only. Keep files in any 'logs' folders on 'answers' drive when clean up functions are run. Note: this is used by 'enable=y'.</i></p> <p>Warnings: a) setting this function to 'n' will delete all user monitoring data. Currently there is no online submission of user monitoring data (this may be implemented in the future) therefore if this setting is 'n' with 'seb' exam type, user monitoring data will be lost before there is an opportunity retrieved it. b) if extensive user minoring such as screen recording is enabled then careful management/monitoring of USBs is required to ensure the answers partition does not become full because that can lead to system failure during use.</p>

Config Setting	Base setting	Locally changeable?	Notes
remote_trigger=	Y=Tickd/on N=Unticked/off	Yes Yes	<p><i>Experimental setting – see warning!</i></p> <p>This allows for a remote trigger from a network source such that a cleanup of answers partition is performed (see the 'enable' item above for details). For example: when a Moodle quiz is successfully submitted the display of the 'response summary' screen occurs. Given the response summary is only displayed if 'submit all and finish' was successfully processed by Moodle the clean up is only triggered once the student has successfully submitted quiz response data to the server.</p> <p>Note: This depends on 'enable=yes'.</p> <p>Note: The function requires a custom plugin or script to be present on the Moodle server (otherwise this setting has no effect).</p> <p>Warning! Take great care in using this feature due to risk of data loss! If the SEB Moodle quiz mode exam involves the editing and submitting of third party software files then it is best to disable this feature. There is a risk of data loss in the event that the student submits the quiz but did not attach their files. Similarly – Disable this feature if it is intended that the files will be retrieved from USBs following the exam or quiz submission.</p>
user_prompt_trigger=	Ticked/on Unticked/off	Yes Yes	<p><i>Experimental setting – see warning!</i></p> <p>Presents a dialog to the user upon user pressing red shutdown button to 'Keep my data and shutdown' or 'Delete my data and shutdown'. The latter option triggers cleanup of the answers partition (see the 'enable' item above for details).</p> <p>Note: this depends on 'enable=yes'.</p> <p>Note: this is different to 'shutdown_trigger' in that the user has a choice in evoking the cleanup or shutting down without cleanup.</p> <p>Warning! Take great care in using this feature due to risk of data loss! This is intended for practice sessions only to reset a USB for the next user.</p>
shutdown_trigger=	Ticked/on Unticked/off	Yes Yes	<p>If Y, the trigger occurs after the user has confirmed they want to shutdown. This transparently calls a cleanup of the answers partition (see the 'enable' item above for details).</p> <p>Note: this depend on 'enable=yes'.</p> <p>Note: this is different to 'user_prompt_trigger' in that the user has no choice in evoking the cleanup (other than not using shut down).</p> <p>Warning! Take great care in using this feature due to risk of data loss!</p>
[Wine]			
enable=y	Ticked/on Unticked/off	No No	Installs WINE at base build time only.
[Java]			
enable=y	Ticked/on Unticked/off	No No	Installs Java at base build time only.
[SPINE]			
enable=y	Ticked/on Unticked/off	No No	Enables SPINE module instillation (programs) at base build time only.
[Displays]			

Config Setting	Base setting	Locally changeable?	Notes
adjust_hd_screens=y	Y=Tickd/on N=Unticked/off	Yes Yes	Attempts to reduce the resolution on high resolution screens (UHD or Retina screens set greater than 1100 pixels in height) by dividing width and height by 2. This is to avoid the issue of tiny menus/icons. Note: This function will not work on laptops where drivers do not provide a 50% smaller equivalent resolution. The user can also manually adjust the screen via Dash > Adjust Display.
brightness=80	Whole integer from 0 to 99.	Yes	Attempts to set the default screen brightness. Warning! This is a balance. Lower numbers can result in screens being disabled (black). Higher numbers can lead to excessive power use. Currently a setting of 80 appears to be optimal (Note this may change with a different mix of hardware and drivers in the e-Exam system base so ongoing monitoring of real world use is needed). However this setting may not work on some machines where brightness may be relative to previous settings e.g. some Apple laptops. A possible workaround: Apple users can manually increase screen brightness whilst running OSX/MacOS prior to rebooting to e-Exam OS. Where the screen is too dark, the user can try to manually adjust the screen via Dash > Adjust Brightness. <i>Warning: no input validation.</i>
[Sound]			
enable=y	Y=Tickd/on N=Unticked/off	Yes (can be disabled) No	Local one-way override possible only when enabled in base. Note: Disable ('N') doesn't work on some Apple hardware.
speakers=n	Y=Tickd/on N=Unticked/off	Yes Yes	Loud speakers. Recommend to set as disabled 'N'. Note headphones remain enabled. Local override. Depends on 'enable'.
[Network]			
enable=y	Y=Tickd/on N=Unticked/off	Yes (can be disabled) No	Enable or disable networking support. Local one-way override possible only when enabled in base. If disabled (N) at build time then networking components will not be installed. Note: network features and exam types 'seb', 'online' depend on this setting. Note: this presents a security risk when used, therefore other settings must be configured correctly. Disable this for non-networked exams.

Config Setting	Base setting	Locally changeable?	Notes
security=auth	open wpa auth ethernet	Yes (only if base system burnt as demo).	<p><i>This feature is a work in progress.</i></p> <p>Sets network security type for wifi or ethernet.</p> <p>Valid: a list of one or two space separated values (each value must be a single word). Network types are tried in sequence.</p> <p>Note: fall back only works for Ethernet then one wifi method.</p> <p>E.g. "ethernet auth" results in Ethernet being tried first, then Wifi using auth (i.e. Eduroam).</p> <p>E.g. "ethernet " results in only Ethernet being used.</p> <p>E.g. "auth" results in only Wifi using auth being used (i.e. Eduroam).</p> <p><i>Warning: other combinations such as putting wifi first or using two wifi methods will cause in unexpected results or failure.</i></p> <p>open = user is asked for SSID but not user or pass. SSID is case sensitive. Works for any open network. This is not encrypted.</p> <p>wpa = assumes WPA or WPA2. Asks user for SSID and passphrase. SSID is case sensitive.</p> <p>auth = connect to preconfigured network with username and password required. Note: Currently assumes Eduroam and is untested on other networks. Requires 'ssid=' to be a valid value (not blank). Will ask for username and password unless net_user.txt exists (and contains a valid username and hashed password in which case these are used. If values are invalid it will fail). This can be used to automatically log on to WiFi.</p> <p>ethernet = if set will try to obtain IP address from a DHCP server.</p> <p>Note: 'WEP' is not supported.</p> <p>Note: If system built/burnt as [System] "mode = full" then this network setting can be changed in local .confiog.txt.</p> <p>Otherwise only base built-in /burnt in settings are read.</p>
ssid=eduroam	SSIDname e.g. eduroam	Yes	<p><i>Local setting only.</i></p> <p>Wireless network SSID e.g. EduRoam</p> <p>This setting only applies when "security=auth".</p> <p>Note: If blank then this function will fail and it will not attempt to connect.</p> <p>The SSID value is case sensitive.</p> <p>Note: Only EduRoam has been tested. See advice under 'Configuring Networks' elsewhere in this guide.</p> <p>Note: Other networks may fail if different security protocols are used – please test before deployment!</p>
domain=	@domain	Yes	<p>Used to append @domain value to user name field. e.g. @monash.edu or @utas.edu.au</p> <p>This setting only applies when "security=auth" and is designed for use with EduRoam.</p> <p>If using Eduroam:</p> <ul style="list-style-type: none"> • If domain added then the user just needs to enter their username. • If left blank then user will need to enter the full user@domain format username. <p>If not using EduRoam: leave this field blank.</p> <p><i>Local setting only.</i></p>

Config Setting	Base setting	Locally changeable?	Notes
moodle_server=	URL dynamic	Yes	Used to specify starting server. Depends on exam 'type' set to 'SEB.' Options: URL = the format server.domain e.g. eexam.transformingexams.com Note: Protocol is optional e.g http:// , https://. If 'dynamic' then the user will be asked to enter an IP address (Note: if using a Moodle server on a Live USB stick then IP will be displayed. Give the IP to users. This only works if USB server is on the same local subnet at the clients). Note: the user entered IP is saved in user info file and will be pre-filled if a reboot of the client was required (unless a cleanup was triggered enabled – See 'cleanup' section for details).
moodle_path=	/path	Yes	Used to specify starting path of server for 'seb' exam type. e.g. /moodle/login/index.php Depends on exam 'type' set to 'SEB.' Must be in the format of /path e.g. "/moodle/login/index.php" Dependant on moodle_server.
whitelist=	domain, domain, domain	Yes	A comma separated list of domains to whitelist (create walled garden). If used must be in the format server.domain. e.g. eexam.transformingexams.com, www.austlii.edu.au. Items must be on the same line in the config file. If left blank then no limits placed on web access (i.e. fully open access). This applies to all exam types. Note the protocol is optional .e.g http://eexam.transformingexams.com and eexam.transformingexams.com will both work. Note: If ntp.ubuntu.com is placed in the whitelist then the system time will be updated if networking is enabled. See also [default] 'timezone' setting. Note: If system built/burnt as [System] "mode = full" then this network setting can be changed in local .config.txt. Otherwise only base built-in /burnt in settings are read.
blacklist=	URL, URL, URL	Yes	<i>Experimental. Untested.</i> A comma separated list of URLs to block. Note: Only applicable to proxy use. Depends on 'proxy=y'. <i>Warning!: must include protocol.</i> E.g http:// and https:// are different so both need to be listed to block a given URL. Intended use in combination with whitelist to allow domains but block certain sections on websites.
exam_url=	http://URL	Yes	Used to specify a starting url. Only used for 'online' exam type. Depends on exam 'type' set to 'online'. Unofficial setting. Requires network support. URL=http://someweb.com
web_browser=	firefox chromium- browser	Yes	Specifies default browser. Specify the browser executable name e.g. "firefox". Any browser that is installed can be used. If Chromium is installed, then this can be "chromium-browser".

Config Setting	Base setting	Locally changeable?	Notes
watchdog=n	Y=Ticked/on N=Unticked/off	No No	<i>Experimental.</i> Monitors WiFi network and attempts to bring it back up if disconnected. Warning: if using Ethernet – then set this to n. Warning: this function is untested. Base burnt in setting only.
firewall=n	Y=Ticked/on N=Unticked/off	No No	<i>Experimental.</i> If Y = Enables whitelist entries (only) to be translated into to IP address(s) that are placed into system IP tables at the time a successful network connection is made. (Note best used for traditionally hosted static IP servers such as Moodle. This feature may cause some cloud hosted LMS such as Canvas to become inaccessible if a large pool of dynamic IPs are needed and/or cloud based resources/caching services are involved). If N (or empty) = then whitelist/blacklist entries are evaluated based on domain names. This relies on the DNS being called. (Note a risk exists with direct request of an IP addressed resource). Note: If system built/burnt as [System] "mode = full" then this network setting can be changed in local .confiog.txt. Otherwise only base built-in /burnt in settings are read.
proxy=n	Y=Ticked/on N=Unticked/off	No No	<i>Experimental. Not in use.</i> Enables Tiny Proxy to either whitelist or blacklist URLs. This will log all requested URL to answers/logs. Warning: this does not work with HTTPS / SSL resources which are unfiltered. Note: If system built/burnt as [System] "mode = full" then this network setting can be changed in local .confiog.txt. Otherwise only base built-in /burnt in settings are read.
timeout=5	Integer greater than zero.	Yes	Time in seconds to wait for DHCP before it times out. Valid: Seconds. Integers greater than zero. Default 5. Intended for use with fall over to WiFi where "security = Ethernet auth". If using Ethernet only then set timeout to a higher value. If Ethernet only and timeout occurs then use Dash: 'e-exam network manager' to reconnect. <i>Warning: no input validation.</i>
[Office]			Settings that apply to Libre Office only. This applies to any compatible file opened in Libre Office.
spellcheck=y	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Local setting only.</i> Turns off automatic spelling if set to 'N' but manual spelling still present. Note to fully disable spelling then the use the setting 'dictionary=n' under [languages]. Only works with Libre office files.
fullsave=y	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Local setting only.</i> Enables full save (i.e. same as File>Save) each 2 minutes (same interval as crash recovery save setting in Libre office). Only works with Libre office files.
generate_pdf=y	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Local setting only.</i> Will generate a pdf when the document is closed. This works regardless of how the Libre office file was opened. Only works with Libre office files.

Config Setting	Base setting	Locally changeable?	Notes
protect=n	Y=Ticked/on N=Unticked/off	Yes Yes	<i>Local setting only. Experimental development use only.</i> Enables debugger mode that affords a level of extra protection and logging. Note: Not recommended for normal use.
[Exam]			
show_student_names=y	Y=Ticked/on N=Unticked/off	Yes Yes	Display or hide student names boxes on e-exam starter dialog.
type=	demo paper office moodle online local seb xapp none	Yes (see 'notes')	Defines the default exam type and sets up launcher with relevant buttons. Valid values are: Demo: all buttons shown (default). Paper and office: opens any Libre Office document (Libre office files, doc, xls, ppt, odt etc). Requires libre office SPINE module to be installed at base system build time. Note: demo ignores local config for background image and only uses built in background. Moodle: <i>Experimental</i> . on-board LMS (requires the Moodle server package to be installed at base system build time). Online: triggers web browser to open to defined URL (requires network enabled – no warning). Local: opens any file that has a default application assigned. (Warning! dependency warnings are not given so you must test for every file type desired). SEB: launch Safe Exam Browser to the defined server and path (requires SEB to be installed at base system build time). Xapp: start any application specified in user/local/SPINE/xapp.sh e.g. this was used to start a Virtualbox instance containing and Android Augmented Reality application. Note: An invalid value results in an empty launcher with only the shutdown button showing.
background_image=	.background.png	Yes	Specifies if desktop background wallpaper image is to be used from the “eexam” partition. Override by specifying the file = .background.png (this file must be present on the e-exam partition. An invalid file results in the built-in image being used). An empty value will result in the built-in image being used. Note: if type=demo then the local setting is ignored and built-in image is used.



Good luck :-)