Net-centric introduction to computing

Lab Tools

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1. Welcome

A key (perhaps *the* key) element of EECS 1012 is the lab component of the course. This component provides a concrete opportunity to practice the material presented in lecture and explore thinking computationally through interactions with the real world.

Labs in this course are intended to be experiential. Labs are expected to be completed in groups of two students. During the first lab you will have an opportunity to choose a lab partner. This partnership does not have to be permanent — you are free to change partners from one lab to the next — and it is possible to complete one or more labs on your own. There are deliverables associated with each lab and your instructor and tutor will let you know if these deliverables are expected to come from an individual or from your team. It is expected, and indeed encouraged, that you collaborate and cooperate with fellow students to complete each lab. Each supervised lab is run by a number of tutorial assistants (also known as TA's) who will help you with the lab and provide guidance, and who are also responsible for marking your labs. The lab itself is overseen by a technician who deals with the nuts and bolts of the lab. These people are there to help you do your lab. If you have problems with a piece of hardware or software, talk to the TA's or the Laboratory Technician. It is normal, and indeed expected, that you will need to ask for help at some point or another during the course. Similarly, if you see a fellow student stumbling over a problem you have already solved, lend a hand. You often learn concepts more fully if you have to explain them to someone else.

You have an assigned laboratory session. You must attend the session in which you are enrolled. There are only a fixed number of seats in the laboratory. It is not possible or practical to change your lab session even if you think that there might be space.

Labs take place in Rooms 106/108 the William Small Centre (building 15 in the image below). The Computing labs are located on the south end of the ground floor of the building. If you are entering from the north side of the building —

walking past Tim Hortons — you will have to pass through the general purpose computing lab before arriving at rooms 106 and 108.

The William Small Labs were specially built for teaching first year computing to Engineering and Computer Science students. The labs were constructed in 2014 and expanded in 2016. Expect to spend a lot of time there.

In addition to labs in William Small, unsupervised "drop in" labs are available in the Prism lab in the Lassonde Building (Building 19 on the map above). The Prism lab in the Lassonde building is open seven days a week. Specific hours for the drop in times in Lassonde are posted by the PRISM lab.

Each of the weekly labs has an associated set of exercises, and these exercises require you to maintain an electronic portfolio (record) of the work you have accomplished. This portfolio is maintained on the course Moodle site and is likely to refer to images and videos that you will create that are stored off of this site.

Every lab in this course has *three* activities associated with it:

A. This pre-lab activity must be completed *before* going to the lab session and involves studying the ePub of the lab. This means reading its content; watching its videos; and thinking it through. It is recommended that you do this in the week that precedes the lab so that you would have time to ask questions; discuss

the lab with fellow students; and research the underlying ideas. This activity culminates in an evaluation (a quiz that is performed on the course Moodle site). There are no marks associated with this evaluation, but you will not be allowed to attend the lab if you have not completed this evaluation prior to your lab session. Furthermore you will not receive grade credit for a lab if you have not completed the part A portion of the lab. **Read the last sentence again.**

B. This in-lab activity is completed *during* the lab session and involves specific tasks to be completed as indicated in the ePub of the lab. This activity has an assigned set of exercises that are evaluated by your TA. It is anticipated that you will complete these exercises during your lab, and have them marked by the TA in your lab session. If you need more time, you may have your lab reviewed by the TA at the start of your next lab. Lab assignments will not be considered for marking after the start of your next lab session.

C. This in-lab activity involves explorations that extend the basic lab. It culminates with an optional "Exercise C". See the specifics of each lab for details. This activity is not graded and does not contribute to your mark in the course, but it will certainly contribute to your understanding of the material.

The Lab Tools lab 'lab zero' is somewhat different than other labs in the course. The basic purpose of this 'lab' is to (i) introduce you to the lab environment, tools, and procedures, and (ii) ensure that you have completed the necessary background safety and academic honesty tutorials before your first in-lab experience. This ePub covers:

- The structure of the labs.
- Basic laboratory safety and procedures.
- Academic integrity and plagiarism.
- Tools used in the course (ePub, Dropbox, VBox, Wordpress).
- The software infrastructure used in the course.
- A suggested structure for the ePortfolio entries that you will generate later on during the course.

2. Background

Each lab's ePub begins with a background section. This provides some background as to the material that the lab covers and places the lab in a broader context. More practically, it provides some background on the material that must be completed prior to participating in the lab. You may find it useful to browse this section first, then have a look at the specific requirements for a given lab, and then go back and read in detail the background material that is most important for **you**. As mentioned above, this laboratory is different from later labs in that its primary purpose is to provide an introduction to the tools and technologies used in the later labs.

2.1 Safety

In any environment, safety is paramount. Throughout this course you will be exposed to technology that can cause injury to yourself or to others. In Canada, WHMIS is the federal response to ensuring that workers know about the safety and health hazards that may be associated with their work environment. WHMIS stands for the Workplace Hazardous Materials Information System. It is a collection of national laws and requirements that first became effective in 1988.

WHMIS training is mandatory for all employees. Given the nature of the labs that you will encounter in computer science and related programs, it is mandatory for students as well. As you proceed in your studies, you may find that you must engage in further WHMIS training. As you will see in the Exercise portion of this ePub, you must complete WHMIS 1 training prior to your first lab. You may be asked to complete WHMIS 1 training in other courses. You only have to do this training once, but you may be asked to prove that you have completed it elsewhere. Keep a copy of the documentation showing that you have completed WHMIS 1 training in case you are asked for it in other courses. If you have already completed WHMIS 1 training elsewhere, proof that you have completed this training will be sufficient here and elsewhere.

2.2 Academic integrity

Academic integrity is the moral code or ethical policy of academia. York University has an established a policy on academic honesty. Violation of this policy can lead to a range of various penalties, from zero on an assignment, to expulsion from the university, to the laying of criminal charges. Understanding, and following York's academic honesty policies is essential. You should follow the link above in order to read the details of York's academic honesty policy. It is quite a lengthy document, but this should help to underscore the importance the university places on ensuring its academic integrity.

Let us end here on a lighter note. The great Tom Lehrer wrote a song about plagiarism. A version of it can be found on YouTube.

2.3 ePub

Throughout this course we will use documents in ePub (specifically ePub3) format. The use of ePub documents provides a convenient container for video, audio, still imagery and text associated with a given lab. It also packages this material in such a way that you can read it using a laptop, tablet or phone.

Although there are many ePub readers, a number of them do not support the full range of material that we will be including in an ePub document. A non-exhaustive list of readers that do support this full range includes:

- Apple's *iBooks* reader (IOS, OSX)
- *Gitden* Reader (Android)
- The *Lucifox* extension to theFireFox browser (Windows, Linux)

You can test if your ePub reader 'works' with video by trying it out on the following embedded video:

If you cannot play the video in your ePub reader then you should consider using a different one. Note that a suitable reader is bundled with the virtual machine appliance (described later).

Although the way in which you interact with pages in your ePub reader differs from reader to reader, you should be able to view embedded graphics and video in whatever the "full screen" mode is for your device. Some ePub readers include mechanisms that allow you to annotate your ePub document. You may find this a useful tool.

2.4 Your laptop or one of the department's ones?

Throughout this course and subsequent courses in computing you will often have the opportunity to use either your (student supplied) hardware or hardware provided by the University. Each choice has its advantages and disadvantages. For EECS1012, computing equipment is provided for students who do not wish to bring their own laptop to the lab. However, if you are planning to use your own computing hardware it will be very useful to bring the hardware to the first lab as you can spend part of the lab configuring the hardware so that it can take full advantage of the lab facilities.

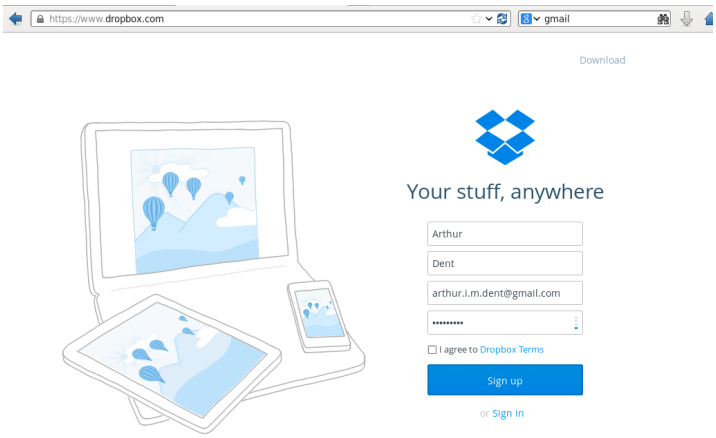
There will always be computing hardware available for you in the lab. So if you plan to use your own hardware but forget to bring it to your lab, there will be hardware to borrow. There are also copies of the computing hardware used in this course available to borrow through the Prism Laboratory in Lassonde.

In order to use your laptop for this course, it must be able to run VirtualBox. Practically, this means that as long as your laptop supports either Windows, OSX, or Linux, it is likely that you will be able to use your laptop in the course. Technically, your computer must support 'virtualization'. Some computers that support virtualization have it disabled by default in the BIOS. You will also need one or two spare USB ports on your device and a few gigabytes of free disk storage. There is a document on the jr web site that provides detailed instructions on installing and customizing VirtualBox for your home machine.

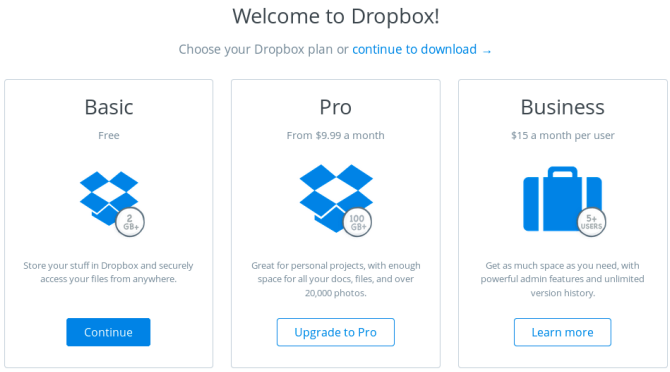
2.5 Dropbox

As a student in EECS1012 you have no permanent storage on the servers associated with the course. This can lead to a number of complex problems. For example, suppose you use a departmental laptop for one of the labs but normally you bring your own. How do you get data from one laptop to the other? You could use a USB key or some other storage device. But if you forgot your laptop then its likely that you forgot your USB key as well. Or perhaps you are not bringing your own laptop to any of the labs. How do you go about providing persistent storage during the term?

It turns out that this is a common problem and a number of free storage solutions exist that utilize storage located remotely and accessible through the Internet. Essentially, these are companies that provide you persistent storage (for free), and encourage you to purchase larger amounts of storage once you see how convenient the free storage can be. In the course, we will utilize Dropbox for this, but other options include Google Drive, Microsoft's OneDrive, and Apple's iCloud. You may find that you like those alternatives more than Dropbox. Feel free to use them instead. This section describes how to setup and use Dropbox on your host machine, and perhaps even more importantly, how to use it on the virtual machine provided for the labs.

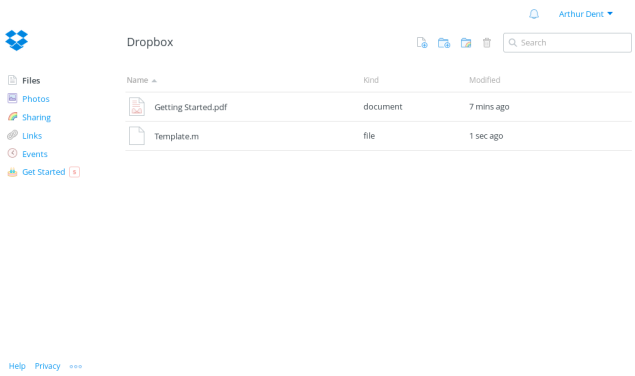


To set up a Dropbox account, go to www.dropbox.com and sign up. You will need an email account for verification. (See some comments on verification and security below.) You will have to choose a password for your Dropbox account. You can choose from various levels of service. The Basic (free) level should be sufficient for this course.



If you are running Dropbox from your home machine, perhaps the most convenient way to use dropbox is to install software that integrates Dropbox with your machine's operating system. From the virtual machine this is not possible; instead, you must use DropBox's web-based interface.

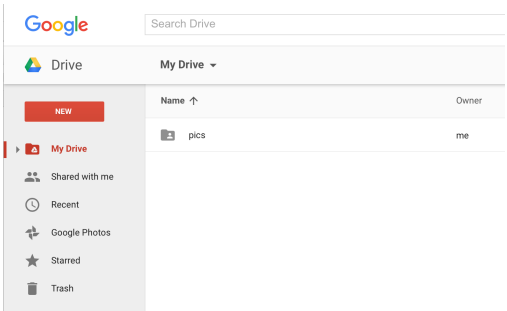
Don't forget to sign out of your Dropbox account when you are finished when you use it from a public machine.



Once signed in to Dropbox you will have access to persistent file storage (called a Dropbox). The Getting Started.pdf file you can find in your Dropbox provides detailed instructions on how to use the web-based interface. Highlighting a file will bring up a set of options including 'Download' to download a file from the Dropbox to the local machine, and the icon of a file with a plus sign on it will bring up a dialog to upload a file to the Dropbox server.

2.6 Google Drive

Google provides a similar service to DropBox known as Google Drive. If you point your browser at drive.google.com you will be asked to authenticate using your google password and you will land at google drive



As with DropBox, Google drive lets you store files in the cloud and access them from everywhere. Also, as with DropBox you can share specific files with various

users or all users if you so wish. One feature of Google Drive that is particularly useful is that you can use it to serve images to embed in web pages. This will prove to be particularly handy for labs in which you wish to include imagery in your ePortfolio. You will exploit this feature in the lab.

2.7 The Virtual Machine

This course uses a Unix variant - CentOS - as the basic operating system. Rather than requiring students to own such a machine, this course utilizes a virtual machine that can be run on a wide variety of different hardware platforms, including laptops that are provided in the labs to students who do not bring their own laptops to class. This section provides some basic instructions as to the process of installing, configuring, and using the virtual machine on your own hardware. If you intend to only use university provided laptops in this course, you can skip over the material related to installing this software on your hardware.

The basic idea behind virtualization is to use one computer platform to simulate another. Wikipedia provides a reasonable introduction to the concept. In this course you will use your computer hardware as the host operating machine and CentOS as the guest computer environment.

2.7.1 Acquiring the Software

You will require two basic pieces of software to run the virtual machine on your own laptop or desktop computer: a copy of the VirtualBox (aka *VBox*) software and the course *appliance* (a file that contains CentOS and several applications designed specifically for this course).

1. Download a copy of VirtualBox for your underlying hardware (this is known as the host platform). You will need to obtain the appropriate version for your platform. See here for a list of supported platforms and links to the applications.
2. Download a copy of the VirtualBox extension pack. This provides support for USB devices, shared folders, and the like for the virtual environment. A link to this file can be found here as well.

3. Obtain the course appliance for this course and import it into your VBox. The appliance is available from from a server at York. The URL, username and password for the course appliance are available from the course moodle site.

***Note**: Some of these images are rather large. You will want to download them from somewhere with good and inexpensive bandwidth. York University's WiFi network would be a good choice. Over a cell phone data connection would be a poor one. You should also be aware that the files used by the virtual machine are rather large — it must simulate an entire computer including its hard drives — so it would be prudent to ensure you have sufficient disk space before installing.*

***Note**: Enable virtualization in your machine's BIOS before running the software. BIOS options are accessible when you reboot your machine and press a particular system-dependent key (such as delete or a function keys) as it restarts. This step is not applicable to Apple host environments.*

2.7.2. Installing the Software

This will depend on the nature of the underlying host machine. See instructions below for some of the supported OS's.

OSX: double click on the image of the CentOS course machine. This will launch the VirtualBox machine and create a machine image for you. This process will also look for updates to the VirtualBox (download and install if there are any) as well as look for and request permission to install the extension pack (and look for and install upgrades, if there are any).

Windows: Save the downloaded *exe* file and then run it. Accept all the installation defaults and you will end with a VBox shortcut on your desktop.

Linux. The downloaded package has to match your Linux kernel architecture. See this link for details.

2.7.3 Running the Software

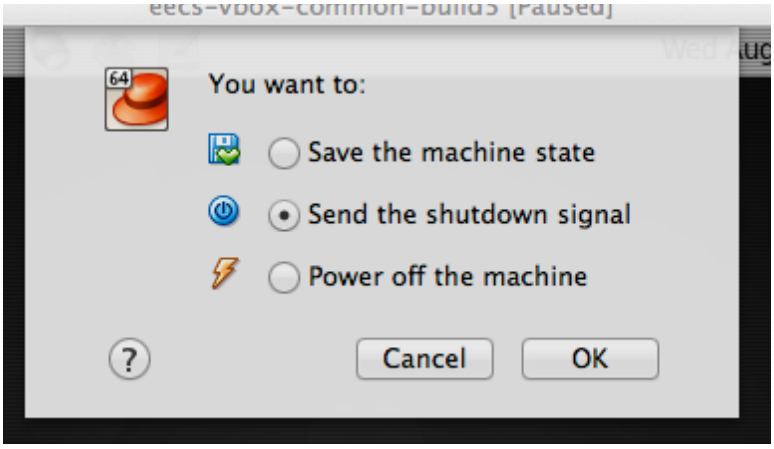
Within the VirtualBox software select the eecs VBox and start it (click on the Start icon). The VirtualBox will power up (see video below).

You can resize the virtual screen to different sizes, access the internet, and run programs inside the virtual machine.

***Note**: The VBox picks up its network connection through the host machine. Hence, if you need to connect to a WiFi network and authenticate, do so on the host machine, not the VBox.*

***Note**: Within the VBox, your username is "user" and you have root privileges with "eecsroot" as the root password. This means you have full control over this virtual machine.*

When you are finished running programs within the virtual machine you close the machine using the standard mechanism of the underlying host OS (click the window close box). The virtual machine will then provide you with three choices in terms of shutting down the host operating system:



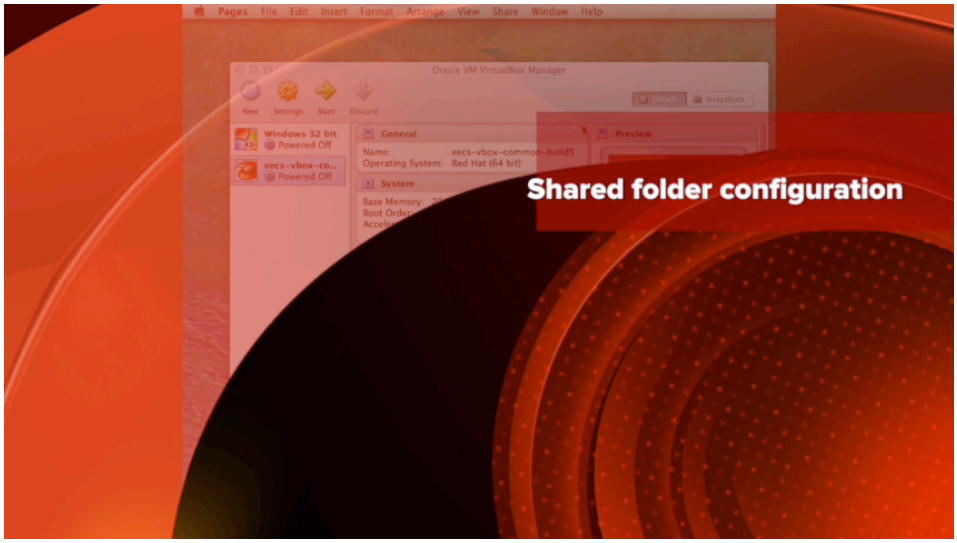
Save the machine state. The machine's state will be saved until the program is next run. This saves everything, including which windows are open, which programs are running, etc. This makes starting up the machine much quicker next time you run it. This is useful only if you are using your own laptop because for University-provided laptops, nothing is saved once you exit.

Send the shutdown signal. This simulates sending the 'shutdown' signal to the host machine. The machine will then ask if you want to power off the machine, reboot, etc.

Power off the machine. This simulates unplugging the machine from the wall. This is probably not a good choice in general as the underlying machine may not be shut down cleanly.

2.7.4 Configuring the Virtual Machine

You can configure the virtual machine in many different ways. One rather important one involves providing a simple mechanism of transferring files between the host OS and the guest OS. VirtualBox supports the notion of shared folders. These are folders (directories) that are shared between the guest OS and the host OS. Before starting up a virtual machine image, under the Machine menu item, choose 'Settings'. This will bring up a dialog that enables you to choose a folder to share between the two machines. One choice here is to choose to share your host OS's Dropbox folder, as this will make it easy to share files among many machines. But the choice of which folder to share is up to you. The process of configuring the shared folder is shown in the video below.



If the shared folder that you select in the host OS is named X then it will appear in the guest OS as the folder /media/sf_X.

If you will use your own laptop then the following VBox features will prove extremely useful:

- Make DropBox itself your shared folder (as was done in the above video). This way, you will have read/write access to all your DropBox files from within VBox in /media/sf_Dropbox.
- Take snapshots of your VBox (accessible from the Machine menu). For example, take a snapshot after configuring the VBox and installing Matlab in it. Later, if it hangs or becomes corrupt for any reason, you can always restore any of your snapshots.
- Save the machine state when you exit it. This allows you to restart it quickly so you can resume working from where you left off.

2.8 The Android tablet

In this course you will develop software that runs (executes) on an Android device. You can use any Android device you want in this course as long as it is running an up to date version of the Android OS (6.0 or later). A standard Android tablet is

provided in the labs and can be borrowed from the Monitor from the first floor lab in Lassonde. In order for an Android device to be used for this course, it must:

3.1. Have USB debugging enabled.

3.2. Have the Html2APK app installed.

You can verify/satisfy the above as follows:

3.1. From the home screen on the Android device, go to *Settings* and then *"Developer options"*. If *"USB debugging"* is not enabled then enable it. On the other hand if you don't even see *"Developer options"* then go to *Settings*, *About*, and tap the *Build number* ten times. After wards, you should see the *"Developer options"* and can use it to enable USB debugging.

3.2. From the home screen, see if the *Html2APK* app is present. If not, go to *Settings*, *Security*, and enable *"Unknown sources"* and tap OK. Then, launch a browser on the device and visit:
http://www.eecs.yorku.ca/~jr/server/Html2APK/app.apk

Tap OK when the browser warns you about downloading this file. This will put the file in your *Downloads*. Go to *Downloads* (in the home screen) and tap *app.apk*. Tap *Next* and then *Install*.

2.9 Your e-Portfolio™

Exercises B and C of the labs will ask you to submit your work electronically to what is known as an **e-Portfolio**. Your e-Portfolio is stored as a collection of Moodle 'Assignments' on the university moodle server. From an operational point of view, each e-Portfolio is a web page that you create within Moodle. You will find the link to the The web-page authoring toolkit within Moodle is a WYSWIG (what you see is what you get) editor. You type the text and use the buttons on the page to insert formatting information. You will discover that this editor does not allow you to embed either images or video inside your ePortfolio although it does allow you to include links to such documents.

2.9.1 Structuring an ePortfolio entry

For each lab in the course you will construct an ePortfolio entry. This entry will describe what the lab was about, your experiences in the lab, any problems that you

might have encountered, and answers to any specific questions asked of you during your lab. You are certainly welcome to include other pertinent information about the lab, but the following general structure should be followed in the structure of each ePortfolio entry.

Each lab should start with a title and abstract. The title should describe what the lab is about. The name of the lab is probably a good start here, but feel free to be more creative. This should be followed by an abstract that describes — to someone who does not have access to the lab ePub — what the lab was about, the basic process followed, and the results you obtained. This should be no longer than two paragraphs and could often be only one paragraph long. Something like (with apologies to Pinky and the Brain, see also here) : In this lab my partner and I explored how a web-based application could be used to control the minds of others using the spectacular display generated on Android devices. Building on software provided by the course, an application was developed in HTML, CSS and JavaScript that hypnotized people viewing the portable display we generated. Although we hoped that this could be used in an effort to conquer the world, we had not accounted for the particularly short duration of the effects. In the end, although the code did generate an interesting display on the Android device, our efforts at world domination were unsuccessful.

Following the Abstract you should have an Introduction section. This section should describe what the goal of the lab is. This can be relatively short — a few paragraphs at most.

Following the Introduction should be a section 'Methods' or 'Process'. The goal here is to describe the methods you followed to complete the lab. Screen captures of appropriate code snippets and even complete code listings may be appropriate here. In completing your lab you may be asked questions along the way. For example, the lab may ask you 'How did you create a pulsating display that hypnotized viewers of your software?'. This type of question might be best answered in this section.

Following the Methods should be a Results section. This may include screen shots, video or other imagery of your application in action as you deem most appropriate. Contextualizing text should be included. For example: The YouTube video shown

below illustrates the software in action hypnotizing a particularly weak-willed member of the class.

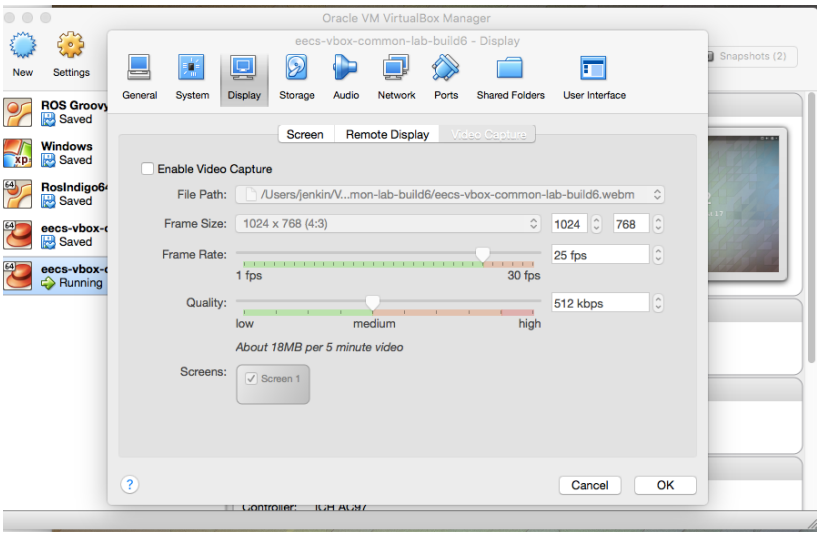
The final section should be a Discussion section. In this section you should answer any summarizing questions asked in the lab ePub. For example, if the lab asked if you were successful in taking over the world, this could be answered here.

2.9.2 Embedding pictures in your ePortfolio

You can embed pictures in your ePortfolio directly. The 'photo' icon will allow you to upload an image to your ePortfolio. You can capture screen shots of both your virtual box as well as the Android device. To capture a screen shot of your VBOX, select the 'Take Screenshot' menu item. This will create an image of your screen as a png file. To capture a screen shot of your Android device, push the power and volume down keys at the same time. This will capture an image of your device on the Android device itself. You can use DropBox or Google Drive to transfer the image to your laptop to edit it or change its format. There is a tool in the VBOX known as GIMP, that can be used to do this. GIMP documentation is available here.

2.9.3 Embedding video in your ePortfolio

Although you can in theory embed video in your ePortfolio directly, disk limits will make that difficult for anything but simple videos. A more practical mechanism is to use an external video storage system, such as YouTube (described below) to store the video and provide a link to the video in your ePortfolio. You can capture videos of the VBOX using the VBOX directly. Under the Display menu item for settings you can find an 'Enable Video Capture' button. Once this is clicked, a video record is made of your entire interaction session. These files can be very large, so it is best to rehearse what you are going to do and then do it with recording enabled, and then disable recording.



It is also straightforward to capture video of your android device running. Departmental Android devices will have 'AZ Screen Recorder - No Root' installed. This is a free app — there are in-app purchases though — that will record a video of what is shown on your screen. When you run this application it brings up a small menu. Clicking the green camera button starts recording (there will be a countdown) and a pull down menu will be available at the top of the screen to stop the video. When you stop, the application will give you the file name of the clip. You can get this clip off of the Android device using DropBox, or GoogleDrive or even email if the clip is small enough.

Although you can probably deal with screen video captures using these methods, it is important to remember that you have other options for video capture. These include:

Cell phones. Almost all cell phones equipped with cameras can be used to capture videos. Android phones, for example, capture videos that can be downloaded to a host computer using standard Android software which differs depending on the host computer. Similarly, IOS (Apple) phones will synchronize with iPhoto. In any event, the raw video file can be downloaded to a host computer for editing.

USB cameras. Such devices either capture video directly into an editing suite on the host computer (e.g., iMovie on OSX) or through a capture program (e.g., the approach taken in Linux).

Raw video captured with any device is unlikely to be suitable as is. Expect to have to edit the video, even if only for length, before posting it online. The free tool FilmoraGO, which can be downloaded from the Android play store can edit video on your android device directly. This is the tool that you will use in this lab. This certainly works, but if you have your own computer you may find the following useful options:

Video editing under OSX. iMovie is a powerful editing suite with many online tutorials. iMovie is available as a free download for Apple computers iMovie has gone through a number of different revisions, but for the 2013 version **this** is a nice introduction. Also see **this**.

Video editing under Linux. For Linux users there are a number of freely available video editing tools including **OpenShot**. There are a number of online tutorials for OpenShot including **this one**.

Video editing under Windows. The standard movie editing tool for Windows is **MovieMaker**. MovieMaker is a free download from Microsoft and runs under a number of different versions of Windows. There are many online tutorials for MovieMaker including **this one**.

Once you have created a video for your e-Portfolio, you must make it available for viewing. Given the limited disk storage available for your e-Portfolio, it is not possible for you to store videos on the server directly. Rather you must store and publish them on one of the standard video sharing sites on the Internet and then link to this video in your e-Portfolio.

It is unlikely that the raw video that you have captured is what you want to publish. Rather, you will want to edit the raw video down to just that portion that contains interesting events. Furthermore, you will probably want to add a text overlay or title card that marks this video as being yours.

A word of caution before starting here. Any video you publish to the Internet *could* be visible to all users of the Internet. It is therefore prudent to ensure that the video that you are uploading is the one you intend to upload, and that you hold the copyright to the material that you post.

YouTube. YouTube provides a very straightforward mechanism to uploading video. You will require a gmail account to upload video, and all such video will be associated with your account. Browse to **www.youtube.com** and select Upload. You will then be prompted for the file to upload. Once uploaded, you will be provided with a URL that links to your video. For example, the video of the William Small centre under construction can be found **here**.

You can annotate and delete videos uploaded to YouTube. It does take some time to convert videos to the format used by YouTube.

Vimeo. Vimeo requires users to create an account, and provides both free and commercial access. Free would likely be sufficient for you for this course. Browse to vimeo.com and create an account. (See note about the need for multiple passwords earlier in this document.) Select a basic account. Note: Vimeo will not let you upload videos until your account has been verified. Once you have done so, an 'Upload a video' button will appear on your Vimeo home screen. Clicking this will bring up a screen that allows you to choose a video to upload, and then to cause it to be uploaded and converted to Vimeo's internal format. As with YouTube, it does take some time for the video to be converted to Vimeo's internal format. Once uploaded, you will be provided with a URL that links to your video. For example, the video of the William Small centre under construction can be found here.

You will likely find it useful to put a title screen on the front of all of your videos. Most of the video tools identified above can assist you in this. You will probably NOT want to include your student number in any such material as York uses this as part of a number of different authentication systems.

2.8 Your online existence

So it is fun to have an email like slartibartfast123@piratescove.net, but eventually you will want to possess an email that a potential employer will not be embarrassed to use to contact you about a potential job. Now might be a good time to acquire one of these. A large number of companies will provide you one. Given that employers are known to check your social media presence, it might also be prudent to start the process of establishing a professional online presence now. Not convinced? Have a look at this and this.

2.9 Maintaining passwords

As you have probably discovered already, many online services require you to maintain a user name and password which you have to remember. Using the same user name and password on a number of different services may be convenient, but it is also highly risky as a security breach in any one such service will compromise all of your accounts. This document provides a high level view of the problem. Nor can you expect all of your services to protect your password. As the security breach at Adobe and Ashley Madison demonstrated, even large technology-driven companies get security wrong. You need to develop a strategy for generating/using/remembering multiple passwords.

There are many solutions to this problem. Companies such as Agile Bits offer a technological solution (1password), and some operating systems include support for password maintenance. But even writing down accounts/passwords will work after a fashion. Of course, you then have to be careful about where you write this down (see here).

One particularly important thing to remember is this. Substantive effort continues to be put towards breaking (cracking) password systems and software. If you make the process particularly easy for a hacker you can expect to have problems. For example, if you are using any of the more common passwords — see here for a list of the 500 most popular passwords — than you can expect to have your accounts to be hacked on a regular basis.

2.10 Programming tools

Programming in this course will be in a language called JavaScript, using HTML and CSS to structure the output of the JavaScript on the page. HTML was initially developed by Tim Berners-Lee in the late 1980's. CSS was first released in 1996 and JavaScript was developed in the mid 1990's by Brendan Eich at Netscape. Each of these tools continues to evolve.

As these tools are intended for the development of applications that run under a range of different environments and to deal with software that has been written using older standards of HTML, CSS and JavaScript, production browsers typically try to render something when the HTML, CSS and JavaScript are not completely correct in terms of the current standards for these tools. This may be very helpful for viewing such material, but it means that using standard environments such as your favourite web browser to debug errors in HTML, CSS and JavaScript can be frustrating. You may find the following helpful

- The web site http://validator.w3.org will validate an HTML document for adherence to the current HTML standard. This can help identify improperly formatted HTML code. There are many pretty printers for HTML available online. You might want to try http://www.freeformatter.com/html-formatter.html
- The web site http://jigsaw.w3.org will validate a CSS document. This can help identify improperly formatted CSS code. If your CSS code is not pretty to look at try a tool such as http://www.cleancss.com/css-beautify.
- The web site http://jslint.com will look for fluff in a JavaScript document. There are similar tools elsewhere such as http://javascriptlint.com. If your JavaScript code is not pretty to look at, take advantage of pretty printers such as http://jsbeautifier.org.
- The Firefox plug firebug is a very simple debugger for JavaScript within Firefox.

3. Exercises

All Pre-lab exercises **must** be completed prior to attending your lab. You will not be allowed to participate in the lab if you have not completed these exercised prior to attending the lab. A backup lab is scheduled each week for students who miss/were unprepared for their normal lab time. You will also get much more out of each laboratory if you spend some time going through the B and C exercises for each laboratory before attending your laboratory session. Lab zero only has a pre-lab exercise. This set of exercises **must** be completed before your first in-lab experience.

3A. Pre-lab

1. Complete WHMIS 1 training. This can be done online before your first lab. When you complete the training there is a quiz. Upon successful completion of the quiz print out (or save on your laptop/phone/tablet) the confirmation page and **bring this to your first lab**. If you have not done this before your first lab — or are unable to document that you have completed this — you will have to do this as the first thing you do in the first lab.
2. Complete York University's Academic Integrity Tutorial. This can be done online. Following the tutorial there is an online quiz. Complete the online quiz and print out your score sheet for the quiz. Obtain a perfect grade on the quiz. Print out (or save on your laptop/phone/tablet) the grade page and **bring this to your lab**. If you have not done this before your first lab — or are unable to document that you have completed this — you will have to do this in the first lab.
3. Complete the 'lab quiz' associated with this lab on moodle. The quiz this week is particularly straightforward, and is included primarily to get you used to the idea of actually doing quiz prior to your lab.
4. If you have your own laptop/phone/tablet, find an ePub reader that can properly display videos on your device.

5. Ensure that you have an email account, as well as a Passport York user name and password.
6. If you have a laptop that you will be using for the course, make sure that it has a fair amount (200MB or more) of free disk space and bring it with you to the lab.
7. If you have an Android device that you will be using for the course, make sure that it has 'Developer Mode' enabled, and bring it with you to the lab.

3B. In-lab

1. If you have not already done so, identify a partner for this lab. Obtain a laptop from the lab monitor (if you don't have yours), along with an Android device (if you are not using yours).
2. Start VBox and launch ***Atom*** from the *Applications*, *Programming* sub-menu. Atom starts with several welcoming tabs open. Make sure you close all of them. To close a tab, click its title first (in order to give it the focus) and then click the ✖ symbol to the right of the title.
3. Use the file menu item to open the project folder user/server/lab0. There are a number of other folders there. These correspond to other labs in the course.
4. Select lab0.html from the project folder. This will bring up the lab0.html source code. To better understand each piece of the content and how it contributes to the rendered page, activate the preview by clicking **Ctrl-Shift-H**. Make sure the tab has the focus before pressing this key combination (i.e. click anywhere in the tab's content first). You can also activate the preview by selecting the *Preview HTML* submenu from the *Packages* menu.
5. Launch firefox inside the VBox. Within firefox open the web page file:///home/user/server/lab0/index.html This will bring up the web page within firefox.
6. Once your CV is complete, view it from your Android device. To do that, launch the *Html2APK* app in your tablet; select *Load* from its menu; and enter the URL: *http://ip:8000/zip/lab0* (where ip is the IP address of your laptop). See the *Laptop* section in this document to learn about finding the IP, and see the *Tablet* section for details on the needed setup.

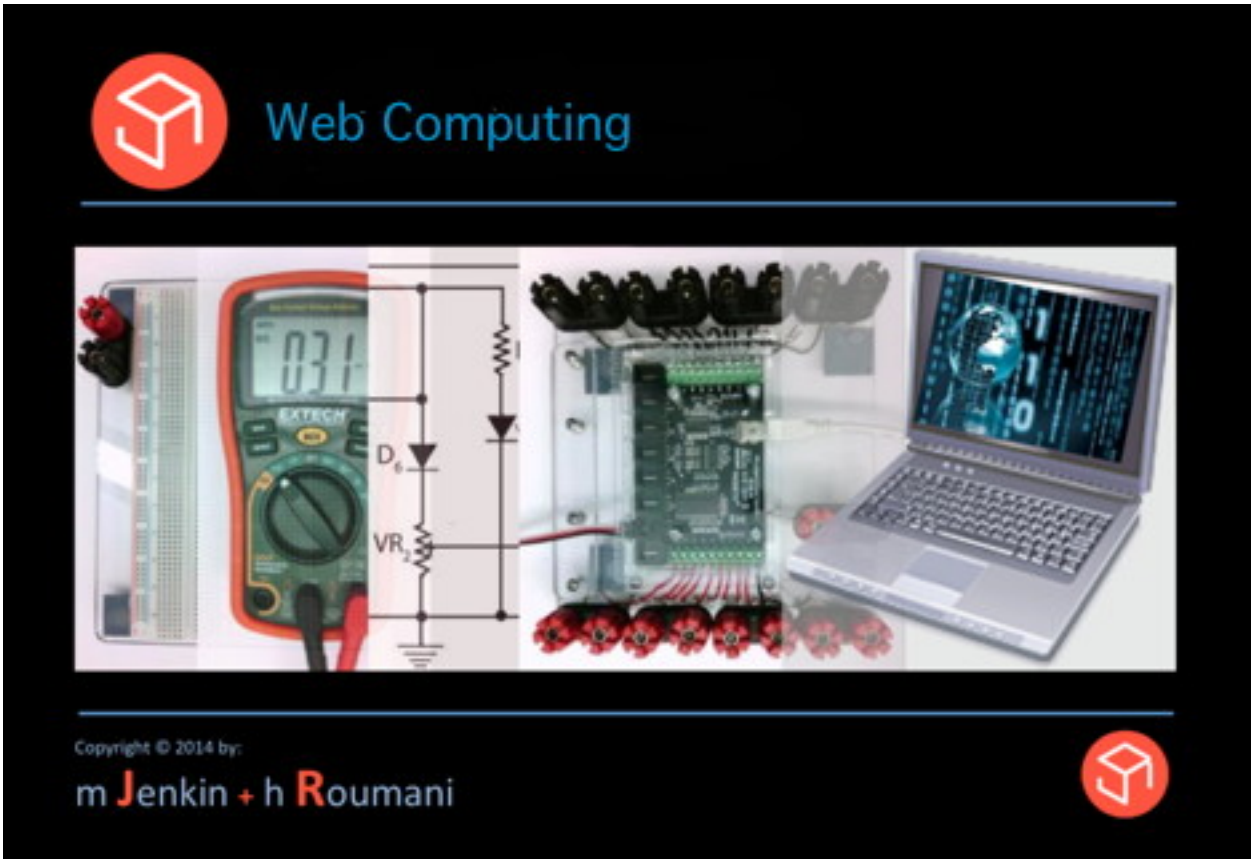
7. Capture a screen shot of the application running within the VBox . Convert this image to a jpeg image and imbed it within your ePorfolio.
8. Capture a screen shot of the application running with the HTML2APK application and imbed this image within your ePortfolio.
9. Capture a video of the web page being loaded in firefox within the VBox and transfer this video to your Android device.
10. Capture a video of the application running within the HTML2PAK application and save this on your Android device
11. Create a short (10 sec) video combining the two videos above. Attach a title (EECS1012 Lab0) and post it on an online video sharing service. Provide a link to this within your ePortfolio. Note: It can take some time for services like YouTube to properly render your video. Feel free to show your results to your TA while this takes place.
12. Complete your ePortfolio for this lab and include links to the images and video produced above. Show this ePortfolio to your TA. (S)he will then record your grade. Note: It is absolutely imperative that you verify that your TA has graded your lab (your ePortfolio) and that you check your lab grades weekly. Unmarked material will only be considered for remarking for one week after the due date.

3C. Advanced

1. Add some additional tweaks to your video, including playing with transitions between the two videos.

4. Credits

The photo on the front cover of this document is of Nagasaki, Japan.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