**ICS2O/3C Module A.3 - OS Concept Map LASS2018**

**Objectives**

1. Research information about software for a specific operating system (OS) environment. You will be assigned one of the operating systems form the list of: Windows, Mac OS, Linux. You will also be provided with a list of topics to investigate.

2. Organize your rough research information into a list of topics, subtopics and facts. This process will involve identifying sub-topics, rearranging your rough research notes, and selecting (or highlighting) interesting facts.

3. Report a summary of your research in the form of a “concept map”. Use the PowerPoint template provided as a starting point. The concept map should only include the best and most interesting information from your organized research notes.

Your assigned operating system is:

· Windows (safe marking)

· Mac OS (safe marking)

**· Linux (double bonus marking)**

· iOS (bonus marking)

· Android (bonus marking)

The concept map template can be downloaded from the “Topic A” folder on the class GitHub repository.

**Step 1 – Rough Research**

Research information about the software for your assigned operating system (OS) environment.

· Guide your research according to the suggested topic list below

· Feel free to copy-and-paste as long as you keep track of your bibliographic references.

· Do not be too picky or concerned about formatting as you will organize this information later in step 2

· Select things that look interesting and don’t forget to include graphics images as well

· Upload your rough research notes to your repository when you are done.

Topic A – Productivity & Application Software

Hubstaff also compiles automatic time reports that can be used for invoicing or internal records, can integrate with multiple project management software and is able to handle employee payroll automatically in the case of companies who employ a virtual workforce.

* The data Hubstaff collects can be used for many things. The time tracked can be used to calculate payments and activity levels can be used to measure productivity. You can see which projects are taking too much time or over-budget. Screenshots can also be used to ensure a remote worker is truly working on the right project, or they can be used to prove to a client that the work that was billed for is valid.
* If you write a lot of reports or papers, you need a good tool to keep track of your references and notes. Referencer fits the bill by organizing your documents and r
* references while putting together research.
* The primary use case for Referencer is for putting together bibliography files in the BibTeX format, but it’s not required. Even if you’re not trying to generate a bibliography, it can be very handy for organizing files and keeping track of notes or other data.
* But if you are putting together a bibliography, it’s an invaluable tool. If you’re working with PDFs that have the right kind of bibliographic information, Referencer can automatically search for reference info and metadata about the document.

**Topic B – Entertainment & Media Software**

### Kodi – Home Theater Software

* Kodi (previously known as XBMC) is a free and open source, highly customizable media server software. It is cross-platform and runs on Linux, Windows, MacOS; iOS and Android. It is more than just a media server; it’s an ideal entertainment center software with a fabulous user interface and several other media server software appliances are based on it.

#### Kodi Features:

* Runs on a wide variety of devices.
* It is user friendly.
* Supports a web interface.
* Supports a variety of user created Add-ons.
* Supports televisions and remote controls.
* Has a highly configurable interface via skins.
* Allows you to watch and record live TV.
* Supports importing pictures into a library.
* Allows you to browse, view, sort, filter or even start a slideshow of your pictures and much more.

### Madsonic – Music Streamer

* Madsonic is an open source, flexible and secure web-based media server and media streamer developed using Java. It runs Linux, MacOS, Windows, and other Unix-like systems. If you are a developer, there is a free REST API (Madsonic API) that you use to develop your own apps, addons or scripts.

#### Madsonic Features:

* Easy to use and comes with jukebox functionality.
* It is highly flexible and scalable with an intuitive web interface.
* Offers search and index functionalities with Chromecast support.
* Has built-in support for your dreambox receiver.
* Supports authentication in LDAP and Active Directory.

### Gerbera – UPnP Media Server

* Gerbera is a free open source, powerful, flexible and full-featured UPnP (Universal Plug and Play) media server. It comes with a simple and intuitive web user interface for easily configuring your web server.
* Gerbera has a highly flexible configuration, allowing you to control the behavior of various features of the server. It allows you to browse and playback media via UpnP.

#### Gerbera Features:

* It is easy to set up.
* Supports metadata extraction from mp3, ogg, flac, jpeg, etc. files.
* Supports user defined server layout based on extracted metadata.
* Support for Content Directory Service container updates.
* Comes with exif thumbnail support.
* Supports automatic directory rescans (timed, inotify).
* Offers a nice Web UI with a tree view of the database and the file system, allowing to add/remove/edit/browse media.
* Support for external URLs (create links to internet content and serve them via UPnP to your renderer).
* Supports flexible media format transcoding via plugins / scripts and much more.

**Topic C – Programming Tools & Environment**

**Bluefish**

## Bluefish is one of the most popular IDEs for Web development available. It can handle programming and markup languages, but it focuses on creating dynamic and interactive Web sites.

* Bluefish is lightweight (using about 30% to 40% of the resources that similar applications use) and fast. Bluefish can open multiple documents at once (up to 3,500 documents, if needed).
* It includes project support, remote file support, search and replace (including regular expressions), unlimited undo/redo, customizable syntax highlighting for many languages, anti-aliased text in windows, and multiple encodings support, among other features.

## **Anjuta**

* Anjuta is a free, open source IDE for the C and C++ languages. It's easy to install and offers such features as project management, application wizards, an interactive debugger, and a powerful source code editor (with source browsing, code completion, and syntax highlighting).
* Anjuta has a flexible and powerful user interface that allows you to drag and drop the tools in the layout to arrange the GUI nearly any way you like. And each user-configured layout is persistent for the project (so you can have different layouts for every project you have going).
* One of the most powerful tools in the Anjuta application is the project manager. This tool can open nearly any automake/autoconf-based project. This project manager doesn't add any Anjuta-based information to the project, so your project can be maintained and developed outside of Anjuta as well.

## **Glade**

* Glade is a RAD (rapid application development) tool used to create GTK+ toolkit and for the GNOME desktop.
* RAD is the process of developing systems incrementally and delivering working pieces every three to four months, rather than waiting until the entire project is programmed before implementing it.
* Glade includes a number of interface building blocks, such as text boxes, dialog labels, numeric entries, check boxes, and menus, to make the development of interfaces quicker.

**Topic D – System Tools**

#### Top – Linux Process Monitoring

* Linux Top command is a performance monitoring program which is used frequently by many system administrators to monitor Linux performance and it is available under many Linux/Unix like operating systems.
* The top command used to display all the running and active real-time processes in ordered list and updates it regularly. It display CPU usage, Memory usage, Swap Memory, Cache Size, Buffer Size, Process PID, User, Commands and much more. It also shows high memory and CPU utilization of a running processes. The top command is much useful for system administrator to monitor and take correct action when required.

#### VmStat – Virtual Memory Statistics

* Linux VmStat command used to display statistics of virtual memory, kernel threads, disks, system processes, I/O blocks, interrupts (a signal to the processor emitted by hardware or software indicating an event that needs immediate attention. An interrupt alerts the processor to a high-priority condition requiring the interruption of the current code the processor is executing.), CPU activity and much more.
* By default vmstat command is not available under Linux systems you need to install a package called sysstat that includes a vmstat program.

#### Iostat – Input/Output Statistics

* IoStat is simple tool that will collect and show system input and output storage device statistics. This tool is often used to trace storage device performance issues including devices, local disks, remote disks such as NFS.
* The **Network File System** (NFS) is a client/server application that lets a computer user view and optionally store and update files on a remote computer as though they were on the user's own computer

**Topic E – Software Security & Updates**

**Firewall Management: Gufw**

* By default, Linux comes with a firewall tool called **iptables**. However, since it’s quite hard to use, people mostly use front-ends to it, Gufw firewall being a popular choice. It’s actually a front-end to the Uncomplicated Firewall, which itself is based on iptables.
* A firewall is responsible for watching what comes and goes through your computer’s network. The ideal is that only the network activity you want passes through, aiding in security.
* Gufw makes it easy for you to restrict the network activity of any program of your choice. By default, it comes with a set of different rules to help manage them. Compare this to iptables, which requires a much more involved sort of effort. You’d need to know how an application connected to the internet, and restrict them based on that.

**Updating Linux**

* If you wanted to install applications and keep your system up to date, you were bound for the command line.

**Application Sandbox: Firejail**

* Sandboxeshelp to protect your system by restricting what your programs can do in them. Programs inside of them aren’t able to affect anything outside of it, such as important system files. This can act as a second layer of security for apps that might have potential exploits in them, such as your web browser.
* Sometimes, sandboxes are also used for testing dangerous programs. Since they’re inside an isolated environment, any damage that they might do is very limited. Of course, end users will probably not try to actively hurt their own computer. It’s the security that isolation provides that’s more important.
* Firejail makes this process easy. Running programs in a sandbox is just a matter of an extra terminal command. If using the command line is not for you, it also provides a simple graphical tool to manage them instead.
* A cool thing about Firejail is that you can choose how restricted you want your programs to be. There’s a lot of flexibility to it. For example, there’s a completely private mode, where the program inside the sandbox can’t affect anything on your computer. Alternatively, you can choose which folders they can access, for something a bit less strict.

**Malware Scanner: ClamAV**

* In general, Linux does not really need an antivirus program, at least in the modern definition of the term. Malware is rare in the world of open source, and even harder to catch. Most programs are installed through your package manager, and these are maintained by your current Linux distribution. As such, they’re guaranteed to be safe. Even so, it’s good practice to scan any dubious looking files for potential threats.
* ClamAV is an open source command-line tool that lets you scan for viruses on Linux. As of early 2016, it also supports scanning files automatically if you enable it.
* Another thing which ClamAV supports is scanning emails. This is quite useful for dealing with dubious attachments and the like. Even if you don’t ever encounter a virus while using Linux, having things like an anti-virus scanner helps.

Topic F – File System & User Accounts

* Linux’s major difference from other operating systems is its ability to have multiple users. Linux was designed to allow more than one user to have access to the system at the same time.
* Permissions are the “rights” to act on a file or directory. The basic rights are read, write, and execute.
* Read - a readable permission allows the contents of the file to be viewed. A read permission on a directory allows you to list the contents of a directory.
* Write - a write permission on a file allows you to modify the contents of that file. For a directory, the write permission allows you to edit the contents of a directory (e.g. add/delete files).
* Execute - for a file, the executable permission allows you to run the file and execute a program or script. For a directory, the execute permission allows you to change to a different directory and make it your current working directory. Users usually have a default group, but they may belong to several additional groups.
* To view the permissions on a file or directory, issue the command ls -l <directory/file>.
* The first ten characters show the access permissions. The first dash (-) indicates the type of file (d for directory, s for special file, and - for a regular file). The next three characters (**rw-**) define the owner’s permission to the file. In this example, the file owner has read and write permissions only. The next three characters (**r–**) are the permissions for the members of the same group as the file owner (which in this example is read only). The last three characters (**r–**) show the permissions for all other users and in this example it is read only.
* To create a new standard user, use the useradd command.
* You will need to set a password for the new user by using the passwd command. Note, you will need root privileges to change a user password. The syntax is as follows:
* passwd <username>
* The user will be able to change their password at any time using the passwd command with the syntax. Below is an example:
* $ passwd  
  Changing password for lmartin.  
  (current) UNIX password:  
  Enter new UNIX password:  
  Retype new UNIX password:  
  passwd: password updated successfully
* There is another way of creating user accounts that might be easier for first-time administrators. However, you may need to install a new package. The installation command for Debian/Ubuntu is as follows:
* apt-get install adduser
* The adduser command automatically creates a home directory and sets the default group, shell, etc. To create a new standard user with the adduser command the syntax is as follows: adduser <name>
* To remove a user account, enter the following command:
* userdel <name>
* Issuing the command above will only delete the user’s account. Their files and home directory will not be deleted.
* To remove the user, their home folder, and their files, use this command:

|  |  |  |
| --- | --- | --- |
| Option | Description | Example |
| -d <home\_dir> | home\_dir will be used as the value for the user’s login directory | useradd <name> -d /home/<user's home> |
| -e <date> | the date when the account will expire | useradd <name>\*\* -e <YYYY-MM-DD> |
| -f <inactive> | the number of days before the account expires | useradd <name> -f <0 or -1> |
| -s <shell> | sets the default shell type | useradd <name> -s /bin/<shell> |

Topic G – Special Features of your OS

Topic H – Limitations of your OS

**Step 2 – Organized Research**

Organize your rough research information to provide more structure and meaning.

· Re-read your rough research to identify (highlight) important sub-topics and facts

· Rearrange (cut–and-paste) your rough research so that related sub topics and facts are next to each other.

· Your finished organization should look like the template provided below.

· Upload your rough research notes to your repository when you are done.

Suggested organization template:

· Topic A – Productivity & Application Software

o Sub-Topic 1

§ Fact 1

§ Fact 2

§ …

o Sub-Topic 2

§ …

o …

· Topic B – Entertainment & Media Software

o …

**Step 3 – Concept Map**

Create a “concept map” as a final report of your organized research.

Use the PowerPoint template provided as a starting point.

You can use PowerPoint or another concept mapping tool of your choice.

Select the best and most interesting information from your organized research.

Summarize and edit your information to fit on the concept map.

Share your finished concept map with Mr. Nestor at p0079141@pdsb.net

The concept map template can be downloaded from the “Topic A” folder on the class GitHub repository

