**Level 2 – Organized Research**

Topic A - Productivity and Application Software

**1. Synaptic**

None are as quick and easy to use as Synaptic, which simply serves as a graphical frontend for the 'apt-get' command line utility. Can be installed on any Debian-based Linux distro, for example Ubuntu or Linux Mint. Apps such as “Games and Amusement” using the pane on the left-hand side can be used to browse these categories. Click the box next to an app name to mark it for installation (or uninstallation) then click the Apply button at the top to affect your changes. All the programs covered in this article can be installed with Synaptic. Overall, this is the app store for linux, which is really reliable, easy, and very efficient.

**2. Mozilla Firefox**

For a number of Linux distros such as Ubuntu and Linux Mint, Firefox is the default web browser. Firefox will download plugins to play other formats for you and can play YouTube videos right off the bat. The browser also updates itself from the get-go, meaning you always have the latest version. Firefox supports a number of extensions to enhance your web experience, and you can customise the browser further via the Mozilla add-ons page, where it is possible to install a colourful theme. The browser’s simple and fluid interface is one of its many attractions. Very easy to understand catch on by new users.

**3. LibreOffice**

While the interface may look rather basic, this product has some extremely advanced features. LibreOffice is on a par with commercial alternatives like Microsoft Office, it is nothing less than a full-blown office suite. It can save and open microsoft compatible files too. The suite also includes three less well-known apps ‘Draw, Math and Base’ which are used for editing vector graphics, composing mathematical formulas and managing databases respectively.

Topic B - Entertainment And Media Software

**1. Audacity**

Audacity is an editing program which allows you to record and tinker with audio. Furthermore, it supports multiple tracks, allowing you, for instance, to record lyrics and backing music separately. Not only can Audacity record audio simultaneously from various inputs (for example, a USB microphone or an electric guitar), it can also trim and edit clips. Audacity also supports VST plugins. The software also supports a number of audio effects such as noise reduction, as detailed in its extremely comprehensive manual which is both bundled with Audacity and available online.

**2. VLC Media Player**

VLC is most commonly known for being a media player. When installed, it downloads codecs for virtually every kind of audio or video file, meaning you're unlikely to ever have playback issues again. The media player client can also act as a server, allowing you to stream media from one device to another. The software can also play DVDs. You can use VLC to clip video files and even convert them from one format to another from AVI to MP4.

**3. GIMP**

GIMP is a free image editor. It can be used to edit and retouch images by resizing, adding layers and other special effects. You can access these via the handy toolbox or dropdown menus. If you're used to Adobe Photoshop, it may take some time for you to adjust to GIMP's interface, but it can do almost everything professional image editors are capable of. Tracks can be exported in a number of popular sound formats such as WAV, OGG and MP3. You can even add certain Photoshop plugins to GIMP. By default the program takes up less than 100MB, which is another considerable benefit, particularly for those short on disk space.

Topic C - Programming Tools and Environment

**1. Bluefish**

It can handle programming and markup languages, but it focuses on creating dynamic and interactive. Bluefish is lightweight using about 30% to 40% of the resources that similar applications use (fast). Bluefish can open multiple documents at once (up to 3,500 documents). One of Bluefish nice features is the Quickbar, a user-defined toolbar that allows you to add buttons by right-clicking and choosing Add To Quickbar. You can add any HTML toolbar buttons to the Quickbar. It includes project support, remote file support, search and replace , unlimited undo/redo, customizable syntax highlighting for many languages, anti-aliased text in windows, and multiple encodings support, among other features. Bluefish has a number of simple tools to help you add various elements to your code. Choose Auto-submit Select Box from the DHTML drop-down and fill out the necessary items to add the element to your code. Bluefish has wizards for C, Apache, DHTML, DocBook, HTML, PHP+HTML, and SQL.

**2. 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. Includes source browsing, code completion, and syntax highlighting.One of the most powerful tools in the Anjuta application is the project manager. This tool can open nearly any automake based project. 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. Anjuta also enjoys a powerful plug-in system that allows you to decide which plugins are active and which are not for each project. And like all open source projects, you can develop your own plugins for Anjuta.

**3. GCC**

GCC is a GNU compiler that works for C, C++, Objective C, FORTRAN, Java, and Ada. It's a command-line tool but is very powerful. The most used are the compilers for C and C++ code. Simple: For C, you invoke the "gcc" command and for C++, you invoke the "g++" command. Two compilers in the same toolkit. And g++ is a compiler, not just a preprocessor. It will build object code from source code without using an intermediary to first build C code from C++ source. This creates better object code and gives you better debugging information.

Topic D - System Tools

**1. Top – Linux Process Monitoring**

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.

**2. VmStat – Virtual Memory Statistics**

Linux VmStat command used to display statistics of virtual memory, kernel threads, disks, system processes, I/O blocks, interrupts, CPU activity and much more. You need to install a package called sysstat that includes a vmstat program, to use the vmstat command.

**3. Lsof – List Open Files**

Lsof command is used to display list of all the open files and the processes. The open files included are disk files, network sockets, pipes, devices and processes. When a disk cannot be unmounted and displays the error that files are being used or opened, this command can help. You can easily identify which files are in use.

Topic E - Software Security and Updates

**1. Wireshark**

Wireshark is a very powerful packet analyzer for system administrators. Its features include live capturing of packets; browsing the contents of the packet; and, understanding various protocols and their parts.

**2. NMAP**

It analyzes raw IP packets and then provides details about the live hosts in the network along with their banner information, ports, services and versions running. There are two versions of NMAP available, a command line interface and a graphical user interface known as Zenmap. While both have essentially identical functionality, the GUI version has inbuilt scan profiles to readily scan the target. Any unintentionally open port on the target system can be detected by the tool, and necessary action can be taken.

**3. Malware, antivirus scanners**

The Linux platform is seeing development of antivirus and other security enhancers to make things easy for a layman. It is designed to detect Trojans, viruses, malware and other threats on the system. For seeking out the rootkits in your distros, the readily available programs are chkRootkit and Rootkit Hunter. Among Linux-based tools for security, ClamAV is an antivirus software program written exclusively for a Linux distro.

Topic F - File System and User Accounts

● File Systems:

-Ext2.

-Ext3.

-Ext4.

-Jfs.

-ReiserFS.

-XFS.

-Btrfs

Topic G - Special Features

● Portable (Multiplatform)

● Multitasking

● Multi User

● Multiprocessor (SMP) Support

● Multithreading Support

● Virtual Memory

● Hierarchical File System

● Graphical User Interface (X Window System, Wayland)

● Wide Hardware Support

● Dynamically Linked Shared Libraries as well as Static Libraries

● POSIX Compliant (Almost)

● Multiple Virtual Consoles

● Multiple File System Support

● Multiple Networking Protocols (TCP/IP, IPX/SPX, Appletalk, AX.25)

● Shell

● Strong Security Model

● Open Source

Topic H - Limitations

Linux has no speech recognition for Synthia to use. AVI and Quicktime movies can not be opened in Linux. SynthEyes CAN open RED R3D's and all normally-supported image sequence types, as support is integrated in SynthEyes. Linux uses UTF-8 encoding throughout, unlike the ISO-Latin-1 used for the Windows and macOS versions. Most things should go well within Linux, with the exception of OpenGL text for non-ASCII characters. Any non-ASCII characters in a SNI version saved in Linux will be misinterpreted in Win & Mac. The keyboard accelerator map is interpreted using a US layout. While this interferes with your ability to remember a few keys, many of the accelerators are based on the positions of the keys, and should not move.

*Money:*

Linux could run any Windows based program, if the money was there to support development. Without the money, the limit is based partly on required kernel/source code availability and sheer will of people to make it work. The same could be said for the ability to run any macOS software. Linux can go in any direction the masses decide. The direction the kernel goes in or the amount of support isn’t required on marketability though, only on community support. Without legal limitations, Linux can go places that Microsoft and Apple can not. With the money behind Microsoft and Apple. they can go places Linux can not! Patents are the primary way to protect inventions for a limited amount of time. Patents also require an outside individual to be able to duplicate the invention for their own use.