An Introduction to Free and Open Source Software (FOSS)

- FOSS is an acronym for Free and Open Source Software.
- It is a blanket term that is used because of commonalities between Free Software and Open Source Software rather than their differences.
- Nevertheless, because of its significant philosophical connotations, the term ‘free software’ is used entirely and exclusively by the Free Software Foundation (FSF), while the Open Source initiative (OSI) considers the word ‘free’ as questionable and much prefers the term Open Source.
- Anyone is freely licensed to use, copy, study, and change the software in any way.
- The source code is openly shared so that people are encouraged to voluntarily improve the design of the software.
- This gives developers the opportunity to improve program functionality by modifying it.
- This is in contrast to proprietary software, where the software is under restrictive copyright and the source code is unavailable to the users. This protects the rights of the creators.
- The term “free” indicates that the software does not have constraints on copyrights.
- The term “open source” indicates the software is in its project form, enabling easy software development from expert developers collaborating worldwide without any need for reverse engineering.
- It provides more capability, security, and sustainability than commercial software at much less cost, it runs much of the Internet, and is increasingly the first software option for individuals and organizations alike.

FREE SOFTWARE

- Richard Stallman's Free Software Definition, adopted by the Free Software Foundation (FSF), defines free software as a matter of liberty not price, and it upholds the Four Essential Freedoms.
- To meet the definition of "free software", the FSF requires the software's licensing respect the civil liberties / human rights of what the FSF calls the software user's "Four Essential Freedoms".
- The "Four Essential Freedoms“ are as given below:
    - The freedom to run the program as you wish, for any purpose (freedom 0).
    - The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
    - The freedom to redistribute copies so you can help others (freedom 2).
    - The freedom to distribute copies of your modified versions to others (freedom 3).
- By doing this you can give the whole community a chance to benefit from your changes.
- Access to the source code is a precondition for this.

OPEN SOURCE

- The Open Source Definition is used by the Open Source Initiative (OSI) to determine whether a software license qualifies for the organization's insignia for open-source software.

FOSS benefits over proprietary software

- **Personal control, customizability and freedom**
  - Users of FOSS benefit from the Four Essential Freedoms to make unrestricted use of, and to study, copy, modify, and redistribute such software with or without modification.
  - If they would like to change the functionality of software they can bring about changes to the code and, if they wish, distribute such modified versions of the software or often − depending on the software's decision making model and its other users − even push or request such changes to be made via updates to the original software
- **Privacy and Security**
  - Manufacturers of proprietary, closed-source software are sometimes pressured to building in backdoors or other covert, undesired features into their software.
  - Instead of having to trust software vendors, users of FOSS can inspect and verify the source code themselves and can put trust on a community of volunteers and users.
  - As proprietary code is typically hidden from public view, only the vendors themselves and hackers may be aware of any vulnerabilities in them while FOSS involves as many people as possible for exposing bugs quickly.
- **Low costs or no costs**
  - FOSS is often free of charge although donations are often encouraged.
  - This also allows users to better test and compare software.
- **Quality, Collaboration and Efficiency**
  - FOSS allows for better collaboration among various parties and individuals with the goal of developing the most efficient software for its users or use-cases while proprietary software is typically meant to generate profits.
  - Furthermore, in many cases more organizations and individuals contribute to such projects than to proprietary software.
  - It has been shown that technical superiority is typically the primary reason why companies choose open source software.

Drawbacks compared to proprietary software

- **Security and user-support**

- According to Linus's law the more people who can see and test a set of code, the more likely any flaws will be caught and fixed quickly. However, this does not guarantee a high level of participation. Having a grouping of full-time professionals behind a commercial product can in some cases be superior to FOSS.
- Furthermore, publicized source code might make it easier for hackers to find vulnerabilities in it and write exploits. This however assumes that such malicious hackers are more effective than white hat hackers which responsibly disclose or help fix the vulnerabilities, that no code leaks or exfiltrations occur and that reverse engineering of proprietary code is a hindrance of significance for malicious hackers.

- **Hardware and software compatibility**
  - Sometimes, FOSS is not compatible with proprietary hardware or specific software.
  - This is often due to manufacturers obstructing FOSS such as by not disclosing the interfaces or other specifications needed for members of the FOSS movement to write drivers for their hardware - for instance - as they wish customers to run only their own proprietary software.
- **Bugs and missing features**
  - While FOSS can be superior to proprietary equivalents in terms of software features and stability, in many cases, FOSS has more unfixed bugs and missing features when compared to similar commercial software.
  - This varies per case and usually depends on the level of interest and participation in a FOSS project.
  - Furthermore, unlike with typical commercial software, missing features and bug fixes can be implemented by any party that has the relevant motivation, time and skill to do so., open source software.[43]
- **Less guarantee of development**
  - There is often less certainty of FOSS projects gaining the required resources and participation for continued development than commercial software backed by companies.
  - However, companies also often abolish projects for being unprofitable, yet large companies may rely on, and hence co-develop, open source software.

Types of FOSS that can be applied to Education

- Audio
- Visual
- Audio - Visual

- **AUDIO**
    - **Audacity:** free and open source sound editor for recording and editing sounds.
    - It can be used to record voice (create new tracks), do a voice over, create a new track merging multiple tracks.
    - Audacity is used to create podcasts and even radio shows.
    - The teacher can create audio based learning materials such as stories, pronunciation exercises, gap fill exercises, audio based worksheets,
- **VISUAL**
    - **GIMP** – *GNU (pronounced as GNoo) Image Manipulation Program* - A teacher can create digital collages, create animated gif images, accentuate images, can create images which have transparent portions , re-size and other image manipulation.
    - **Freemind** - for Mind mapping/concept mapping
    - **Dia** – for creating flowcharts

- **AUDIO – VISUAL**

- **Blender**: It is used to create 3D animated videos, 3D modelling, edit video clips
- **OpenShot**