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'A Study on Growth and Development of Open Source Software in Education'

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Abstract: *Open source software is a novice concept which has brought heralds of success in IT Industry. These have modeled a paradigm shift in technological developments by bringing new metaphors of cooperation and collaboration. The future of Open Source Software in education is filled with endless possibilities. In this background, the basic premise of the paper is to explore the growth and development of Open Source Software especially in the field of education. The paper identifies the importance of Open Source Software and its rationale in the educational institutions. It goes on to look the key differences between the two terms used in open source community. Further, it also concludes with the list of common OSS used in academics.*

Key Words: Open Source Software; Technology; Education

"*The most unfortunate thing is that India still seems to believe in proprietary solutions. Further spread of IT which is influencing the daily life of individuals would have a devastating effect on the lives of society due to any small shift in the business practice involving these proprietary solutions. It is precisely for these reasons open source software need to be built which would be cost effective for the entire society. In India, open source code software will have to come and stay in a big way for the benefit of our billion people.* **"** *– A.P.J. Abdul Kalam*[1]

I. Introduction

Today, Information and Communication Technology has provided us an ability of flexibility and access to information and resources. It has not only empowered the IT community to take part in exploring new narratives but has also created a platform where intellectual work could be created and shared from anywhere to anyone at anytime. Open source software is a novice concept which has brought heralds of success in IT Industry. These have modeled a paradigm shift in technological developments by bringing new metaphors of cooperation and collaboration.

II. Open Source Software- A Notion to Approach

Open Source Softwares are the one in which source code is made available to the users who have the right to access, use, contribute modify, change, improve and distribute under non-restrictive licensing terms. Thus, the programming instructions of the software are delivered to anyone using the software so that these can be customized as per one's own requirement. Further, anyone can contribute in improving the source code, and thereby, finding the loopholes and reporting it back to developer or developers. Moreover, modified source code can be redistributed under interoperable or non-existent license terms and agreements. Open Source Software has been defined by Jim Whitehurst , President and CEO of RedHat (2009) "as a collaborative software-development method that harnesses the power of peer review and transparency of process to develop code that is freely accessible."[2]

As explained by Neil Gandal (2011) "Open source software methods rely on developers who reveal the source code under an open source licence. Under certain types of open source licences, any further development using the source code must also be publicly disclosed."[3]

Friedman Thomas (2006) explains the concept in memorable way as "Think of these communities as chat rooms with freelance engineers who collaborate together to produce a piece of software, with everyone contributing improvements to the source code to make it sing and dance better, and using it, as long as they conform to the license rules of that particular source community".[4]

Therefore, these are developed either by funding agencies or by group of software developers working under some common kinship for onwards distribution to much larger community. Because of the main feature of cost effectiveness, these softwares have mitigated the need and importance of proprietary softwares. Hence, use of Open Source Software (will be termed as OSS for the rest of the paper) neither charge any license fees for its usage nor does it place restrictions on the use of other softwares which are installed along with the licensed software.

The main features of OSS as extracted from the definition provided by open source initiatives are presented for broader understanding of the concept:

1. The source code in its intact form is given to the users and they have right to modify it.
2. Users are also allowed to redistribute or even sell the software to one or more parties without paying any fees or royalty for such sale.
3. Modifications, improvements or even alterations are allowed in the source code and can be distributed under the same license terms of the original software. Derived works from the original software are also allowed. Hence, any bugs or errors can be traced and reported to the creator and the community for improvements in the quality, applicability and functionality.
4. The license shall not discriminate any person or group of persons.
5. No specific technology or computer interface shall be promoted by the license provided for using OSS.
6. Source-code can be restricted only if patch files are given with the source code for the purpose of modifying the program at builds time. In such case, license permit for producing derived works with a different name or with different version.

III. Free Software Vs Open Source Software

There are two set of philosophies or ideologies regarding this software movement, one school of thought proclaims it as software freedom and call it as free software (term promoted by Richard Stallman) and the other call it as Open Source Software (term connoted in a strategy session held at Palo Alto, California in 1998) , is also coined as 'Intellectual Commons Community' by Thomas Fried man[4]. The main promoters of this terminology are Eric S.Raymond, Bruce Perens, Larry Wall, Guido van Rossum and Paul Vixie. In Free Software the user has a freedom to copy and reuse the software but it is not cost free. The derived work or innovations are required to be contributed back to the community. Richard Stallman explained free software as one which has freedom to run the program as for one's purpose, freedom to modify the programme as per one's needs, freedom to redistribute copies either for gratis or for some fee and freedom to redistribute modified versions of the program, so that the community can be benefitted from some improvements.[5]
However, both serve as a replacement or substitute to the proprietary softwares but still the main differences as inferred from the various viewpoints are categorized as under

S. No	Free Software	Open Source Software
1.	It is termed as a social movement.	It is termed as concept or a methodology of developing softwares by some IT professionals.
2.	It is licensed with GNU General Public License.	It is either licensed with GPL or some other license authority for the integration of software other than free one.
3.	The right is given to use and modify under the same license terms and hence is not for the review process.	It is a peer review in which anyone can contribute for the improvement of the software.
4.	It is accessed to a closed group.	It is accessed to anyone and it is freely available.
5.	Freedom is in terms of software price since the license doesn't give the rights to reuse or repackage the source code.	In open source software, freedom pertains to the licensing schemes is much more than the price. Here cost of reuse is zero.
6.	Sometimes code is kept private therefore competitors have to reinvent their versions right from scratch.	Derived works termed as forking can be taken from original source code which can be used for modifying or adding new features, interfaces etc.

These two approaches sprouted a new terminology named FOSS, Free and Open Source Software or Free Libre Open Source Software in which these concepts have been relatively blended.

IV. Advantages of Open Source Software over Proprietary Software in Education

The advantages of using open source learning software's are as follows:

- Schools, Universities and other educational institutions are been financially burdened for paying heavily to software companies for using their products. Open Source softwares are freely available and they are sometimes better alternative to proprietary softwares. Further, users are not required to pay license fees annually for using these softwares.
- Open source software can be easily customised as per the requirements of educational institutions. New features and tools can be imported freely to learning management systems and enterprise resource planning systems.
- Documentation and help for installing and using the OSS is available on the respective OSS website. Therefore, it will save time and cost of purchasing manuals and books for operating them. Further, developers of the softwares also respond to the questions and queries regularly for rendering continuous help to the users.
- Many of OSS are multilingual like Moodle, Claroline, Discussion Forums and the likes, so these can be easily localised to the meet the educational goals.

- Meticulous and continuous improvements are made in these softwares by OSS community in form of new versions. Since, the source code is easily available; hence it is subject to modifications from all over the world.
- Adaptation of open softwares will help students in learning how technology works and can will foster and amplify creativity in them especially at the secondary level and OSS community also helps them to publish their work.

V. Importance of Open Source Software in Education

There has been consistent growth in the use of open source software in the field of education all over the world. OSS has attempted to transform the education system from traditional to more vibrant and more creative cognitive domain. It has not only assisted in developing the Universities or educational institutions virtually but has also complemented the traditional teaching in attaining new heights. Due to advent of Open Source Softwares, teachers, evaluators, curriculum developers, evaluators, academic managers and trainers are being compelled to rethink the ways of harnessing technology in their academic endeavors. The growth of OSS in the recent years has ameliorated the delivery of high quality content with increased access to information and communication technology at substantially lower cost. It has therefore significantly contributed in bridging digital divide across the world. Adapting OSS in educational system will not only help in curtailing explicit and implicit cost of purchasing proprietary softwares but will also discourage piracy by the people who are unable to afford the purchase of licensed copies of proprietary softwares. It has also given an opportunity to the knowledge seekers who are unable to attend on-campus education or who have limited access to educational resources and those who wish to study for the sake of knowledge and learning. OSS has also fostered creativity, flexibility, adaptability, reliability and quality in open and free dissemination of knowledge and information by educational institutions. In coming years, effective construction of voluntary communities of interest using Open Source Software will dominate individual vision and knowledge. (Eric Raymond, 2000)[6] Further in a study conducted by Kotwani Gunjan and Kalyani Pawan, revealed that the students who learned the mathematics concepts from open source software grasped the concepts in less time period and in conformance with the syllabus of the class.[7]

Attwell Graham (2005) also assessed that OSS has contributed in social reward and recognitions in respect to sharing and collaborative development of learning applications. Further, at the same time the emphasis of lifelong learning is a key force in creating awareness regarding the different types of knowledge and of developing software to support wider forms and contexts of learning.[8] There is one more point of view in regard to OSS because these emphasise on peer review, open source provides a particularly good vehicle for education (Lakhani and Wolf, 2005).[9]

Thus in the wake of the above, it is assessed that OSS has marked its relevance for schools, colleges, distance learning, healthcare, professional and vocational educational institutions. The growth and development of OSS in Education is being studied from the following dimensions:

1. Contribution of OSS in Academic Process-

Use of open source software has provided a great opportunity for educational institutions in improving teaching and learning process. Teachers can now use their subject expertise to select appropriate OSS which will help them in meeting specific learning objectives. Virtual universities like University of Phoneix are offering professional programmes in an online mode successfully. Education portals like Edusoft, Edumate provides customized community software which features easy ways for students to connect with their professors and their peers to get them more engaged in their classes.

Open Courseware like of MIT, Yale and likes has provided free and open digital publication of high quality study materials of renowned Institutions and Universities. These has really complemented OSS movement as they are free and openly licensed which is accessible to anyone at anytime.

Being connected with the web is the need of the hour for the educational institutions. OSS like Mozilla Firefox, Galeon, Konqueror has secured user authentication and has authorised users to access the web and has made the browsing easier for teacher, researchers and students.

Another important development in OSS movement is the upsurge of Open Source Learning Management System like Moodle, Sakai, Blackboard etc. which are the electronic platforms used to launch and manage e-learning programmes which ensures registration, course administration, problem solving, interaction, tracking and reporting. Advent of LMS has given breakthrough to education by replacing the conventional classroom based teaching to interactive and collaborative learning. Online marking tools enable instructors in giving feedback to the learners and helps in evaluating assignments, answer scripts online. Course development tools are used for developing effective and interactive course materials by incorporating text, audio, video, graphics, and animation and multimedia tools. University of Colorado was the first university which used a web based system to offer online programme.

Streaming and Podcasting Open Source Softwares like Matterhorn, Miro video converter, VLC Media Player, ipod disk and likes helped in managing audio and video contents. Lectures recording can be produced; existing video lectures can be managed and can be served to designated distribution channels. It also provides user interfaces in which students can effectively learn from videos. Further, graphical applications like inkjet are the power tools use to create graphics. Similarly, Open Graphics Library is a cross language multiplatform API for developing 2D and 3D computer graphics. It is generally used in CAD, virtual reality, scientific visualisation, flight simulations and video games.

(A list depicting commonly used softwares and their application in education has been compiled for gaining greater insight of its relevance)

2. Contribution of OSS in Administrative Functions of Educational Institutions-Infrastructure Convergence

OSS has also supported administrative functions especially in customizing Student Information Systems as per the institutional requirement as against proprietary software. One such example is the use of open office in many universities and schools instead of Microsoft office for operating system. Maintaining and linking Open Source Software of Student Information System like Projectfedena with LMS has also made functioning transparent. Management of student's records, records of revenues and expenses, academic records, registration of students has made administration of educational institutions more efficient by using initiatives like SchoolTool. Web servers like Apache can also be used to host public and internet sites. Further MYSQL is used as database server which is also adopted by Institutions for infrastructural support. Open Source LMS is used for site management, user management and course management.

3. OSS from learner's perspective

If used correctly and suitably, OSS can bestow blessings on students community as learning can be made more interesting, interactive, creative, and independent by applying new pedagogical methods and design which these softwares has complemented. Software like Interactive white board, Mathematica, Google scholar, Sakai , School Tool Open student and others has explored new vistas of learning like home-based learning, e learning, seminar based learning, virtual learning and collaborative learning.

4. OSS towards building a Knowledge Society

Synchronous and Asynchronous communications provided in LMS through Discussion Forums and real time chats, video conferencing, and community networking allows users to make social connections, study groups and independent collaborative teams. Instruction for students in the use of the software and better preparation for the challenges of collaborative learning, especially negotiation and other group skills, are likely to produce a more effective learning system. (Curtis and Lawon, 2001)[9]

Using open source blogging platforms like world press and Lifetype and open online portals helps in creating, sharing and assimilating knowledge across the worldwide thereby filling the developmental divide.

VI. Conclusion and Discussion

After studying the entire journey of open source software, it is found that Open Source Softwares for the universities, schools, educational and training institutions have not only provided an opportunity but is also an important resource for the institution. Renowned Universities and Schools like MIT, Harvard, Phoenix and many other schools at Ontario, Canada, America, to name few and even some schools at Kerala (as promoted by State Government) are captivating the advantage of these community developed softwares. This movement has lanced the share of proprietary softwares to Linux and others because of low cost burden, freedom to use and swift association with the latest technology. Thus, the use of OSS has promoted freedom to think, use, implement, innovate, moderate and develop new software platforms which can take technological intervention in teaching-learning process to great heights. Therefore, the key question now is to ponder upon as to how to spread this revolution in educational institutions across the country.

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Open Source For You, Volume 10, Issue-01, April,2013

Appendix

Appendix: List of the Most Accessed Open Source Software in Education- A Bird's- Eye view

S.No	Category	Open Source Software	Alternative to proprietary software	Features	Used by	Benefits of OSS in Education	Links/ Reference
1.	LMS/ CMS	Moodle	Blackboard Echo 360 Desire2Learn StudyWiz Frog	Acronym for Modular Object-Oriented Dynamic Learning Environment Can be installed on any computer that can run PHP and SQL database. It can also run on Windows and Mac operating systems and Linux. Moodle facilitate the following: Assignment submission, Discussion forum File downloading available Grading Online calendar Online news and announcement (College and course level) Online quiz Wiki Reference- https://en.wikipedia.org/wiki/Moodle	The Open University, UK Wharton County Junior College University of Texas at San Antonio UNH Cooperative Extension - eLearning The Center for Child and Family Studies Online Training	A centralized pool or integrated software which is complete package that automates administration, tracking and reporting of online programmers. Academic and administrative functions are included in the framework. It facilitate instructor in managing course and communicating with the learners. Can be used for Online Learning & Blended with Big Blue Button to create Virtual Class Room Environment.	http://docs.moodle.org/25/en/About_Moodle https://en.wikipedia.org/wiki/Moodle http://xolotl.org/blog/xolotl/who-using-sakai-moodlehttp://xolotl.org/blog/xolotl/who-using-sakai-moodle
2.		Sakai CLE Sakai OAE	Blackboard Echo 360	Comprises of the following:	Abilene Christian University	Research, portfolios and group projects are possible using collaborative tools.	http://www.sakaiproject.org/ http://en.wikipedia.org/wiki/Sakai_Project http://www.sakaiproject.org/organization-list
			Desire2Learn StudyWiz Frog	My workplace tools Generic collaborative tools Teaching tools Portfolio tools etc. My sakai widgets Includes document distribution Gradebook Livechat Assignment uploads and online testing	• Northwest University • University of Texas M. D. Anderson Cancer Centre	It also includes wiki, mailing list, archives and RSS reader. .	
3.		Canvas	Blackboard Echo 360 Desire2Learn StudyWiz Frog	Cloud-hosted learning management system	Auburn University, Brown University, New Mexico State University, and the Utah Education Network (including University of Utah and Utah State University). It is currently being rolled out by the University of Maryland and the University	It is learning management system which can aid in creating course contents with the help of rich content editor, speed up grading, and can track learning outcomes and can send notifications through email to the learners and colleagues.	http://www.turnkeylinux.org/screenshots/canvas-home

					of Washington. Refernce: http://www.utexas.edu/its/canvas-project/		
4.		.LRN	Blackboard Echo 360 Desire2Learn StudyWiz Frog	Support multiple languages, dialects and timezones. Different roles are supported for .LRN Classes, such as students, professors and administrative staff. Individual users can personalize their own personal portal layout. Reference: http://www.dotlrn.org/product/	Costa Rica Institute of Technology (ITCR), Costa Rica Center for 21st Century Skills, USA Los Angeles Unified School District, USA Spanish National University for Distance Education (UNED), Spain DigitalOne, Hong Kong Bir Zeit University, Palestine Reference: http://www.dotlrn.org/users/	It is Enterprise-class open source software for supporting e-learning and digital communities.	http://www.dotlrn.org
5.		Author	Blackboard Echo 360 Desire2Learn StudyWiz Frog	Comply completely with the accessibility specifications of W3CWCAG 1.0.	Athabasca University Reference: http://cde.athabascau.ca/softeval/reports/R370408.pdf	This provides a platform for continuing professional development for academic research and tutors. This software can be used by visually impaired and disabled learners with the help of screen reader. It can adapt to different technologies including mobile phones, tablets, PDA and text based web browsers.	www.atutor.ca
6.		Course builder		Uses Google Technologies	Khan Academy Stanford University, Swiss federal Institute	It includes lessons, student activities and assessments. It is basically a community which is a bundle of Google products.	https://code.google.com/p/course-builder/ https://code.google.com/p/course-builder/
7.	Podcasting/Lecture recording	Opencast Matterhorn	MediaSite Panopto			Audio and video contents are managed. Lecture recording can be produced existing video lectures can be managed and can serve designated distribution channels.	http://opencast.org/matterhorn/
8.		BigBlue Button	Sony SoundForge			Virtual Class Room Systems BigBlue Button is an open source web conferencing system built on over fourteen open source components to create an integrated solution that runs on Mac, Unix, and PC computers.	http://www.bigbluebutton.org/
9.		Miro Miro Video Converter	ANUSOft Convertor			Used to convert various Media Formats	http://www.getmicro.com http://www.miro

							videoconveter.com
10.		ipodDisk				IPod disk can be termed as device hard disk drive accessible to the computer it is connected with. IPod can store data, files, pictures as well as music files. With the disk enabled by the user iPod allows accessing the file system so that files can be copied from the device files stored.	http://ipoddisk.en.softonic.com/mac
11.		MPlayer	Windows Media Player	Available for major operating systems, including Linux, Microsoft Windows, Unixlike and MacOSX		Mplayer can be played in various media formats. It can also save all streamed content to a file. MEncoder is a accompany program which can take input stream or file and transcode it into several different output formats.	http://mplayerosx.sourceforge.net
12.		Videostreaming	MediaGoblin Plumi Kaltura	Stream videos from all popular video file formats. Also supports motion jpeg. Stream video from host computer. Can host any number of pre-recorded video files Streamed video can be view from any web browser with flash plugin or in windows Media player		Teachers or instructors can set up video broadcasts of video content or classes on their webpage or through email invitations to watch streamed content.	http://www.nchsoftware.com/broadcam/index.html
13.	Online Lectures /Webinars/Remote Participation	Open Meetings	Adobe Connect Blackboard Collaborate Mega Meeting	It is used for presenting, online training, and web conferencing. It also includes collaborative whiteboard drawing and document editing and user desktop sharing.		It is browser based software which can setup instantly a conference in the web. One can use microphone or webcam, can share documents on a whiteboard or can even share screen and may also record meetings using Open meetings. It provides an excellent platform for video conferencing, instant messaging, whiteboard, collaborative document, editing and other groupware tools. It is available on hosted device as well it can be downloaded and installed as a package. It can also accommodate any number of users.	http://openmeetings.apache.org/
14.	Interactive Content Creation	Xerte	Adobe Authorware Articulate + Articulate storyline HotPotatoes Qwizdom	It can successfully be integrated with online videos and many other web based tools.		It is a free, open source content creation tools. Interactive contents can be prepared using this toolkit with rich media and high accessibility. It provides simple online tools that can be easily used in creating content rich interactive learning materials. Content so created using Xerte can be easily shared or repurposed or exported for online use.	http://www.xerte.org.uk/index.php?lang=en
15.	Ebook	ApacheOpe	Microsoft	Word processor		It is a complete package of all office	http://openoffice.a

	Authoring	nOffice LibreOffice NeoOffice	Office Adobe Acrobat	Spreadsheet (Calc) Presentation Application Data Management Application (Base)		tools as in Microsoft Office. Its default file format is ODF i.e Open Document Format which is an ISO/IEC standard.	pache.org/ https://en.wikipedia.org/wiki/OpenOffice
16.		Sigil	iBooks Author Adobe InDesign	Can be used for files in .TXT,HTML and .EPUB format		It is free, open source-book editor for files in .EPUB format. It is handy to use in importing files and edit e-books. Creation and editing of e-book can be successfully possible using tis software.	http://sigil.en.softonic.com/
17.		eBook Speaker		Can orate webpage, text, word, rtf, email, excel, pdf or clipboard data.		Word to speech software which can read the text documents loudly and can convert .wav file so that it be listened at anytime and anywhere.	http://web.inter.nl.net/users/lemmensj/homepage.uk/eBook-speaker.html http://www.prlog.org/10371107-ebook-to-speech-text-speaker-software-converts-word-to-voice.html
18.		Etherpad Gobby	Google Docs	Supports imports/exports to many major data exchange formats.		These are used for creating collaborative documents. Online Editors which helps in collaborative editing.	
19.	E-portfolio	Mahara		Mahara imports and exports data and allow user to take content from one installation to other.		Mahara is customisable and flexible. It is the learning environment which is blend of social networking tools. In which one can share his/ her views, ideas and knowledge. Digital	https://mahara.org/
				Contains tools like: Users blogs File manager View creator		portfolio can easily be created using this software.	
20.	Discussion Forums	Vanilla Phpforums	PHPBB Forum Engine	It is termed as lightweight internet package which is written in the PHP scripting language. Full Featured discussion forums. Forum hosting is free. Variety of the themes can be applied. Categories can be formed for forum as per the registration type for users.		Vanilla Forums are open-source, standards-compliant, customizable discussion forums. It is pluggable, themable, multilingual community – building product to host a forum on the server's infrastructure. It fosters customised community participation which automatically creates contents and it drives members to pool their ideas.	http://vanillaforums.org/
21.	Graphics	OpenGL	DX Studio Electric Image Animation System	It language and platform independent		Open Graphics Library is a cross language multiplatform API for developing 2D and 3D computer graphics. It is generally used in CAD, virtual reality, scientific visualisation, flight simulations and video games.	http://www.opengl.org/
22.	Interactive Whiteboard	OpenSankore	SmartBoard	Range of tools can be adapted as per user's requirements.		It is also translated into many different languages. Course contents can be supplemented with flash animations, images, audio, videos or by including existing .pdf or .ppt	http://www.opensstudent.ca

	Softwar e					documents.	
23.	Classro om Manage ment	iTALC (Intelligently Teaching and Learning with Computer)	Master Eye	It is powerful didactical tools for teachers. It can control other computers on the same network.		Monitoring of computer lab is possible. Students from home can also join lessons via VPN connections.	http://italc.sourcef orge.net/ http://en.wikipedi a.org/wiki/ITALC
24.	M-Educati on	Molly	Microsoft Office Mobile	Molly is a web-based application framework targeting all phones, 'smart' or otherwise. Native applications can only target a few classes of device, leaving a large number of potential users unable to use the service.		Molly is a framework for the rapid development of information and service portals targeted at mobile internet devices. The framework follows a philosophy, featuring a wide variety of applications and connectors to common and standards-based systems including the Sakai Virtual Learning Environment.	http://mollyproje ct.org/
25.	Manage ment Informat ion System (MIS)/S tudent Records	A1 Academia	SIMS (School Information Management System)	It contains the following features and modules: Admissions module Registration Module Class Scheduling Curriculum Management Workload Management Facilities Management Class Attendance Accommodation Management Financial Aid		It is an Enterprise Academic Management Solution. It is a complete bundle of administrative and university's management functions especially designed for higher learning institutions. It contains entire set of information regarding processes, records, curriculum and administrative tasks. Reference:https://en.wikipedia.org/ wiki/A1_ERP	http://academia. a1.io/
26.		Fedena		Requires ruby The following are main modules of this source tool: Admissions examinations Attendance Hostel library Transport	Education Department of Government of Kerala	Can automate the tasks of managing a school.	http://projectfeden a.org/ Pandey Vinayak, Use Fedena to Manage Your School, Page No. 42-43 Linux, Vol 10, November, 2012 Issue
27.		School Tool Open student		Student contact management Calendars for the school Resource Allocation Teacher grade books Class attendance Report card Generation		Complies student information system, their grade book, attendance, calendaring and reporting This tool is mainly used for primary and secondary schools. Applications can be customised as per the requirement of schools.	http://www.scho oltool.org/
28.	Science Educati on	Scilab	MATLAB MAPLE	User can write programs in its own programming language. Can accommodate hundreds of mathematical functions		Designed for scientific and numerical computations.	https://www.scila b.org
29.		Maxima	MATLAB Mathematica Maple Mupad MathCad	Complete programming language. Is available on Linux as well as Windows.		Full-featured computer Algebra system. Specializes in symbolic operations	http://maxima.en .softonic.com
30.		Grace		Available both on Windows and Linux		Graph plotting tool Can be used for both linear and nonlinear curve fitting	http://www.graces oftware.com

31.		Celestia	TheSky (astronomy software)	3D Astronomy Programme Available for Linux, Windows, Mac		Programme which can depict the Universe at any point of time and from any place. Celestia displays the orbital path of any object, allows users to orbit around the plants and track various objects in space.	http://www.shatters.net/celestia
32.		Avogadro	3D Molecules Edit and Drill Accelrys Draw ChemDoodle ACD Chemsketch	Designed for cross-platform		Used for students and researchers An advanced molecular editor and visualize. Designed for use in computational chemistry, molecular modeling, bioinformatics, material sciences and related area.	http://avogadro.openmoleculesnet/wiki/Main_Page
33.		Latex	WinEdt (Shareware), Scientific Word	Can be used in any platforms	American Mathematical Society	Used to produce scientific documents, especially where mathematical symbols are used.	http://www.latex-project.org/
34.	Statistics	R-Project	IBM SPSS	A well-developed, simple and effective programming language which includes conditionals, loops, user-defined recursive functions and input and output facilities.		Is used for Data Analysis & Presentation It is used in statistical computing and graphics.	http://www.r-project.org http://www.r-project.org/
35.	Accounting and Finance	Eqonomize Skrooge Grisbi	SAP BusinessOne Sage Tally Traverse Microsoft Money			Software with which one can create accounts, record incomes and expenses and can schedule transactions for a financial year.	http://eqonomize.sourceforge.org http://www.grisbi.org http://skrooge.org Reference: http://en.wikipedia.org/wiki/Comparison_of_accounting_software.

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