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## Free and Open Source Software Movement in LIS Profession in Pakistan

Ata ur Rehman

*National Centre for Physics - NCP, Islamabad - Pakistan, ata.rehman@gmail.com*

Khalid Mahmood

*University of the Punjab, Lahore, Pakistan, khalid.dlis@pu.edu.pk*

Rubina Bhatti

*The Islamia University of Bahawalpur, Pakistan, dr.rubytariq@yahoo.com*

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## **Free and Open Source Software Movement in LIS Profession in Pakistan**

### **Ata-ur-Rehman**

Manager (Library)

National Centre for Physics (NCP), Islamabad &  
M. Phil Scholar, The Islamia University of Bahawalpur

Email: ata.rehman@gmail.com

### **Prof. Dr. Khalid Mahmood**

Professor, Department of Library & Information Science  
University of the Punjab, Lahore

Email: khalid.dlis@pu.edu.pk

### **Dr. Rubina Bhatti**

Assistant Professor, Department of Library & Information Science  
The Islamia University of Bahawalpur

Email: dr.rubytariq@yahoo.com

### **Abstract**

Free and Open Source Software (FOSS) movement has brought a series of alternative software solutions for almost all categories of software including Operating Systems, Database Systems, Web Servers, Programming Languages, Enterprise Resource Planning (ERP), Graphics, Games, Networking, and System Administration.

FOSS Movement has got a major share in the market of software from its beginning. Libraries are the early institutions which adopted computer packages for management of information and automation of library procedures. FOSS Movement is very popular in libraries around the world. Libraries have been blessed with Free and Open Source Software including Integrated Library Software, Digital Library Management, Content Management, Inter-Library Loan Management, Document Delivery Services, and other web-based services around the world including developing as well as developed countries.

FOSS Movement in LIS Profession of Pakistan is not very old. It started in mid of the first decade of 21<sup>st</sup> century and started the journey slowly. But now after five to six years, it is getting popularity in all type of libraries in the country. The purpose of this study is to explore the current status of FOSS Movement in Pakistan and the efforts made by the individuals or LIS organizations to promote Free and Open Source Software in Pakistan. This paper has also suggested measures to be taken in future to promote FOSS movement.

The methodology of this study is based upon the literature review and interviews of some key persons involved in Free and Open Source Software in LIS in Pakistan have been conducted.

**Keywords:** Software, Open Source Movement, Libraries, Pakistan.

**Paper type:** Research Paper

## **1- Background of the Study**

Free and Open Source Software, usually abbreviated as FOSS, F/OSS or simply OSS is a very important and popular category of software in the world. Richard Stallman (A long time Programmer at Massachusetts Institute of Technology – MIT from 1971 to 1983) founded the movement and introduced GNU (Abbreviation of GNU's Not Unix) manifesto. The purpose of GNU project was to develop a UNIX like Free and Open Source Operating System to be launched under a public license, GPL (General Public License). Linus Torvalds, a second year student at the University of Helsinki developed a UNIX like operating system in 1991 which is known as Linux now. The outcome of this movement is a long list of very useful Free and Open Source Software in every category of life. FOSS software are very popular in every continent of the world.

Libraries in all over the world adopted the software system for cataloging, classification and dissemination of information. In Pakistan, FOSS Movement is relatively at early stage and the movement is spreading slowly but steadily. Although a few articles are available about the perception of LIS community towards FOSS and adoption but there is a need to record the history of FOSS Movement in Pakistan. This study is an effort to fill this gap in literature about FOSS Movement in Pakistan.

## **2- Problem Statement and Objectives of the Study**

Free and Open Source Software Movement has provided alternatives for almost each category of information management systems. Libraries of Pakistan are also adopting Free and Open Source Software for daily tasks of libraries including Integrated Library Systems, Digital Library Systems, Content Management Systems, etc. Professional associations of library and information science (ILS) and individuals have contributed a lot for the promotion of this movement and FOSS in Pakistan by creating awareness among library professionals and by

taking active part in the development and customization of favorite library software in last few years. The objective of this study is to keep the record of all these efforts of professional bodies and individuals. Another objective of the study is to find out the hurdles involved in the promotion of FOSS in Pakistan.

### **3- Methodology**

Literature review and interviews of the eminent experts of Free and Open Source Software in country has been chosen to conduct this study. For this purpose the researchers interviewed nine eminent scholars and activists of FOSS thorough phone, chat, e-mail, video chat, etc (List of respondents is given as Annex I) and got their point of view about the FOSS movement in Pakistan. For this purpose a semi-structured interview method was used and questions related to the history of FOSS, their role and activities in this movement, future of FOSS and suggestions for the promotion of FOSS were asked. Also the activities of these individuals have been noted from the archives of major LISTSERVS (PakLAG, Librarianwelfare, Libcoop, etc). Archives of official websites of library science professional bodies have been used too. For this purpose the information has been recorded from the following websites:

- LISolutions <http://lisolutions.org/>
- PakLAG <http://www.paklag.org/>
- PLWO <http://www.plworg.com/>
- PULISAA <http://www.pulisaa.org.pk/>

### **4- Literature Review and Discussion**

Herman (2008) states that in early ages of software development (1950's and onward), computer companies provided the software along with hardware. As hardware was the major focus of these companies, the price of software was very low or nominal. Programmers at the

time had grown up in an era of freely shared software, much the same as many share cooking recipes.

Open Source Software, abbreviated as OSS is computer software that is released under some free/public license and it permits users to study, change and improve the software (Kandar, Mondal & Ray, 2011). This provides a great liberty for users to have the ownership of software in real sense. Scerikar and Jang (2006) stated that Open Source Software evolved into a sophisticated movement during 1970's to 2000's which has produced very stable and useful software packages and after 1998, this movement has become a revolution in software development industry. This movement of twenty years or so has drawn increasing attention in organizations of all sizes – commercial, non commercial and governmental and even with individual consumers as high quality consumer-oriented OSS products have emerged (Carillo & Okoli, 2008). “A key aspect of [FOSS] is the availability of the source code – the human-readable text files used to create the program. Accessing the source code allows anyone to examine the program to see how it works, fix bugs, or change it to suit personal needs. Like freedom of speech, one does not need to use source code to benefit from it” (Pfaffman, 2007).

#### **4.1- Role of Richard Stallman**

Richard Stallman, a longtime software developer at Massachusetts Institute of Technology (MIT) announced GNU project in 1983 saying that he had become frustrated due to the new changes in the philosophy of software industry. It was the time when many commercial companies started developing commercial software and they hired the software developers on commercial basis. But Richard Stallman left MIT, started GNU project, and launched Free Software Foundation (FSF). The main purpose of this foundation was to secure right of freedom of users. According to Free Software Foundation, Free Software is the software that provides the following freedoms for the users:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and adapt it to your needs (freedom 1).

Access to the source code is a precondition for this.

- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.

#### **4.2- Open Source Movement**

Richard Stallman is the founder of this movement and the main goal of the movement is to give freedom to computer users by replacing software which has restrictive licensing terms. Open source movement is a social movement and all people of the world must be blessed with this movement (Kandar, et al., 2011)

According to Keats (2009), In the late 90s, a group of people who were unhappy with the single-minded emphasis of Richard Stallman and the FSF on freedom, and who had personal differences with Stallman, developed the concept of open source and formed their own movement to promote it. The focus of this parallel movement was on the shorter-term business benefits, particularly software quality, rather than on the freedoms of users. The main argument for the term open source software is that the concept of “free” is ambiguous and that business people are somehow afraid of, or uneasy about the idea of freedom.

The Open Source Initiative (OSI) was founded in 1998 as a nonprofit education and advocacy group for open source software (Tiemann, 2009). Open Source Initiative (<http://opensource.org/>) describes the following criteria for Open Source Software as Open Source Definition (OSD):

- 1- Free redistribution of software

- 2- Source code should be available
- 3- Derived works
- 4- Integrity of the author's source code
- 5- No Discrimination against Persons or Groups
- 6- No Discrimination against Fields of Endeavor
- 7- Distribution of License
- 8- License Must Not Be Specific to a Product
- 9- License Must Not Restrict Other Software
- 10- License Must Be Technology-Neutral

Trainor (2009) describes that one of the biggest advantages of the open source model is that all users of the product have the potential to contribute to its development. So everyone has liberty to enhance the functionality of any OSS.

A critical issue that is related to FOSS is the quality assurance model of software and these software are not much user friendly in usage. Tawileh and Rana (2006) state that end users usually argue that the FOSS community is technology-centric and the community feels difficulty to adopt FOSS.

### **4.3- Open Source Software (OSS) and Libraries**

Libraries are the early users of computers and software. Libraries started using software in 1960s and word processors, spreadsheets and other packages were being used for day to day operations of libraries. During 1960s the term library automation was being used for automating the library procedures. Development on a standard for catalog sharing was started in 1967-68 and it was named as Machine Readable Catalog (MARC).

Rafiq (2009) says that most of the libraries in developing as well as developed countries do not afford to purchase costly commercial software and FOSS have more attraction for them.



There are many state of the art library software projects available in FOSS category for all kind of routine procedures. An initiative in this regard was the establishment of Open Source Software for Libraries (OSS4Lib Project – <http://www.oss4lib.org/>) at Yale Medical Library in early 1999. The mission of oss4lib is to build better and free systems for use in libraries. Toward this end, it maintains a listing of free software and systems designed for libraries (the physical, books-on-shelves kind), and it tracks news about project updates or related issues of interest (Chudnov, 2005). Libraries are reengaging with software development projects and a dozen of library projects are being developed by library community (Schneider, 2009).

A general perception about the Use of Free and Open Source Software is that it is necessary to have the programming skills to use a FOSS. According to Rafiq and Ameen (2009), “OSS applications require both an LIS and IT skill set. This issue can be addressed with the induction of IT professionals in libraries. Pakistani libraries, especially the large one like university libraries, may introduce new designations like system librarian, computer programmer, etc.”

According to Hoy and Koopman (2008), “The use of FOSS in libraries is gaining ground in parts of the world where there is sufficient technical expertise to provide support and the library market is big enough to support its use. In the developing world FOSS expertise needs to be fostered by governments to make sure its use is viable, particularly as the markets are small and expertise is lacking.”

In Pakistan, Free and Open Source Movement is relatively new and still in its early stages. Open source software has become more common in the library and in everyday life (Petrich, 2009). According to library professionals who participated in this study, the first Free and Open Source adopted in Pakistan was Greenstone Digital Library Software (GSDL) by

United Nations Digital Library in 2000-01 ( $n^1=2$ ). But it is the matter of fact that GSDL after its implementation at UN Digital Library could not get popularity till the last week of June 2006 when a Sample Multilingual Digital Library was launched by the University of Management and Technology Library with documents in English, Urdu and Arabic language. Another development in this regard was the First National Workshop on Greenstone Digital Library Software by PakLAG at Islamabad on June 22-24, 2006. In the mean time, Mehran University of Engineering and Technology, Jamshoro launched another Free and Open Source Software, Zebra Indexing Server to put their library catalogue on LOC Z39.50 gateway. This information was shared by a senior library professional, Mumtaz S. Memon who gave her presentation on MARC 21 and shared the success story of launching z39.50 catalogue on LOC Gateway using Free and Open Source Indexing Server, Zebra in a workshop at National Agricultural Research Centre (NARC), Islamabad in 2005. This presentation opened a new opportunity for library professionals and PakLAG took the lead and arranged a few hands on trainings on Zebra Server, Yaz Client and MARCedit utility to convert existing library catalogue into MARC21. PakLAG team launched many library catalogues on LOC gateway during this time.

A few Free and Open Source Software which are being used in Pakistani libraries are Koha ILS, Greenstone Digital Library Software (GSDL), DSpace, EPrints, Zebra Indexing Server, etc.

Koha is a full featured open source ILS (Integrated Library System) currently being used by libraries all over the world (Randhawa, 2008). It is MARC and z39.50 compliant library system for all type of libraries. It is web-based software that has been built on LAMP (Linux, Apache, MySQL, Perl/PHP) platform. A large number of libraries in the world are using Koha ILS for library automation.

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<sup>1</sup>  $n=?$  refers to the number of individuals having this point of view

Rafiq and Ameen (2010) conducted a survey of sixty one (61) university libraries in Pakistan to find the use of Free and Open Source Software and found that only three libraries (4.9%) were using Koha ILS but as far as the intentions of the library professionals are concerned, 47.8% library professionals said that they would adopt Koha ILS in future.

Greenstone Digital Library Software is another open-source software for the construction and presentation of digital information (Randhawa, 2008). “Greenstone is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM. Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato, and developed and distributed in cooperation with UNESCO and the Human Info NGO. It is open-source, multilingual software, issued under the terms of the GNU General Public License” (About Greenstone, <http://greenstone.org>).

Rafiq and Ameen (2010) reported that out of twenty libraries, seven libraries were using Greenstone Digital Library Software (35%) and three libraries were using EPrints (15%) in Pakistan. 90.9% libraries told that they would use Greenstone Digital Library Software (GSDL) in future.

DSpace is an institutional repository creating software. It is also an open-source software designed and developed by Massachusetts Institute of Technology (MIT) Libraries and Hewlett-Packard (HP). Document submission in DSpace is very easy and management and access of digital contents is very systematic. DSpace supports PDF, HTML, JPEG and other favorite file formats.

Zebra Server is z39.50 indexing server by Indexdata. Zebra server is used for indexing of MARC data to retrieve by using some z39.50 client. Yaz is a very simple client to search the MARC records from Zebra Server. This data can also be accessed by other Integrated Library Software (Koha, Virtua, etc).

Other Free and Open Source Software in libraries are EverGreen (ILS), WordPress (Blogging / Content Management), Joomla (Content Management System) and Zotero (An extension of FireFox browser used for citation management).

### **5 – Findings and Discussion**

In Pakistan, Koha ILS was first introduced at University of Management and Technology (UMT), Lahore in 2006 (n=2). Then further explored at NRSP-IRM (Now N-IRM) and its first public catalogue was launched at N-IRM (Rehman, 2007). Pakistan Legislative Strengthening Project (PLSP) was started in 2005 and the objective of this project was to automate the libraries of four provincial assemblies (Punjab, Sindh, Balochistan, NWFP/KPK). Koha ILS (for windows) was selected for this project. This project included software deployment and data conversion of existing library catalogue (Rafiq & Ameen, 2009).

Rafiq and Ameen (2009) describe that 60 percent of respondents to their survey mentioned lack of budget (finance) as their number one problem in library automation. Therefore, FOSS can be an alternative for library automation in libraries of Pakistan. Establishment of Digital Library Network of South Asia (DLNetSA) is a major development for the promotion of Free and Open Source Software in South Asia and LISolutions is working as member of DLNetSA and National Node of Pakistan. LISolutions has also been elected as vice chair of DLNetSA for two years in 2010. The major objective of DLNetSA is to promote Greenstone Digital Library Software (GSDL) and Koha in South Asia (n=1).

Development of Koha-GSDL integration LiveCD and an international training on GSDL-Koha integration using DLNetSA LiveCD in Pakistan are the major achievements of DLNetSA. Dr. Mohan Raj Pradhan, General Secretary of DLNetSA from Nepal was one of trainers in this training.

Promotion of Free and Open Source Movement in Pakistan can be studied deeply by exploring the following aspects:

- 1- Capacity building of library professionals through seminars, trainings, workshops and talks
- 2- Development and enhancement in FOSS
- 3- Research activities for the promotion of FOSS

### 5.1- Seminars, trainings, workshops and talks

Capacity building of library professionals for the adoption of FOSS is very important. Analysis of interviews of library professionals associated with FOSS movement shows that many events have been conducted by individuals and organizations. The list of trainings, workshops, seminars and talks is given in table 1.

**Table 1. Events for capacity building of professionals in FOSS adoption**

<i>Sr</i>	<i>Event</i>	<i>FOSS</i>	<i>Type</i>	<i>Organizer</i>	<i>Place</i>	<i>Dates</i>
1	National Training Workshop on Koha, Dspace and LibraryWorld	TLS (Koha, DSpace)	Hands on Training	PLWO	Karachi	July 25-26, 2011
2	International Training on e-Library	GSDL, Koha	Hands on Training	LISolutions, DLNetSA	Islamabad	July 20-22, 2011
3	National Training on Total Library Solution – TLS	TLS (Koha, DSpace, GSDL, Joomla, WordPress)	Hands on Training	LISolutions	Lahore	July 9-10, 2011
4	National Workshop on PakLAG Koha with Dspace	PakLAG Koha, DSpace	Hands on Training	PakLAG	Islamabad	June 27-29, 2011
5	Training on “Open Source Tools for Digital Archives”	GSDL	Hands on Training	LISolutions	Islamabad	March 12, 2011
6	One-Day Workshop on Research by Using Open Source Software	Zotero	Lecture / Demo	PLWO	Lahore	February 19, 2011
7	A talk on “Free and Open Source Alternatives for Library Operations”	Multiple FOSS	Talk / Lecture	PULISAA	Lahore	January 15, 2011
8	Three days training on Koha 3.2	Koha (Linux)	Hands on Training	LISolutions	Sargodha	October 28-30, 2010
9	MARC Conversion, Zebra Server and uploading catalogue on Library of Congress gateway	Zebra Server	Hands on Training	PakLAG	Karachi	October 2, 2010
10	Seminar on Promotion of Free and Open Source Software in Pakistan	Multiple FOSS	Seminar / Lecture	LISolutions	Islamabad	August 6, 2010
11	2nd Two day Training of Koha Library System	Koha (Linux)	Hands on Training	LISolutions	Bahawalpur	June 15-16, 2010
12	Seminar on Need for Establishment of National Node of GSDL in Pakistan	GSDL	Seminar / Lecture	LISolutions / PLC	Karachi	June 10, 2010
13	PakLAG Koha Orientation Seminar	PakLAG Koha	Demo	PakLAG	Karachi	March 20, 2010
14	1st Two Day Training of Koha Library System	Koha (Linux)	Hands on Training	LISolutions	Bahawalpur	March 03-04, 2010

15	3rd National Workshop on Koha ILS	Koha (Windows)	Hands on Training	PakLAG	Lahore	August 30-31, 2008
16	2nd National Workshop on Koha ILS	Koha (Windows)	Hands on Training	PakLAG	Islamabad	June 25, 2008
17	1st National Workshop on Koha ILS	Koha (Windows)	Hands on Training	PakLAG	Islamabad	May 30-31, 2008
18	Training for Information Professionals	GSDL, Other topics	Seminar / Demo	KIMS	Islamabad	March 17-18, 2007
19	1st National Workshop on Greenstone Digital Library Software	GSDL	Hands on Training	PakLAG	Islamabad	June 22-24, 2006
20	3rd Workshop on Advance Library Automation	Zebra Server	Hands on Training	PakLAG	Islamabad	February 02-03, 2006
21	2nd Workshop on Advance Library Automation	Zebra Server	Hands on Training	PakLAG	Lahore	July 15-16, 2005
22	1st Workshop on Advance Library Automation	Zebra Server	Hands on Training	PakLAG	Lahore	July 8-9, 2005

## 5.2- Software Development

As the philosophy of FOSS is based upon sharing every person in the community of practice can participate in the up gradation process of any OSS. As Koha and Greenstone Digital Library Software are the two favorite library software, users have added new functionality and a few new features have been added to customize them according to their needs. PakLAG Koha is an example of customized version of Koha for Windows. “PakLAG team started working on PakLAG Koha in April 2007” (Shafiullah, 2011). A new module of patrons card generation has been included along with virtual keyboard, Urdu spine label creation module and Urdu MARC record export functionality (n=3). Now PakLAG has made PakLAG Koha (for Windows) free and also launched its latest version Koha 3.4.3 (Fedora version) with DSpace (Institutional Repository) software free of cost (Shafiulla, 2011). LISolutions’ has also added a few reports and on-screen keyboard in Koha (Windows Version) and source code to this enhancement is available at LISolutions’ website (n=1). Similarly UN Digital Library team has customized the look and feel of GSDL to match with the current color scheme of UN website (n=1). National Rural Support Programme – Institute of Rural Management (NRSP-IRM, now known as N-IRM) has also customized the user interface of AHKRC Digital Library (Akhter Hameed Khan Resource Center Digital Library) and this collection can be accessed at <http://ahkrc.net.pk/>.

As we have discussed earlier that the use of FOSS require some technical skills because the deployment method is not easy for a lay man. Keeping in view the users' skill set in mind, some efforts have been made to make the process of deployment and configuration easy. Total Library Solution (TLS) by LISolutions is such an effort. It is a suite of Free and Open Source Software preinstalled and pre-configured and users need not to worry about the lengthy procedures of installation and configuration. This is a Live DVD that can be found on world's largest FOSS portal Sourceforge (Rehman, 2011). PakLAG has also launched a USB version of Koha on Linux to make the installation and configuration process easy (n=2). Translation of GSDL interface in Urdu language is also an on going project of GSDL with the collaboration of LISolutions. For this purpose, LISolutions has engaged volunteer library professionals who are working on the translation of GSDL.

### **5.3- Research Activities**

Research activities can play very important role for the promotion of FOSS movement in Pakistan. The following researches have been conducted in Pakistan in the last few years.

- 1- Rafiq, M. (2009). LIS community's perceptions towards open source software adoption in libraries. *The International Information & Library Review*(41), 41(3), 137-145.
- 2- Rafiq, M., & Ameen, K. (2009). Issues and lessons learned in open source software adoption in Pakistani libraries. *Electronic Library, The*, 27(4), 601-610.
- 3- Rafiq, M., & Ameen, K. (2010). Adoption of Open Source Software in Pakistani Libraries: A survey. *Information Age*, 4(3), pp 35-38.
- 4- Ata ur Rehman, M. Phil Thesis on "Use of Free and Open Source Software in University Libraries of Pakistan" (Cont.) at Department of Library and Information Science, The Islamia University of Bahawalpur

- 5- Farasat Shafiullah, "From LAMP to Koha: Case study of the Pakistan legislative assembly libraries" presented in KohaCon 2010 at Wellington New Zealand (25-27 October 2010)

## **6 – Conclusion**

Free and Open Source Movement in Pakistan is in early stages but progressing steadily. Professionals of LIS are playing very important role in adoption of FOSS in their libraries. There is a dire need to organize hands on trainings and workshops for Free and Open Source Software for library professionals by professional bodies including PLA. To get the benefits of Free and Open Source Software, it is necessary to encourage the research activities in this field from LIS schools.

Efforts for the promotion of Free and Open Source Software should be acknowledged by library professionals to make this movement successful so that an alternative of commercial software may be available for every library having low budget.

## **7 – Recommendations**

Following recommendations have been made by the participants of the study to speed up the FOSS movement in Pakistan:

- 1- Pakistan Library Association should realize the importance of Free and Open Source and solid steps should be taken for the promotion of Free and Open Source Movement.
- 2- FOSS should be included in the curriculum of MLIS Library Science in all Library Schools.
- 3- Individuals and professional bodies working on Free and Open Source Software should work in collaboration.



- 4- University Libraries should fund Free and Open Source Projects for customization of software for local needs.
- 5- Alternative support for Free and Open Source Software should be available on pay for support model.

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***Participants of the Study:***

The following library professionals were interviewed for this study:

1. Amir Rasul, Hafiz - National University of Science and Technology (NUST) - Islamabad
2. Ashfaq Hussain – Supreme Court of Pakistan - Lahore
3. Bushra Almas Jaswal - Forman Christian College - Lahore
4. Farasat Shafi ullah – National University of Science and Technology (NUST) - Islamabad
5. Muhammad Ajmal Khan – Pakistan Library Automation Group (PakLAG)
6. Muhammad Rafiq - International Relief & Development (IRD) - Afghanistan
7. Muhammad Rafiq Awan – The Islamia University of Bahawalpur - Bahawalpur
8. Mumtaz S. Memon - Mehran University of Engineering & Technology, Jamshoro
9. Nadeem Siddique – Lahore University of Management Sciences (LUMS) - Lahore

***Interview Questions:***

1. What is your role in the introduction/adoption of Free and Open Source Software in Pakistan?
2. In which capacity you have worked for FOSS Movement in Pakistan?
3. In your point of view, what are the important steps taken by individuals or organization for FOSS Movement in Pakistan?
4. What steps can be taken to promote FOSS in Pakistan?
5. What are the major hurdles in adoption of FOSS in Pakistan?