

Ethical ptonciples in Sofyware Security from Islamic Perspective

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Ethical Principles in Software Security from Islamic Perspective

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ABSTRACT:

The ethical principles in software security are a dynamic and complicated field of study and involve security and exchange of information across networks unethically, which rise a big concern to researchers and specialists. Computer ethics focuses on human endeavors influenced or directed by use of computer technologies. In this paper we will demonstrate the basic principles of ethical practices in development of computer applications and software based on the perspective of Islam and attempt to converge between the ethics of Islam and the current ethical standards in ICT. The study concluded that adopting the Islamic ethics in workplace as stated in Quraan and Hadith of prophet Mohammed Peace be upon him is the only way to protect computers users from all kinds of attack and be safe from unethical behaviors. The study recommended educating the morals of Islam in all educational institutes, especially to students in Faculties of Information Technology to reinforce the Islamic ethics among software developers.

Ethical ptonciples in Sofyware Security from Islamic Perspective

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Keywords: Software Security, Islamic Perspective, Unethical Crimes, Ethical Principles.

ملخص البحث:

تعد المبادئ الأخلاقية في أمن البرمجيات مجالاً دراسياً ديناميكياً ومعقداً ويشتمل على أمن وتبادل المعلومات عبر الشبكات بشكل غير أخلاقي، مما يثير قلقاً كبيراً لدى الباحثين والمتخصصين. تركز أخلاقيات الكمبيوتر على المساعي البشرية التي تتأثر أو توجه باستخدام تقنيات الكمبيوتر. سنعرض في هذه الورقة المبادئ الأساسية للممارسات الأخلاقية في تطوير تطبيقات وبرمجيات الكمبيوتر من منظور الإسلام ومحاولة التقارب بين أخلاقيات الإسلام والمعايير الأخلاقية الحالية في تكنولوجيا المعلومات والاتصالات. وخلصت الدراسة إلى أن اتباع الأخلاق الإسلامية في مكان العمل كما جاء في القرآن الكريم وحديث النبي محمد صلى الله عليه وسلم هو السبيل الوحيد لحماية مستخدمي أجهزة الكمبيوتر من جميع تعدد المبادئ الأخلاقية في أمن البرمجيات مجالاً دراسياً ديناميكياً ومعقداً ويشتمل على أمن وتبادل المعلومات عبر الشبكات بشكل غير أخلاقي، مما يثير قلقاً كبيراً لدى الباحثين والمتخصصين. تركز أخلاقيات الكمبيوتر على المساعي البشرية التي تتأثر أو توجه باستخدام تقنيات الكمبيوتر. سنعرض في هذه الورقة المبادئ الأساسية للممارسات الأخلاقية في تطوير تطبيقات وبرمجيات الكمبيوتر من منظور الإسلام ومحاولة التقارب بين أخلاقيات الإسلام والمعايير الأخلاقية الحالية في تكنولوجيا المعلومات والاتصالات. وخلصت الدراسة إلى أن اتباع الأخلاق الإسلامية في مكان العمل كما جاء في القرآن الكريم وحديث النبي محمد صلى الله عليه وسلم هو السبيل الوحيد لحماية مستخدمي أجهزة الكمبيوتر من جميع أنواع الهجمات ويكون في مأمن من السلوكيات غير الأخلاقية. وأوصت الدراسة بتنقيف الأخلاق الإسلامية في كافة المعاهد التعليمية وخاصة لطلبة كليات تكنولوجيا المعلومات لتعزيز الأخلاق الإسلامية لدى مطوري البرمجيات.

الكلمات المفتاحية: أمن البرمجيات، المنظور الإسلامي، الجرائم غير الأخلاقية، المبادئ الأخلاقية.

1.Introduction

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

The issue of security and exchange of information across networks rise a big concern to researchers and specialists , and also the international organizations and the world associated with it also, in view of the importance of the superior information technology in various spheres of life in this day and age , but there is doubt that the increasing reliance on information and networks also increases the impact of dangers that may be encountered , and therefore must be continued operations seek to address these risks and interest in the development of methods and technical means necessary to confront these dangers compliance with the principles and values of Islam.

Nowadays software involve in many critical applications such control systems, health and human life guard systems, financial and banking systems, scientific and educational systems, entertainment and games, and other systems related to different aspects of human life[1]. Ethics is a branch of philosophy that is concerned with human conduct, more specifically the behavior of individuals in society, and ethics involves not only on human relationships but also in non-human entities such as computer software. Ethics examines the rational justification for our moral judgments; it studies what is morally right or wrong, just or unjust[2] .

The ethics in computer is defined the field of study involving the concepts of ethics, facts and morals values regarding rapidly increasing computer technologies. Computer ethics is mainly focuses on human actions influenced by use of computer

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

technologies in the right way without breaching the privacy and confidential information associated with the user[3] . An example of unethical ways in information technology is hacking an e-mail account, writing a program script that spy on user's confidential data, generating unethical graphics, designing spy software and malware, processing information where human ethics could be implemented improperly

Currently computer users are facing ethical many challenges in a daily bases with the increasing complexity of information technology tools and systems. These ethical challenges are essential and should be eliminated or managed through adoption of Islamic values and way of life[4] .However, the users and the developers to computer software needs for morals and ethics more than even and Islam is a great source of rules that regulate the behavior of human, and this what people need in this age of information and communication technology. This is what happened to our society changes because of the development that has happened in the present era of information and communication technology , which has affected the ethics of Muslim community; either positively or negatively, no one can overlook the possibilities magnificent provided us information and communication technology , and especially after the merger of the computer and communications in the Internet and other means of communication and even in the western communities they can't ignore the negative consequences that resulted from

Ethical ptnciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

unethical development to computer software and related product of information technology, especially computer software that contradict ideologically and intellectually with people culture as in Muslim communities. Hence the reason for that has effects in the whole Muslim community all levels; whether at the individual or group level.

The Background of the Study

2. In this paper we will demonstrate the basic principles of ethical practices in development of computer applications and software based on the perspective of Islam and attempt to converge between the ethics of Islam in social life and legal practicing to computer software development. The paper will evaluate the Islamic values in implementing ethical practices in computer network security and intended to make a valued contribution to answering the ethical problems associated with ICT, and investigating the social and political questions associated with the use, adoption and development of ICT using ethical means.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

3. The Objectives of the Study:

The foremost objective of the study is to link Islamic work ethics to computer software and network security to use ethics. In addition, this paper will give intent look at:

1. To demonstrate the concepts of Islamic ethics for computer software and network security.
2. To evaluate the ethical issues of computer use and its enlightenment in point of Holly Quran and Hadith of prophet Mohammed Peace be upon him.
3. To set recommendations for managing Islamic ethics in computer software and network security.

4. Ethics in the Era of Information Technology:

Ethics is a field of study that is mainly focus on dividing the right and wrong actions and behaviors, and the distinguishing between what is deemed a good from bad. Ethical studies evaluate the morality of human behaviors, actions, regulations, laws and social environment, and suggest the best means to behave correctly in social life as well as in work. Ethicists attempt to justify their moral verdicts by mention to ethical principles of major theories that endeavor to capture people's moral perception about what is right and wrong. The two main theoretical approaches that are most common in the field of ethics are consequentialism and deontology. While Consequentialist approaches focus on actions are considered wrong to the extent that they have awful consequences, whereas

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

deontological approaches focus on people and assumes that people always have moral duties and works that be present independently of any good or bad consequences. Ethical principles then inform legislator how to organize law associated with ethics in work and social life, but it should be noted that ethics cannot act as a substitute for morality[5]:

Ethical actions and behavior in Information Technology is a include many debates and dedicated to advancing the discussion between moral philosophy and the field of information and communication technology (ICT). The first time ethics discussed in connection with information technology by mathematician Norbert Wiener in the 1940. He found some of the ethical issues and practices associated with the use of information technology improperly, which include[6] :

- Violating the copyright by unauthorized persons through downloading files and storing them without a permission of the copyright holders. This action is like stealing as described in Islam and breaches the ethical values of Islamic behavior.
- Spying and monitoring employees' emails and data stored electronically and other using work network to copy confidential of employees in the work. Again this is also a spy action which is prohibited in Islam completely.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

- Hackers are using unauthorized access to online databases associated with the company and employees, and in many case financial data, which critically affect the business of the company in this context a new study concluded to articulate the ethical principles of financial institutions as enshrined in the Qur'an and the Sunnah of the Prophet so that Islamic financial system will not lose focus and to avoid being carried away by the flamboyant and excessive profits and surpluses of the conventional financial institutions[7].
- Web sites installing cookies without permission of users and without they know about it, and then spyware and monitor user's online activities, and may get bank password and user name to steal money from user's bank account. To avoid these technical problems,the users Must have Islamic morals As recommended by the study adopting the Islamic ethics in workplace as stated in Quraan and Hadith of prophet Mohammed Peace be upon him is the only way to protect computers users[8].

Computer Ethics is a part of practical philosophy which deals with how computing professionals should make decisions regarding professional and social conduct. Margaret Anne Pierce, a professor in the Department of Mathematics and Computers at Georgia Southern University has categorized the ethical decisions related to computer technology and usage into three primary influences[9] :

- 1 .The individual's own personal code.
2. Any informal code of ethical conduct that exists in the work place.
3. Exposure to formal codes of ethics

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

There are many ethical dilemmas associated with computer applications that are frequently studied and evaluated by scholars in ethics in business and information technology. One of the main issues deals with some of the new ethical dilemma that have come out recently, or taken a new form, with boosting of Internet technology and Social Networking. However, currently there are many ways and techniques that considered unethical to acquire information about others users in the social network without their permission and in some cases when they are not available on the net. Therefore, ethical issues about information storage are now an increasing problem, and with the easy to store big volume of personal data on the social networking, a high risk of accessing these data by hackers become more critical problem for service providers. This produces another dimension to different ethical situations associated with unauthorized access, security, and hacking confidential information.

5. Unethical Crimes in Computer Security:

Since the First distributed attack networks were seen in 1999, computer misuse enabled by warms and other vectors has steadily grown. This rapid growth has given rise to it variety of ethical challenges for researchers seeking to combat these threats[10] .

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

The ethical issues in computer security affected the development of information technology systems dramatically in recent years. The crimes on the computer networks and information technology systems are classified as unethical actions and offense. The word crime in the language means the offense, which infringement or guilt, and the collection of word criminality and misdeeds, a crime. The offense and criminalizing is a criminal, and is known Islamic Sharia crime as "the legitimacy of prohibitions prohibited in Islam[11]" . Crimes in computer networks and the Internet defines as " [12]the kind of offenses that require familiarity with special techniques of computer and information systems for the commission or the investigation and prosecution of its actors[13]" , and can also be defined as "a crime that is committed if someone using know computerized work illegally[14]" and the researcher of this study defines as " any act of unlawful use it as a tool to access information of computer users without permission , and using this information unethically for the benefit of the hacker who is considered a theft of information, and this is defined a crime in Islam"

We can classify the crimes that take place through the use of information technology into several sections and each section regard to a particular type of unethical crimes that can be committed as follows:

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

1. Crimes aim to distribute information. In this kind be published confidential information has been obtained illegally through penetrations of information networks and disseminate this information to the public , and examples of the deployment of credit card information , bank and bank account numbers , as well as the dissemination of information intelligence on countries or people , as happened in penetrating CIA network (Figure-1)[15].



Figure-1: Image of CIA website before and after the break

2. Crimes aimed to promote rumors. In this crime publishing false information and incorrect or beliefs concerning persons or countries in order to disturb public order in the country , as well as the dissemination of rumors about some things and bring about confusion in the communities.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

3. Electronic fraud crimes. This crime involves the use of technology in the fraud in order to achieve a particular goal, such as falsification of credit cards , passports and other official documents and identification, which can be forged using advanced technological means , and also falls below operations bank transfer phantom accounts to another by penetrating the networks of banks.

4. Crimes of Information Technology. The most important example is its piracy operations that occur for computer programs that are original and make copies of them to be sold in the market instead of the originals, such as drivers or software applications are expensive, and that is imitated by pirates professionals in this field.

All the actions above are considered crimes and unethical offense that could affect the user to computer network and system very badly. However, all these actions are strictly prohibited in Islam as stated in Holly Quraan and the speech of prophet Mohammed ^{Peace be upon him}, and There are many unethical breach to computer security, as some them below:

1.An unethical employee is one who illegally accesses their company's network for numerous reasons. One could be the money they can get from selling top secret information, or some may be bitter and want revenge[16] .

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

2. People's perception and attitude towards computer ethics and information security significantly affect the way they use information technology. This is especially the case among university students who are generally regarded as major violators of computer ethics and computer security[17].

6. Components of the security of information Networks.

When we talk about the topic of " information security " and information networks , the first thing that comes to mind is how to maintain the confidentiality of information , and at the mention of crimes information we mean that it has been leaked this information , which means that there has been a violation of this secrecy , what are components of this system, which we call the information security or the security of information networks.

Specialists believe that information security is a complex process not consisting of three components are all equally important and serious, and these components are:-

Ethical principles in Software Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

First, the confidentiality of information Data Confidentiality

This aspect includes the actions and measures necessary to prevent informed unauthorized information that is applied to an item of confidential or sensitive information , and this is meant the security and confidentiality of information , and of course the degree of secrecy and the type of information varies from one place to another according to the policy in the same place , and examples of these confidentiality of information that must be: personal information of individuals , corporate financial budget before announcing , information and data private military armies and military sites in the country.

Second: Safety Information Data Integrity

This aspect is not the biggest concern is to maintain the confidentiality of the information , but have to maintain the integrity of this information from the fraud and the change after announcing publicly , it has the body what to announce financial information or other belonging to the body , and here comes the role of maintaining the integrity that this information will be protected change or fraud, and examples: the Declaration of ministries or universities for the names of students admitted to work out, is to protect these lists to be locked against change and forgeries delete names and put the names of the other causing embarrassment and legal problems for the institutions.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

Third, to Ensure Access to Available Information

Perhaps it makes sense to know that all the procedures and information industry basically aimed at one goal which is the delivery of information and data to the right people at the right time , and thus preserve the confidentiality of information and to ensure their safety and not to change it does not mean anything if he could not authorized persons or authorized access it, and here comes the importance of the third aspect of the aspects or components of information security is to ensure the access of information to authorized persons access to it through the provision of channels and means safe and fast to get that information , and in this aspect works vandals by various means, to deny and to prevent users from access to information such as delete information before access or even attack the devices store information and destroy or at least sabotage

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

The dangerous means the danger of internal attackers from within the scope of the information network, they are individuals or workers who belong to the same entity targeted , and perhaps this kind of risk is more deadly and dangerous than the threat of enemies external , and represents the greatest threat to the institutions , whether corporate or Government Organizations or even governments themselves, threat of invasion of privacy of the home is easy to happen and difficult to detect it in many cases , especially if the person the attacker has the power to access to system information networks do not face any difficulty in the operations of the security and confidentiality on the network and can even blur the attack and wipe out the effects of any entry easily, and can be summarized the most important aspects of internal dangers are as follows:

- Penetrate the internal networks of organizations.
- Penetrate information systems by theft or change or deletion of information.
- Find and create gaps in the security system of networks.
- Change the system to create information networks for the benefit of the attacker.

A report released in the United States in 2003 that 36 % of those are considered to be internal users are more dangerous to the information systems available within these institutions from external threat[18] .

Ethical ptnciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

But for reasons informational and maintain the prestige of companies and institutions, most of them focused policies on the operations of secure information networks where from external threats without internal, and here we can ask the question a project about the motivations that can drive a working in an institution or a government to a violation of the confidentiality of the information available and launching an attack can to the detriment of this body that works out, We find the answer to this in the following points:

- 1- Cases of dissatisfaction. Often describes investigations into cases of security breach of internal information networks for that reason it is a case of dissatisfaction when of the work towards the body that works out , whether this case dissatisfaction with physical or career or revenge of the director or so of personal reasons.
- 2- Self-assertion. Sometimes haunt the workers in the fields of information some moments of selfishness , which feels the individual his need to prove his ability to break through the barriers and violation of the privacy of the network, or access to databases protected by walls of secrecy , and so on just to satisfy his ego that he is able to challenge, or fame as happens in many cases of hackers penetrating government sites all over the world , has helped the spread of software protection and penetration to break a lot to try to carry out attacks to breach networks.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

3–Take advantage of material. It may be a hack in cases of unpaid competitors for the purpose of defeating or damage or theft of information or so, whereupon some of the companies and institutions for the purpose of bribing some people leaking information and penetration of information networks peer sums of money.

But the danger coming from abroad, the degree of severity is less, for several reasons, including that it was originally expected that there will be external attacks and therefore any network must be fitted with systems and security protocols that work to repel the attackers and attempts to breach security by her abusers , and the building networking is now a high degree of craftsmanship and precision so that organizers of the building and installation of networks is familiar with all types of attacks and intrusions followed by the hackers , but they are studied carefully and work to swift solutions to them and prevent them.

7. Islamic Ethics in Software Security

The Islamic ethics inspire the people to obey work ethically whatever the type of work. Nowadays most of business depends on computers and the security of computer software is highly critical especially for organizations specialist in confidential information such as financial, political, national security institutions. However the user for various computer applications should behave ethically as well as software developers.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

Therefore, the users should follow Islamic ethics like honesty, integrity, fairness in violating any ethical issues such as –use of time, privacy, security, intellectual property right, and etc. Here all of the issues relating ethical concerns are illustrated in the light of Islamic principles and conventional ethics.

Islam reinforces the sanctification of one's heart and mind to make it ready for any practices. One has to submit himself or herself to the Allah (SWT) completely. Takwah (farness of Allah) must be achieved as the main characteristic of a Muslim so that he/she doesn't lead to any offence which harmful for others. As He said in the holy Qur'an: "O you, who have believed, enter into Islam completely (and perfectly) and do not follow the footsteps of Satan (Devil). Indeed, he is to you a clear enemy." (Qur'an, 2: 208).

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

For Muslims, the sources for Islamic principles and teachings are the Qur'an and Hadith. Islamic work ethic is based on the principles and teachings of Islam. Islam is supposed to be a complete way of life and could be implemented in work as well as in social life. For example the developer of computer security and those who have professional experience in accessing computer network should not use their experience unethically to steal confidential or financial information of individuals and organizations through unethical breach to computer networks through various ways like compromise or security attacks. There are two sources of ethics in Islam; the Qur'an, which contains verbatim words of Allah or God revealed to Prophet Muhammad Peace be upon him, and the second sources is Al-Hadith, which represent the speech and actions of Prophet Muhammad Peace be upon him. However, both two sources show the importance of ethics in social life as well as work and the behavior of Muslims, whether at home or outside home in the society including the workplace .

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

From the beginning, Islam has viewed work activities not only as a divine calling but also a necessary aspect of human life, a source of social gratification and psychological pleasure. The Quran instructs Muslims to persistently work whenever and wherever it is available: “disperse through the land and seek of the bounty of God” (Quran, 62:10) and “God hath permitted trade and forbidden usury” (2:275). The Prophet Mohammed Peace be upon him preached that merchants should perform tasks that were not only morally required, but that were essential for the survival and flourishing of a society. He declared, “I commend the merchants to you, for they are the couriers of the horizons and God’s trusted servants on earth” and “the honest, truthful Muslim merchant will stand with the martyrs on the Day of Judgment”. In this statement we can see three basics of ethics in work, which are:

• Honesty

IEEE maintains the code of ethics, which indicates the highest ethical and professional conduct through honest work in information technology. IEEE and ACM have approved a joint Software Engineering Code of Ethics governing these practices in both bodies. Section (1) entreats members to “contribute to society and human well-being and to avoid harm to others”, along with six other principles (for example; be honest, respect privacy). This statement is identical with prophet Mohammed Peace be upon him to be honest in work and in dealing with people. An honest and trustworthy merchant will be raised with the prophets, the truthful and the martyrs .

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

- **Trust**

To enable interactions across security domain boundaries, trust in computer software and the security of computer networks is a definite factor to ensure ethics in information technology applications.

- **Truthful**

The extent of loyalty and faith in security of computer networks, and without ensuring truthful users, it would be very difficult to software developers to merchandise their products.

As indicated above, the Islamic morals and ethical principles in work are identical with the ethical standards in Information Technology as agreed by main organizations that regulate the rules and standards of Information Technology and Telecommunication (ICT) such as IEEE and ACM. This lead to a conclusion that adopting the Islamic ethics in work as stated in Qur'an and Hadith of prophet Mohammed Peace be upon him is the only way to protect computers users from any kind of attack and unethical behavior.

8. Conclusions

The fast and vast development in information technology and the creation of new software and computer applications has good and bad impacts to the society. However, unethical issues have become more familiar with computer software and network security.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

However, the bad effects are the society is exposed to many illegal and immoral activities such as the commission of computer crimes, degradation of moral value, social crises, destruction of marriage institution and insult on Islam. The study shows that the developers of computer software and network security must obey the ethical principles in Islam to protect the users from illegal use and breaching the security of computer users unethically. The study emphasizes that it is very important to develop the Islamic outlook to computer ethics especially in Islamic countries. In addition to that placing ethical codes for computer crimes is highly important for Islamic counties. Facts show the importance of the Islamic law to minimize computer crimes and protect the privacy of users by adopting special ethical regulations and tough penalties to those who breach the law. To ensure the full enforceability of ethical practices their needs a well organized Islamic society and finally an Islamic state.

9. Recommendations

There are some steps that can play a great role to reduce the unethical ways of using computer resources and follow the Islamic ethics to protect the security and privacy of computer users, as in the following:

1. Islam reinforces to submit self to the Allah (SWT) completely, therefore ensure the developers of computer software or hackers from unethical practicing to their experience in programming.

Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

2 .Takwah (farness of Allah) must be implemented as the main characteristic of a Muslim as a computer user of developer, so that the Muslim thinks wisely before do harmful for others. As Allah said in the holy Qur'an: "O you, who have believed, enter into Islam completely (and perfectly) and do not follow the footsteps of Satan (Devil). Indeed, he is to you a clear enemy." (Qur'an, 2: 208) this is a perfect statement that keep away computer programmer or hacker away from anything unjust and unethical.

3 .The morals of Islam should be practiced in all educational institutes, especially in Faculties of Information Technology.

4.Increasing the levels of awareness of information security and cybercrime issues amongst users at home is important and this can be done through media and government and educational institutions, and in all public media.

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Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

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Ethical ptonciples in Sofyware Security from Islamic Perspective

Sanaa Abdoussalam Ammar Ennajeh, Tahani T Ahmed Hamoma

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