THE CODE OF ETHICS FOR SOFTWARE ENGINEERS, PUBLIC INTEREST
AND THE ISLAMIC PERSPECTIVE

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Introduction

The lifestyle of today’s society is highly influenced by Information Technology (IT). Whether a person is a member of a developed community or not, various aspects of his or her life would be directly or indirectly related to or affected by information systems and softwares that run and control these systems. These softwares are one of the many products in the information age and the people responsible for developing them must put into consideration the interest of the public as immediate and distant consumers of this product. Although the IT profession is not as regulated as other fields like medicine or law, there exist guides and codes for the software engineers to remind them of the relation between their practices and the interest of the public. In the context of Malaysia and Muslim communities, these codes of ethics can be viewed from an Islamic perspective so that a closer connection can be made with the belief of Islam and the aspiration of developing an e-community and e-Malaysia according to our own mould and cultural norms.

The Code of Ethics for Software Engineers and Public Interest

The code discussed is the Software Engineering Code of Ethics and Professional Practice Version 5.2, developed by the IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices that was published in 1999. Members of this task force consist of representatives from the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE-CS) as well as from the Association of Computing Machinery (ACM). This joint task force is chaired by Professor Donald Gotterbarn, Director of the Software Engineering Ethics Research Institute, East Tennessee State University, USA (http://www-cs.etsu.edu/gotterbarn/). The version reviewed here is the current version and the code exists in two versions lengthwise, short and full version. In the preamble of the full version, it is mentioned that:

“To ensure, as much as possible, that their efforts will be used for good, software engineers must commit themselves to making software engineering a beneficial and respected profession. In accordance with that commitment, software engineers shall adhere to the following Code of Ethics and Professional Practice. The Code contains eight Principles related to the behavior of and decisions made by professional software engineers, including practitioners, educators, managers, supervisors and policy makers, as well as trainees and students of the profession. The Principles identify the ethically responsible relationships in which individuals, groups, and organizations participate and the primary obligations within these relationships. The Clauses of each Principle are illustrations of some of the obligations included in these relationships. These obligations are founded in the software engineer’s humanity, in special care owed to people affected by the work of software engineers, and the unique elements of the practice of software engineering. The Code prescribes these as obligations of anyone claiming to be or aspiring to be a software engineer.”
The eight principles outlined by the code are as follows:

1. PUBLIC - Software engineers shall act consistently with the public interest.
2. CLIENT AND EMPLOYER - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
3. PRODUCT - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
4. JUDGMENT - Software engineers shall maintain integrity and independence in their professional judgment.
5. MANAGEMENT - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
6. PROFESSION - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
7. COLLEAGUES - Software engineers shall be fair to and supportive of their colleagues.
8. SELF - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession (http://www.acm.org/serving/se/code.htm).

Public

The current version of the code places the public as the first principle. This is a change from the previous version whereby the first principle was the product. This shows that the professional bodies have put greater emphasis on the interest of the public. Obligations stated under this first principle (i.e., the public) mention the course of actions that should be taken by software engineers as appropriate:

- Accept full responsibility for their own work.
- Moderate the interests of the software engineer, the employer, the client and the users with the public good.
- Approve software only if they have a well-founded belief that it is safe, meets specifications, passes appropriate tests, and does not diminish quality of life, diminish privacy or harm the environment. The ultimate effect of the work should be to the public good.
- Disclose to appropriate persons or authorities any actual or potential danger to the user, the public, or the environment, that they reasonably believe to be associated with software or related documents.
- Cooperate in efforts to address matters of grave public concern caused by software, its installation, maintenance, support or documentation.
- Be fair and avoid deception in all statements, particularly public ones, concerning software or related documents, methods and tools.
- Consider issues of physical disabilities, allocation of resources, economic disadvantage and other factors that can diminish access to the benefits of software.
- Be encouraged to volunteer professional skills to good causes and contribute to public education concerning the discipline.

These obligations highlight where the field of software engineering is giving emphasis. In developing good software products, producing qualified programming codes is deemed insufficient anymore. The development process of softwares must be in accordance with public interest and social values (Tomayko and Hazzan, 2004, p.79,83).

Islam and Public Interest
Protection of public interest can be explained by looking at how Islam establishes the relations between a Muslim and other members of the public, whether they are fellow Muslims or non-Muslims. Relations amongst Muslims is clearly understood whereby all Muslims are considered brothers by faith - the spirit of Islamic brotherhood (‘al-ukhuwwah al-Islamiyyah’). The Prophet Muhammad s.a.w. had mentioned in one of his sayings narrated by Abdullah bin Umar and recorded by Al-Bukhari, hadith number 2310, which means:

A Muslim is a brother of another Muslim. So he should neither oppress him nor hand him over to an oppressor. And whoever fulfilled the needs of his brother, Allah will fulfill his needs.

In looking after the interest of the Muslims, the Prophet stressed this in his saying recorded by Abu Muhammad Al-Manziri, hadith number 2733, which means:

Those who do not give importance to the affairs of the Muslims, he is (considered) not one of us. (Al-Manziri, 1417H, p. 362)

With regards to the relations with non-Muslims who are peaceful and do not show animosity towards Islam (‘dhimmi’), their rights and welfare are respected and protected in Islam. In one of his hadiths, Prophet Muhammad s.a.w. mentioned that whoever slanders a ‘dhimmi’, a punishment from Hellfire awaits him (al-Haythami, 1407H, vol. 10, p. 280). In addition, Islam describes that all mankind are from the same origin, that is the first man Adam a.s, and should be treated fairly, be able to enjoy common benefits and share common responsibilities (Abdalati, 1998, p.137). The Quran reminds man of this in the verse, which means:

O mankind! Be careful of your duty to your Lord Who created you from a single soul and from it created its mate and from them twain hath spread abroad a multitude of men and women. Be careful of your duty toward Allah in Whom ye claim (your rights) of one another, and toward the wombs (that bare you). Lo! Allah hath been a watcher over you. (4:1)

Protection of public interest also involves safeguarding the environment in which human beings and living things inhabit. This is because humans rely on the environment and other organism for their livelihood. Allah s.w.t has created everything for man to make use of in a responsible manner. Therefore, man should have a sense of responsibility towards his own actions and the effects that it may have on other people and the surroundings (Mohd Amim, 2002, p.131). Islam stresses the importance of being responsible and accountable in actions, as mentioned in the Quran, which mean:

Namely, that no bearer of burdens can bear the burden of another; That man can have nothing but what he strives for; That (the fruit of) his striving will soon come in sight. (53:38-41)  
On no soul doth Allah Place a burden greater than it can bear. It gets every good that it earns, and it suffers every ill that it earns…..(2: 286)

In relation to this, Allah s.w.t has warned mankind that He may return back to them effects of the mischief and destruction that they have done as a reminder of their irresponsible actions. The Quran mentions this in the verse, which means:

Mischief has appeared on land and sea because of (the meed) that the hands of men have earned, that (Allah) may give them a taste of some of their deeds: in order that they may turn back (from Evil). (30:41)

Therefore protecting public interest is seen as a religious obligation in Islam and Muslims should take this into consideration in their actions that would affect others directly or indirectly.
Islam and Principles of the Code of Ethics for Software Engineers

In the following, the eight principles from the code will be discussed from an Islamic perspective by referring to related Islamic sources. Previous work in describing Islamic fundamentals for software engineering has been done which encompasses various issues related to the field, particularly by Prof. Mohammed Zeki Khedher, a senior member of IEEE from the University of Jordan. He had suggested that the ethical principles suggested by the professional bodies be presented in a proper way which is Islamic in nature (Khedher, 2001). In light of this, the principles from the code are mentioned below in relation with Islamic sources. The first principle concerning public interest has been discussed in length previously.

CLIENT AND EMPLOYER

Islam emphasizes the importance to carry out duties and tasks that have been entrusted to us and fulfilling our commitments. The Quran mentions this in the verses which meaning are stated below:

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\text{Allah doth command you to render back your Trusts to those to whom they are due.....(4:58)}
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\[
\ldots\text{and fulfil (every) engagement, for (every) engagement will be enquired into (on the Day of Reckoning). (17:34)}
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PRODUCT

In producing quality software products, proper documentation of the development process is required for future reference. The importance of documentation is stressed in the following verse, which means:

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\text{O ye who believe! When ye deal with each other, in transactions involving future obligations in a fixed period of time, reduce them to writing.....(2:282)}
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Another aspect is the selection with suitable capabilities to handle the development process. The Quran mentions about the story of Prophet Musa a.s. being chosen by Prophet Ayub a.s. to shepherd his sheep after being persuaded by his daughters who recognized the qualities possess by Musa a.s. The meaning of the verse is as follows:

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\text{Said one of the (damsels): “O my (dear) father! engage him on wages: truly the best of men for thee to employ is the (man) who is strong and trusty” (28:26)}
\]

Prophet Muhammad s.a.w. reminds the Muslims to perform their duties and actions to the highest standards in his saying, which means:

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\text{Allah loves if one performs a task, he performs it perfectly (Al-Haythami, 1407H, vol. 4 p. 98)}
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JUDGMENT

Muslims are required to maintain a high level of integrity in making decisions and avoid any form of dishonesty. Many verses from the Quran stresses on this, some of which the meanings are as follows:
And do not eat up your property among yourselves for vanities, nor use it as bait for the judges, with intent that ye may eat up wrongfully and knowingly a little of (other) people's property. (2:188)

....no burden do We place on any soul, but that which it can bear;· whenever ye speak, speak justly, even if a near relative is concerned.....(6:152)

MANAGEMENT

Managers should be fair in their judgments, delegate tasks appropriately and take responsibility of the decisions that are made. The meaning of verses from the Quran on these issues are stated :

....And when ye judge between man and man, that ye judge with justice (4:58)
On no soul doth Allah Place a burden greater than it can bear. It gets every good that it earns, and it suffers every ill that it earns.....(2: 286)

PROFESSION

Software engineers, in practicing their trade, would be required to act with integrity and righteousness to safeguard the reputation of the profession.

But any that (in this life) had repented, believed, and worked righteousness, will have hopes to be among those who achieve salvation (28:67)

In this light, Prophet Muhammad s.a.w. warn the deceivers and fraudsters in his saying, which means:
Those who cheat is (considered) not one of us. (Ibn Hibban, p. 270)

COLLEAGUES

Team work and collaboration is essential in any software development process, and team members should treat one another with fairness. The meaning of verses from the Quran on these issues is stated:

...Help ye one another in righteousness and piety, but help ye not one another in sin and rancour....(5:2)
Allah commands justice, the doing of good...(16:90)

SELF

As individuals, software engineers should promote ethical approaches in the profession. Promotion of good and truth is mentioned in the Quran in the verses that follow, which means:

To each is a goal to which Allah turns him; then strive together (as in a race)
Towards all that is good...(2:148)
....and (join together) in the mutual teaching of Truth....(103:3)

A well known saying by Muslim scholars encourages lifelong learning which is required by software engineers:

Seek knowledge from the cradle to the grave (Haji Khalifah, 1992)

It is worth mentioning here that, Prof Zeki has the opinion that some aspects of Islamic fundamentals are more advanced and comprehensive than the code and has proposed in his
work various ethical obligations from an Islamic perspective based on the eight principles of the code (Kheder, 2001). What is mentioned above is a brief encounter with Islamic sources and can be further elaborated and discussed in greater depth and detail.

Conclusion

Software engineers are in a position to cause a lot of harm or improve the quality of life of others, and themselves, given the fact that computer systems and software has a vast influence on modern life (Tomayko and Hazzan, 2004, p.77). Therefore, following the code of ethics would be a way of protecting public interest. In the case of Malaysia, the Ministry of Domestic Trade and Consumer Affairs has published in 1995 the Malaysian Code of Ethics for Business Practices (Kod Etika Amalan Perniagaan Malaysia) which among others mentions that the code of practice for every profession has to be adhered to as a form of safeguarding the consumer (Afida, 2002, p.108, 110).

Islam gives a high degree of importance to ethics. Ethical behavior is seen as a form of obedience and submission to Allah s.w.t. and is closely related to faith (Amjad, 2000). Emphasis given by Islam on ethics and protection of public interest shows a connection between Islamic values and the principles outlined in the code, despite the differences in the underlying philosophies between the two. It is hoped that the understanding of this connection would benefit Muslims software engineers in particular and all software engineers in general. In addition, this connection would underline the universality of Islamic values as well as its comprehensiveness encompassing all human activities, including technical professional practice.

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