**Handouts of Lecture 9 Professional Practices (IT)**

**Lecture Title: Professional Ethics**

**Introduction**

Informally, a profession is a vocation that requires a high level of education and practical experience in the field. Professionals have a special obligation to ensure their actions are for the good of those who depend on them, because their decisions can have more serious consequences than the choices made by those holding less responsible positions in society.

**How Well Developed Are the Computing Professions?**

Millions of people have a computer-related job title, such as computer engineer, computer scientist, programmer, software engineer, system administrator, or systems analyst. Is a computer-related career a fully developed profession like medicine or law? Let’s consider the characteristics of a fully developed profession.

**Characteristics of a Profession**

A fully developed profession has a well-organized infrastructure for certifying new members and supporting those who already belong to the profession. Ford and Gibbs have identified eight components of a mature professional infrastructure:

Initial professional education—formal course work completed by candidates before they begin practicing the profession.

Accreditation—assures that the formal course work meets the standards of the profession.

Skills development—activities that provide candidates with the opportunity to gain practical skills needed to practice the profession.

Certification—process by which candidates are evaluated to determine their readiness to enter the profession.

Licensing—the process giving candidates the legal right to practice the profession.

Professional development—formal course work completed by professionals in order to maintain and develop their knowledge and skills.

Code of ethics—mechanism by which a profession ensures that its members use their knowledge and skills for the benefit of society.

Professional society—organization promoting the welfare of the profession, typically consisting of most, if not all, members of the profession

When the public can trust the competence and integrity of the members of a profession, every one of its members benefits. For this reason professionals have a stake in ensuring that fellow members of the profession are capable and act appropriately. For mature professions, professional societies establish codes of ethics and require their members to keep their knowledge current through continuing education and training. Professionals who do not follow the code of ethics or fail to keep up with changes in the field can lose their licenses.

**How do computer related careers stack up?**

It is easy to find a crucial difference between systems analysts, computer programmers, and system administrators on the one hand and accountants, lawyers, and physicians on the other hand. At the heart of every mature profession is certification and licensing. Certification and licensing allow a profession to determine who will be allowed to practice the profession. For example, a person may not practice law in a state without passing the bar exam and being granted a license. In contrast, people may write computer programs and maintain computer systems, either as consultants, sole proprietors, or members of larger firms, without being certified or having been granted a license. There are other differences between computer-related careers and mature professions. A person does not have to complete college or serve an apprenticeship under the guidance of an experienced mentor in order to gain employment as a programmer, system administrator, or systems analyst. The vast majority of people who hold computer-related jobs do not belong to either of computing’s professional societies. It is up to particular employers to monitor the behavior of their employees and guide their continuing education—no professional organization has the authority to forbid someone from managing computer networks or writing computer programs. In another important respect computer programmers differ from most professionals, such as dentists and ministers. Typically, professionals work directly with individual clients. A dentist treats one patient at a time. An accountant audits one business at a time. Most computer programmers work inside a company as part of a team that includes many other programmers as well as managers. In this environment the responsibility of an individual person is more difficult to discern. Low-level technical decisions are made by groups, and final authority rests with management.

**Status of certification and licensing**

The two largest organizations supporting the computing field are the IEEE Computer Society (IEEE-CS), with about 75,000 members, and the Association for Computing Machinery (ACM), with about 97,000 members. Like organizations supporting mature professions, the IEEE-CS and the ACM strive to advance the discipline and support their members through publications, conferences, local chapters, student chapters, technical committees, and the development of standards. A software engineer is someone engaged in the development or maintenance of software, or someone who teaches in this area. In 1993 the IEEE-CS and ACM set up a joint steering committee to explore the establishment of software engineering as a profession. The joint steering committee created several task forces to address particular issues. One task force conducted a survey of practitioners with the goal of understanding the knowledge and skills required by software engineers. Another task force developed accreditation criteria for undergraduate programs in software engineering. A third task force developed a code of ethics for software engineers. In May 1999, the ACM Council passed a resolution that stated, in part, “ACM is opposed to the licensing of software engineers at this time because ACM believes that it is premature and would not be effective in addressing the problems of software quality and reliability”.

**Ability to harm the public**

The computing “profession” may not be as well developed as the medical or legal professions, but in one key respect—the ability to harm members of the public—those who design, implement, and maintain computer hardware and software systems sometimes hold responsibilities similar to those held by members of mature professions. The Therac-25 killed or gravely injured at least six people, in part because of defective software. While most software engineers do not write code for safety-critical systems such as linear accelerators, society does depend on the quality of their work. People make important business decisions based on the results they get from their spreadsheet programs. Millions rely upon commercial software to help them produce their income tax returns. Errors in programs can result in such harms as lost time, incorrect business decisions, and fines. System administrators are responsible for keeping computer systems running reliably without infringing on the privacy of the computer users.

**The Importance of Taking Personal Responsibility**

The ability to cause harm to members of the public is a powerful reason why those in computer-related careers must act according to ethical principles. Without formal certification and licensing and other components of a well-developed profession to rely upon, those in computer-related careers must take more personal responsibility for developing their ethical decision-making skills.

**Software Engineering Code of Ethics**

The Software Engineering Code of Ethics and Professional Practice is a practical framework for moral decision-making related to problems that software engineers may encounter.

**Preamble**

Computers have a central and growing role in commerce, industry, government, medicine, education, entertainment and society at large. Software engineers are those who contribute by direct participation or by teaching, to the analysis, specification, design, development, certification, maintenance and testing of software systems. Because of their roles in developing software systems, software engineers have significant opportunities to do good or cause harm, to enable others to do good or cause harm, or to influence others to do good or cause harm. 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 policymakers, 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.

Principles

**PRINCIPLE 1: PUBLIC**

Software engineers shall act consistently with the public interest. In particular, software engineers shall, as appropriate:

1.01 Accept full responsibility for their own work.

1.02 Moderate the interests of the software engineer, the employer, the client and the users with the public good.

1.03 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.

1.04 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.

1.05 Cooperate in efforts to address matters of grave public concern caused by software, its installation, maintenance, support or documentation.

1.06 Be fair and avoid deception in all statements, particularly public ones, concerning software or related documents, methods and tools.

1.07 Consider issues of physical disabilities, allocation of resources, economic disadvantage and other factors that can diminish access to the benefits of software.

1.08 Be encouraged to volunteer professional skills to good causes and contribute to public education concerning the discipline.

**PRINCIPLE 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. In particular, software engineers shall, as appropriate:

2.01 Provide service in their areas of competence, being honest and forthright about any limitations of their experience and education.

2.02 Not knowingly use software that is obtained or retained either illegally or unethically.

2.03 Use the property of a client or employer only in ways properly authorized, and with the client’s or employer’s knowledge and consent.

2.04 Ensure that any document upon which they rely has been approved, when required, by someone authorized to approve it.

2.05 Keep private any confidential information gained in their professional work, where such confidentiality is consistent with the public interest and consistent with the law.

2.06 Identify, document, collect evidence and report to the client or the employer promptly if, in their opinion, a project is likely to fail, to prove too expensive, to violate intellectual property law, or otherwise to be problematic.

2.07 Identify, document, and report significant issues of social concern, of which they are aware, in software or related documents, to the employer or the client.

2.08 Accept no outside work detrimental to the work they perform for their primary employer. 2.09 Promote no interest adverse to their employer or client, unless a higher ethical concern is being compromised; in that case, inform the employer or another appropriate authority of the ethical concern.

***Reference:***

***Lecture topic: Professional Ethics***

***Gao, Y. (2012). Ethics for the Information Age by Michael J. Quinn. World Libraries, 20(1).***