COMP 516
Research Methods in Computer Science

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Lecture 19: Legal, Social, Ethical and Professional Issues (2)

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Professions: Characteristics

- Substantial education and / or training are required in order to practise a profession
- The members of a profession themselves decide the nature of this education and training
- The members of a profession sometimes also control entry to the profession
- A profession is typically organised into one or more professional bodies
- A profession lays down standards of conduct with which its members must comply

Professional Bodies in Computing

- Institute of Electrical and Electronic Engineers Computer Society (IEEE-CS) founded in 1946 in the USA
  - ⇝ "world's leading computing membership organization and the trusted information and career-development source for a global workforce of technology leaders"
- Association for Computing Machinery (ACM) founded in 1947 in the USA
  - ⇝ "world's largest educational and scientific computing society, uniting educators, researchers and professionals"
- BCS (British Computer Society), The Chartered Institute for IT, formed in 1957; received a royal charter in 1984
  - Recognised as a professional engineering institute for the registration of information systems and software engineers
  - One of the licensed institutions of the Engineering Council, itself formed in 1982

British Computer Society

- Chartered Scientist is a professional qualification in the UK, holders can use the post-nominal letters CSci
- the required standard for Chartered Scientist registration is MSc qualification (or equivalent) with four years of postgraduate work experience

To be a Student Member the fee is 30 pounds per year and

- you have to be a student on a BCS accredited degree programme

To become a Professional Member (MBCS): 106 pounds per year

- 5 years IT work experience, or
- 2–3 years IT work experience plus relevant recognised qualifications (depending on level of qualification), or
- an Honours degree with BCS exemption

Professional Ethics

- More restrictive than universal ethics because
  - it involves the more restrictive society/culture of work and commerce
  - it determines right/wrong in cases where a general ethical theory might not do so
- Applies also to other restrictive social contracts such as study
- Many flavours of professional ethics exist:
  medical, engineering, ~~banking~~, etc
- Often associated with formal structure
  BMA (medicine), IET (engineering), BCS (computing)
- Often formally constructed rules and codes of conduct
  Hippocratic oath taken by doctors

The IT Professional Context

- Legal obligations
- Social obligations
- Ownership/sharing obligations
- IP obligations
- Product development process obligations
- Product quality obligation
  - validity
  - robustness
  - simplicity
  - modifiability
  - reusability
  - compatibility
  - efficiency
  - ease of use
  - portability
  - integrity
- Product consequence obligations

BCS Code of Conduct

Four component parts:

1. Public Interest
2. Professional Competence and Integrity
3. Duty to Relevant Authority
4. Duty to Profession

(`http://www.bcs.org/upload/pdf/conduct.pdf`)

- Contents of the Code of Conduct changes frequently
  ⇝ BCS members need to keep up to date with such changes
- Code of Conduct is complemented by a Code of Good Practice
  `http://www.bcs.org/upload/pdf/cop.pdf`

Public Interest

- Safeguarding public health and safety
- Have due regard for the legitimate rights of third parties
- Conduct your professional activities without discrimination
- Promote equal access to the benefits of IT

Professional Competence and Integrity

- Only undertake work that is within your professional competence
- Do not claim any level of competence that you do not possess
- Upgrade and maintain knowledge, skills and competence on a continuing basis
- Respect and value alternative viewpoints and, seek, accept and offer honest criticism of work
- Avoid injuring others, their property, reputation, or employment by false or malicious or negligent action or inaction
- Reject and do not make any offer of bribery or unethical inducement

Duty to Relevant Authority

- Carry out your professional responsibilities with due care and dilligence in accordance with the Relevant Authority's requirements whilst exercising your professional judgement
- Avoid any situation that may give rise to a conflict of interest between you and your Relevant Authority and clients
- Accept professional responsibility for your work and for the work of colleagues under your supervision
- Respect confidential information
- Be honest about products and services and do not take advantage of a lack of knowledge or inexperience of others

Duty to the Profession

- Accept your personal duty to uphold the reputation of the profession
- Seek to improve professional standards through participation in their development, use and enforcement
- Uphold the reputation and good standing of BCS, the Chartered Insitute for IT
- Act with integrity towards other professionals
- Notify BCS if convicted of a criminal offence or becoming bankrupt or disqualified as a Company Director
- Encourage and support fellow members in their professional development

ACM Code of Conduct

Four component parts:

- General moral imperatives
- Professional responsibilities
- Organisational leadership
- Compliance with the code

General Moral Imperatives

- Contribute to society and human well-being
- Avoid harm to others
- Be honest and trustworthy
- Be fair and take action not to discriminate
- Honor property rights including copyrights and patents
- Give proper credit for intellectual property
- Respect the privacy of others
- Honor confidentiality

Professional Responsibilities

- Strive to achieve the highest quality, effectiveness and dignity in both the process and products of professional work
- Acquire and maintain professional competence
- Know and respect existing laws pertaining to professional work
- Accept and provide appropriate professional review
- Give comprehensive and thorough evaluation of computer systems and their impacts, including analysis of possible risks
- Honor contracts, agreements, and assigned responsibilities
- Improve public understanding of computing and its consequences
- Access computing and communication resources only when authorised to do so

Organisational Leadership

- Articulate social responsibilities of members of an organisational unit and encourage full acceptance of those responsibilities
- Manage personnel and resources to design and build information systems that enhance the quality of working life
- Acknowledge and support proper and authorised uses of an organisation's computing and communication resources
- Ensure that users and those who will be affected by a system have their needs clearly articulated during the assessment and design of requirements; later the system must be validated to meet those requirements
- Articulate and support policies that protect the dignity of users and others affected by a computing system
- Create opportunities for members of the organisation to learn the principles and limitations of computer systems

Compliance with the Code

- Uphold and promote the principles of this code
- Treat violations of this code as inconsistent with membership in the ACM

Standards and Standardisation

- Standards are written agreements on some technical matter that seeks to ensure that what is governed is fit for purpose
- In information technology, standards deal with
  - Protocols
  - Data formats
  - (Programming) Languages
    - Syntax
    - Semantics
    - Technical aspects
- (Proper) standards are devised by standards organisations
- Proprietary 'standards' are typically devised by companies and accepted due to the company's market power

Standards Organisations

- ISO — International Standards Organisation
  `http://www.iso.org/`
- ANSI — American National Standards Institute
  `http://www.ansi.org/`
- CEN — Comitté Européen de Normalisation
  `http://www.cenorm.be/cenorm/`
- BSI — British Standards Institute
  `http://www.bsonline.bsi-global.com`
- IETF — Internet Engineering Task Force
  `http://www.ietf.org/`
- ITU — International Telecommunication Union
  `http://www.itu.int/home/`

ISO: International Standards Organisation

- A federation of national standards bodies from some 130 countries
- Non-governmental
- Established in 1947
- ISO's mission

  To promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity
- ISO's work results in international agreements which are published as International Standards
- Among those are standards for programming languages (C, C++, Ada) and processes (quality assurance ISO 9001)

IETF: Internet Engineering Task Force

- International community of network designers, operators, vendors, and researchers; open to any interested individual
- First IETF meeting was held in 1986
- IETF's mission

  The mission of the IETF is to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better. These documents include protocol standards, best current practices, and informational documents of various kinds.
- Every IETF standard is published as an RFC 'Request For Comments'

ITU: International Telecommunication Union

- International organisation of
  - member states (189)
  - sector members (602)
    e.g. phone companies, TV companies, equipment manufactures
- Traces its origins back to 1865
- ITU's mission is to coordinate the operation of telecommunication networks and services and advance the development of communications technology
- Works through conferences and meetings, where members negotiate the agreements which serve as the basis for the operation of global telecommunication services, based on specifications and recommendations prepared by experts

IETF and ITU are 'in conflict' concerning who is responsible for the future of the Internet and related communications technology

Enforcement of standards

- Some standards are enshrined in (national) laws and regulations
  ⇝ mainly measurements and safety standards
  ⇝ enforcement overseen by standards organisation or other (government) organisations, and the legal system

  Examples: 'Kilogram', 'Metre', 'Class 1 banana'
- Proprietary 'standards' as well as standards devised by standards organisations can be enforced using trademarks

  Example: 'Java' and 'Wi-Fi' are both trademarks
  Products (Java Virtual Machines, Wireless devices) have to pass compliance tests before vendors are allowed to use these trademarks

Enforcement of standards

- Some standards are enforced by the requirement for interoperability in the market

  Example: An e-mail client that does not correctly implement RFC 2821 (Simple Mail Transfer Protocol) and RFC 3501 (IMAP) will not succeed in the market

  Enforcement is often only partial

  Example:
  SQL is standardised
  Currently SQL:2011 (ISO/IEC 9075(1-4,9-11,13,14):2011)
  Vendors (Oracle, Microsoft) implement
  a 'superset of a subset' of SQL:2008 (precursor of SQL:2011)
  in their SQL server products
- A lot of standards are not enforced