

# Profession and Professional Bodies

# Lesson Goals

- The legal status of professional bodies
- The ideas of reservation of title and reservation of function
- The current status of the engineering profession in UK, USA and internationally
- The arguments for and against the licensing of information systems engineers or software engineers

# Nature of Profession

- Professional
  - Within limits who puts the interest of organization above of their own convenience
  - They can be relied on to carry out the work competently and conscientiously regardless of the circumstances
- Common characteristics of professionals
  - Substantial education and training are required in order to practice the profession
  - The members of the profession, themselves decide the nature of this training and control entry to this profession
  - The profession is organized into one or more professional bodies
  - The profession lays down standards of conduct with which members must comply and when necessary enforces these through disciplinary procedures

# Professional bodies

- group of people coming together because of a shared interest in a particular type of activity
  - BCS
- the professional body matures, it is likely to develop a range of functions, of which the following are the most important
  - **establishing a code of conduct to regulate the way members** of the body behave in their professional lives and **a disciplinary procedure to discipline members who breach this code**;
  - establishing **mechanisms for disseminating knowledge of good practice and new developments to its members**, typically through publications and conferences but increasingly also through the use of the worldwide web;
  - **setting standards of education and experience** that must be met by people wishing to become members of the body;
  - **advising government and regulatory bodies** about matters within its area of expertise.

# Professional bodies

- Royal charter
  - BCS 1984

# Reservation of Title and Function

- Reservation of title
  - Legal monopoly ?
  - Architects Act 1997; it is criminal act to call yourself an architect unless you are registered with Architect Registration Board
- Reservation of function
  - Law to restrict certain activities
  - England and Wales; only members of Institute of Chartered Accountants and Association of Certified Accountants are allowed to audit the accounts of public companies – title ?
- Under the Veterinary Surgeons Act 1966, you are not allowed to call yourself a veterinary surgeon unless you are registered with the **Royal College of Veterinary Surgeons (RCVS)**; in order to be registered, you must have the proper qualifications. And, subject to certain limitations, **it is a criminal offence to carry out surgical procedures on animals unless you are registered with the RCVS.**

# Reservation of Title and Function

- In the USA, title and function are usually reserved not to members of professional bodies, but to people whose names are on a register maintained by a state government. Recent developments have shown a tendency for the UK to move in the same direction.

# Software development as engineering

- Two constraints apply to all engineering activities
  - engineering involves designing and building things that must work properly, that is, must meet a set of predetermined requirements concerning their functionality, their performance, and their reliability;
  - the process of designing and building the object must be completed within specified constraints of time and budget.



# The Status Of Engineers

- Legal Status Of Engineers in USA
  - it is illegal to call yourself an engineer in a given state unless you are registered with the State Engineers Registration Board;
  - it is illegal for a company to use the word 'engineering' in its name unless it employs at least one registered engineer;
  - academic programs including the term engineering in their title must be taught mostly by registered engineers;
  - it is illegal to carry out engineering work except under the supervision of a registered engineer.

# Software Engineers Registration

- Disasters related to software engineers
  - Therac-25 USA
    - the software controlling the machine contained bugs which proved to be fatal
    - the design of the machine relied on the controlling computer alone for safety
  - London Ambulance System – UK
  - Failures of these systems was programming error arising from ignorance of elementary concepts
  - Lack of professionalism
- There have been calls for compulsory registration of software engineers and for legislation to carry out software engineering activities to be carried out by or under registered software engineers
- Profession is divided on this issue

# Software Engineers Registration Difficulty

- Identifying boundary between critical and non-critical system
  - Traffic control system is critical
  - Medical record system critical or not ?
- Many Chartered Engineers have not studied specialized techniques needed for working on critical systems
- The only way of this for happening
  - Pressure from health and safety executive

# Software Engineers

## Registration Difficulty

- **Diversity of Roles and Skills:**

- Software engineering encompasses a wide range of roles and skills.
  - Professionals in this field may specialize in various areas such as programming, system architecture, database management, user interface design, etc.
- Creating a one-size-fits-all licensing structure that covers such diverse roles can be challenging.

- **Rapid Technological Advancements:**

- The field of software engineering evolves rapidly.  
Technologies, programming languages, and methodologies often change quickly.
- Licensing processes may struggle to keep pace with the dynamic nature of the industry.

# Software Engineers Registration Difficulty

- **Industry Self-Regulation:**

- The software industry has largely embraced self-regulation and relies on organizations, certifications, and professional associations to set and maintain standards.
  - Bodies like the IEEE Computer Society and the ACM (Association for Computing Machinery) provide guidelines and certifications that professionals can voluntarily pursue.

- **Global Nature of Software Development:**

- Software development is a global industry, and professionals often collaborate across borders.
- Implementing a standardized licensing system that applies universally can be complex and may face challenges related to international cooperation and recognition.

# Software Engineers

## Registration Difficulty

- **Education and Certification:**
  - Instead of licensing, the industry places emphasis on education and certification.
    - Many employers value academic degrees, certifications (such as those from Microsoft, Oracle, or the Project Management Institute), and practical experience when hiring software engineers.
- **Innovation and Entrepreneurship:**
  - The software industry values innovation and entrepreneurship. Introducing licensing requirements could be perceived as a barrier to entry and innovation, hindering the dynamic and creative nature of the field.
- **Ethical Guidelines and Codes of Conduct:**
  - Professional organizations in software engineering often promote ethical guidelines and codes of conduct.
  - While not legally binding, adherence to these principles is encouraged for maintaining professional integrity.
- **Nature of Degree Programs**
  - A lot of variation in CS degree programs around the world unlike other licensed professions.

# NCEAC

- NATIONAL COMPUTING EDUCATION ACCREDITATION COUNCIL (NCEAC)
  - Higher Education Commission has setup an accreditation authority, National Computing Education Accreditation Council (NCEAC). NCEAC will look after the matter regarding the accreditation of institutions and their departments, faculties and disciplines by giving them appropriate ratings and define the organization's objectives, functions and duties to be performed. It will periodically evaluate, scrutinize and monitor the standards followed in different Universities, Degree Awarding Institutions and their affiliated colleges offering computing degree programs.

# PEC

- professional and statutory federal institution for accreditation and regulation of engineers.
- PEC is dedicated to promote engineering education in Pakistan.
- PEC grants license and issues registration of engineers, consulting engineers
- It is also discharged with the accreditation of engineering programs throughout the country.



# Professional Bodies Lesson Goals

- To be aware of all professional computing bodies all over the world
- Understand the membership structure of BCS
- To be familiar with range of activities carried out by professional bodies
- Understand the obligations that professional bodies impose on members and understand the code of conduct of BCS
- Be familiar with the services that professional bodies offer to their members in order to help them meet the obligations

# Professional Bodies

- Previously we studied the role of professional bodies in establishing and maintaining the status of profession
- Now we shall look at some of the ways in which they serve their members and public

# Development of professional bodies in computing

- The Institute of Electrical and Electronic Engineers (IEEE)
  - Professional engineering society
  - IEEE-CS 1946
- Association for Computing Machinery ACM 1947
- BCS 1957
  - British equivalent of ACM
  - Professional, qualification-awarding body
- 1960s saw great expansion in national computer societies
  - Italian Association for Informatics and Automatic Computing 1961
  - Australian Computer Society 1966
  - Computer Society of India 1965
  - Singapore Computer Society and Irish Computer Society 1967
  - German Informatics Society 1969 – Pakistan Computer Association 2006

# Professional Conduct

- Standards of behaviors of members expected to follow in their professional life
- Code of conduct; standards of behaviors of members
- Code of practice; best way to practice your profession
- Difference ?
- BCS Code of Conduct Sections
  - The public interest
  - Duty to relevant authority
  - Duty to profession
  - Professional Competence and Integrity

# Professional Conduct VS Practice

- **ISO/IEC 27002:2013**
  - ISO/IEC 27002 is an international standard that provides a code of practice for information security management. It outlines a set of best practices and controls that organizations can implement to manage information security risks effectively. The standard covers various aspects of information security, including access control, cryptography, physical security, and incident management.
- **Association for Computing Machinery (ACM) Code of Ethics and Professional Conduct**
  - The ACM Code of Ethics and Professional Conduct is a set of guidelines and principles designed to guide computing professionals in their ethical decision-making. It covers areas such as integrity, confidentiality, professional competence, and social responsibility. The code is meant to promote responsible and ethical behavior among computing professionals and ensure that they contribute positively to society.

# BCS Code of Conduct

- sets out the professional standards required by BCS as a condition of membership.
- applies to all members, irrespective of their membership grade, the role they fulfil, or the jurisdiction where they are employed or discharge their contractual obligations.
- governs the conduct of the individual, not the nature of the business or ethics of any Relevant Authority\* .

# Public Interest

- a. have due regard for public health, privacy, security and wellbeing of others and the environment.
- b. have due regard for the legitimate rights of Third Parties.
- c. conduct your professional activities without discrimination on the grounds of sexual orientation, marital status, nationality, colour, race, ethnic origin, religion, age or disability, or of any other condition or requirement.
- d. promote equal access to the benefits of IT and seek to promote the inclusion of all sectors in society wherever opportunities arise.

# Duty to Relevant Authority

- a. carry out your professional responsibilities with due care and diligence in accordance with the Relevant Authority's requirements whilst exercising your professional judgement at all times.
- b. seek to avoid any situation that may give rise to a conflict of interest between you and your Relevant Authority.
- c. accept professional responsibility for your work and for the work of colleagues who are defined in a given context as working under your supervision.
- d. NOT disclose or authorise to be disclosed, or use for personal gain, or to benefit a third party, confidential information except with the permission of your Relevant
- NOT misrepresent or withhold information on the performance of products, systems or services, or take advantage of the lack of relevant knowledge or inexperience of others.



# Duty to profession

- a. accept your personal duty to uphold the reputation of the profession and not take any action which could bring the profession into disrepute.
- b. seek to improve professional standards through participation in their development, use and enforcement.
- c. uphold the reputation and good standing of BCS, the Chartered Institute for IT.
- d. act with integrity and respect in your professional relationships with all members of BCS and with members of other professions with whom you work in a professional capacity.
- e. encourage and support fellow members in their professional development.

# Professional Competence and Integrity

- a. only undertake to do work or provide a service that is within your professional competence.
- b. NOT claim any level of competence that you do not possess.
- c. develop your professional knowledge, skills and competence on a continuing basis, maintaining awareness of technological developments, procedures, and standards that are relevant to your field.
- d. ensure that you have the knowledge and understanding of Legislation\* and that you comply with such Legislation, in carrying out your professional responsibilities.
- e. respect and value alternative viewpoints and, seek, accept and offer honest criticisms of work.
- f. avoid injuring others, their property, reputation, or employment by false or malicious or negligent action or inaction.
- g. reject and will not make any offer of bribery or unethical inducement

# Status of professional codes of conduct

- Some clauses are vague and some are clear
  - **You shall notify the Society if convicted of a criminal offence or upon becoming bankrupt or disqualified as Company Director.**
  - **In your professional role you shall have regard for the public health, safety and environment.**
- In practice, it is only possible to take disciplinary action in cases where the rule that has been broken is a precisely specified and objective one.

# Education

- The BCS promotes education in a number of ways:
  - It runs its own system of professional examinations and grants approval to suitable organizations that provide courses to prepare students for them.
  - It accredits degree programs offered by institutions of higher education.
  - It sets the syllabus for a range of vocational qualifications and accredits training organizations to provide the associated short courses.

# Education

- BCS Professional examination
  - Certificate
  - Diploma
  - Professional Graduate Diploma
  - Projects are accessed at diploma and PGD level
  - PGD with project considered as honors degree
- EUCCIP - professional qualification accepted throughout Europe
  - IT Experience with no education.
  - People with non-IT education.
  - Younger students interested in IT
- Accreditation
- Short Courses
  - Information Systems Examination Board (ISEB)

# CONTINUING PROFESSIONAL DEVELOPMENT

- Little attention in past as how a professional kept his knowledge up-to-date
- Individual efforts
  - Take available opportunities
- CPD to individual members
  - BCS Supports CPD
  - BCS provides structure of recording and assessing
  - BCS also provides means by which it can be achieved
- CPD for members
  - BCS members receives a copy of monthly publication; The Computer Bulletin
  - Keeps members aware of new developments and topics of interest to the profession

# CONTINUING PROFESSIONAL DEVELOPMENT

- CPD to industry
  - ISM (Industry Structure Model)
    - MATRIX
  - SFIPlus (Skills Framework for the Information Age)
    - Software based
  - The BCS also provides a Career Development Accreditation service, which provides external, independent assurance that an organization's training programme not only meets the needs of the business and the trainee, but also complies with the best practice of the industry as a whole.

# ADVACEMENT OF KNOWLEDGE

- Computer Journal
  - 6 issues a year
  - Carries the results of research carried out in industry, universities all over the world
- IEE
  - IEE Proceedings
- For IT professionals who are not engaged in research
  - Computer (publication of IEEE-CS), IEEE Software, and the Communications of ACM contain authoritative articles on new developments and current issues are written at a level that an IT Professional can understand.
- Specialist groups
  - Organize or sponsor conferences
  - Produce books, reports specialized software etc



# MEMBERSHIP GRADES OF BCS

