

# **THE COMPUTING PROFESSION**

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**NUCES, ISLAMABAD CAMPUS**  
**(LECTURE SLIDES WEEK # 1)**

## 2 CHARACTERISTICS OF A PROFESSION

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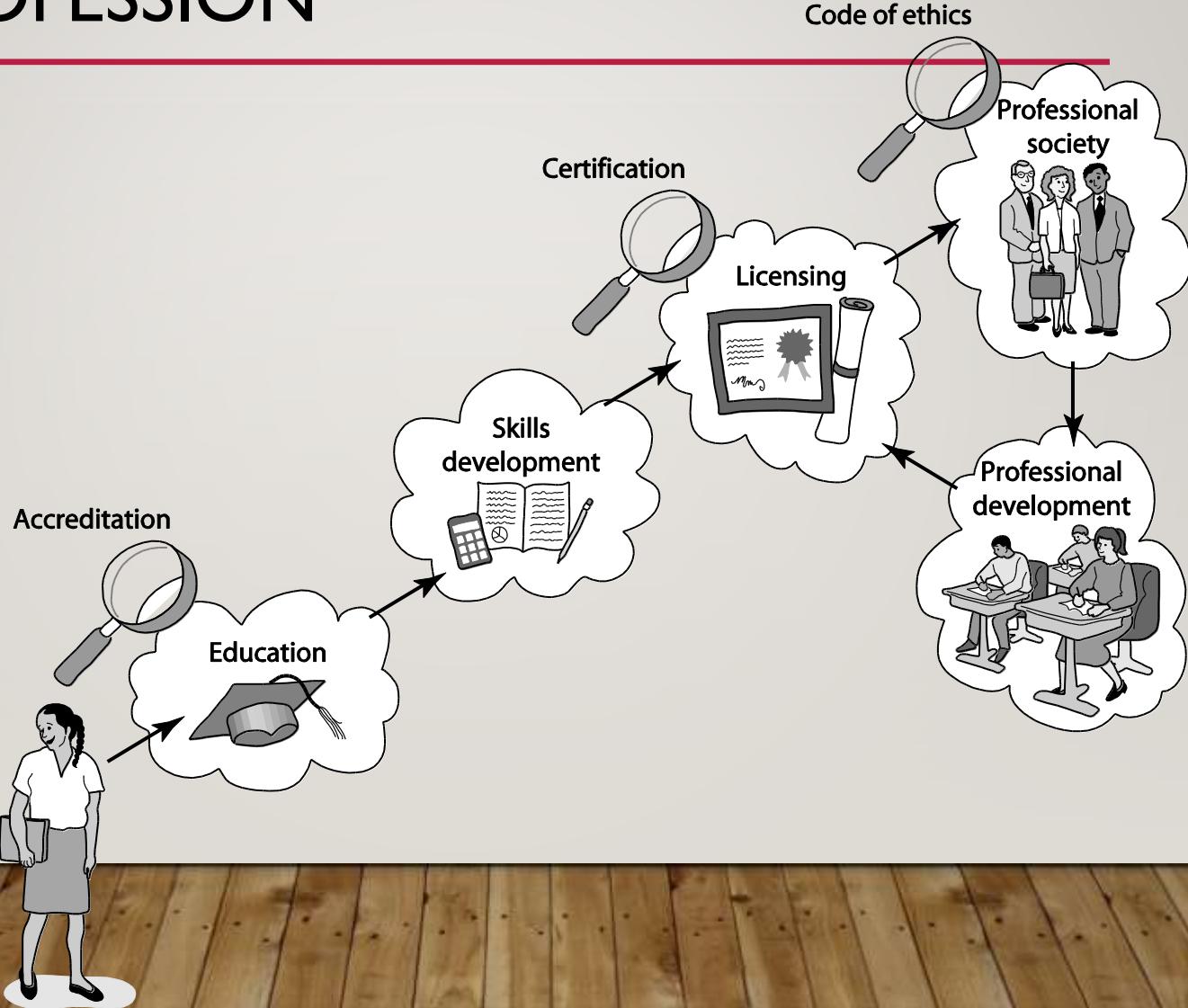
- No Single Definition
  - Who is using?
  - What is the Context?
- Characteristics:
  - Expert Knowledge
    - Special Technical Knowledge, Skills
    - Substantial Education and Training in order to Practice
  - Autonomy
    - Independence in conducting Professional Practice
    - Members themselves decide Training Nature and control Entry
    - One or more Professional Bodies
    - Codes of Conduct
  - Internal Governance
    - Controlled by its Practitioners
    - No External Authority
  - Service to Society

# 3 COMPUTING PROFESSION

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- Is Computing a Profession?
  - Expert Knowledge
  - Autonomy
  - Internal Governance
  - Service to Society

# 4 ATTRIBUTES OF A MATURE PROFESSION



## **5 CHARACTERISTICS OF A FULLY DEVELOPED PROFESSION**

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- Initial professional education
- Accreditation
- Skills development
- Certification
- Licensing
- Professional development
- Code of ethics
- Professional society

## **6 PROFESSIONAL ORGANIZATIONS**

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- Networking with one's fellow scientists and engineers is extremely important for personal and professional development.
- Professional societies sponsor conferences, publish journals, and serve as reviewers or editors.
- They set professional and educational standards and provide job and career services for their members.

# 7 PROFESSIONAL BODIES

- **Professional Bodies:**

- **Overview:**

- A profession is typically organized into one or more professional bodies. Usually starts by a group of people coming together because of a shared interest in a particular type of activity
    - A **professional association/body** is usually a nonprofit organization seeking to further a particular profession, the interests of individuals engaged in that profession and the public interest.
    - A group of people in a learned occupation who are entrusted with maintaining control or oversight of the legitimate practice of the occupation;" also a body acting "to safeguard the public interest;" organizations which "represent the interest of the professional practitioners," and so "act to maintain their own privileged and powerful position as a controlling body.

- **Importance**

# 8 PROFESSIONAL BODIES

## • Professional Bodies:

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- Major Functions:
  - Establishing a code of conduct:
    - Regulate members professional behaviors and disciplinary procedures
  - Establishing mechanisms for disseminating knowledge:
    - Good practices and new developments
    - Publications, Conferences, WWW
  - Setting membership criteria
  - Advising Government and Regulatory Bodies
- Moving Status (Country to Country)
- Reservation of Title and Functions by the Govt.

## 9 PROFESSIONAL SOCIETIES

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- ACM – 97,000 members
- IEEE-CS – 75,000 members

Both support members through

- Publications, conferences, local chapters, student chapters, technical committees and the development of standards
- Professional society

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- [ACM \(Association for Computing Machinery\)](#) “world’s largest educational and scientific computing society;” focused on advancing computing as a science and a profession.
- [Association for the Advancement of Artificial Intelligence \(AAAI\)](#) “nonprofit scientific society devoted to advancing the scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in machines.”
- [Association for Women in Computing \(AWC\)](#) “one of the first professional organizations for women in computing” focused on “promoting the advancement of women in the computing professions.” (**PWiC**)
- [Computing Research Association](#) focus is “to enhance innovation by joining with industry, government and academia to strengthen research and advanced education in computing”
- [IEEE Computer Society](#) “world's leading membership organization dedicated to computer science and technology”
- [IEEE \(Institution of Electrical and Electronics Engineers\)](#) “world’s largest professional association for the advancement of technology” (**WiE**)
- [IET \(Institution of Engineering and Technology\)](#) “To inspire, inform and influence the global engineering community, supporting technology innovation to meet the needs of society.”

# II PROFESSIONAL REQUIREMENTS

- Origins of Professions

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- Revolutions -> New Professions
  - Hunters and Gatherers
  - Agrarian Revolution -> Birth of Civilization
  - Industrial Revolution -> Capitalism, Colonialism, Nation State
  - ICT Revolution -> Knowledge Economy -> Information Age, Artificial Intelligence, Data is a wealth

## 12 JOB THAT DID NOT EXIST A FEW YEARS BACK

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- App Developer
- Data Scientist
- Educational Consultant
- Millennial Generation Expert
- Social Media Architect
- Business Architect
- Cloud Architect
- App Developer. ...
- Telemedicine Physician. ....
- Virtual Assistant
- Social Media Manager.
- SEO Analyst. or search engine optimization specialist
- Uber Driver. ...
- Driverless Car Engineer. ....
- Podcast Producer. ...
- Zumba Instructor.
- Employment Brand Manager
- Content Moderators

## 13 PROFESSIONAL REQUIREMENTS:

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- Set of highly developed skills and Deep knowledge of the domain
  - Skills developed through experience
  - Skills must be backed-up by well-developed knowledge base
  - Shallow knowledge could be damaging
    - Decisions require understanding, analysis, and adoption of concepts to suit the environment
    - Technicians vs. Engineers / Scientists

# Professional Requirements

- Professional Requirements:
  - Autonomy:
    - Professionals provide either products or services
    - Power Balance – Provider vs. Receiver
    - Professional:
      - The Power Play is in favor of the Professional
      - Lawyer and a Client
      - Physician and a Patient
      - Engineer and a Customer
  - Non-Professional:
    - The Power Play is in favor of the Customer
    - Auto-Mechanic and a Client
  - Varying the way – Professional vs. Non-Professional
    - Marked differences in the way the service is provided

# 15 PROFESSIONAL REQUIREMENTS

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- Professional Requirements:
  - Observance of Code of Conduct:
    - The Professional Code
      - Set of Guidelines – What a Professional ought to do and not to do
      - Protects – Image of the Profession and that of Professional
      - Professionals are required to adhere the Code
    - The Personal Code
      - Individual Moral Guidelines
      - Mostly acquired from the Cultural Environment
      - Supplement the Professional Code Significantly

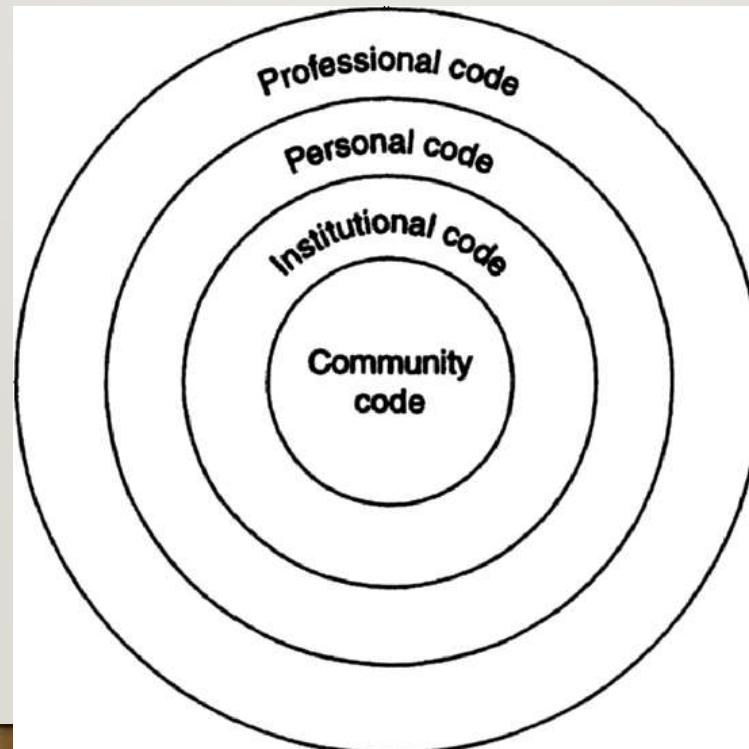
# 16 PROFESSIONAL REQUIREMENTS

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- Professional Requirements:
  - Observance of Code of Conduct:
    - The Institutional Code
      - Imposed by the Institution / Organization
      - Meant to build and maintain the public's confidence in the Institution and its Employees
    - The Community Code
      - Developed over a period of time
      - Based on either the Religion or the Culture
      - May be imposed by the Civil Law

# 17 Professional Requirements

- Professional Requirements:
  - Observance of Code of Conduct



# PILLARS OF PROFESSIONALISM

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- Professionalism is Supported by Four (4) Pillars:
    - Commitment
    - Integrity
    - Responsibility
    - Accountability

# 19 PILLARS OF PROFESSIONALISM (CONTD.)

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- **Commitment**

- The person making the commitment must do so willingly without duress
- The person responsible must try to meet the commitment, even if help is needed
- There must be agreement on what is to be done, by whom, and when
- The commitment must be openly and publicly stated
- The commitment must not be made easily
- Prior to the committed date, if it is clear it cannot be met, advance notice must be given and a new commitment negotiated

## 20 PILLARS OF PROFESSIONALISM (CONTD.)

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- **Integrity**

- State of undivided loyalty to self-belief
  - Honesty, Un-compromising self-value, Incorruptibility
- Three Maxims of Integrity:
  - Vision
    - Capacity to anticipate and make a plan of action
    - Sign of Good Leadership
      - Initiative, Autonomy, Authority
  - Love of what is doing
    - People do better if they love what they do
  - Commitment
    - Bonds until it is done

## 2I PILLARS OF PROFESSIONALISM (CONTD.)

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- Responsibility
  - Deals with Roles, Tasks, Actions, and Consequences
  - Various Types: Professional, Personal, Communal, Parental etc.
  - Responsibilities vary depending on age/role
  - Professional Responsibilities as a Provider:
    - Product Responsibilities
    - Service Responsibilities
    - Consequential Responsibilities

## 22 PILLARS OF PROFESSIONALISM (CONTD.)

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- Accountability
  - Obligation to answer for the execution of one's assigned Responsibilities
  - Process:
    - **Setting** Measurable Goals, **Planning** what needs to be done to meet those Goals, **Reporting** Progress towards Goals, **Evaluating** the Reports, and **Using** that feedback to make Improvements
  - Three Key Elements:
    - A set of outcome measures that reliably and objectively evaluate performance
    - A set of performance standards defined in terms of these outcome measures
    - A set of incentives for meeting the standards and/or penalties for failing to meet them