

786!!!!

Professional Practices In IT:

Degree Programs:

- Computer Science
- Software Engineering
- Information technology
- Computer Science:

-Develop ways to solve computation problems, e.g store data, send data, display data e.t.c with best performance (using algorithms)

- Develop new ways to use computer and make them do new things
- Design and develop software systems

Theory-Model-Designing-Implementation-Testing-Verification

-Software Engineering:

- Develop and maintain reliable software systems
- provide software development practices
- integrate computer science with engineering discipline

-Information technology:

-use technology to meet demands of businesses, government, health-care, schools, and other organizations

- administration and configuration of systems
- installation and maintenance

-use and manage databases, e-governance and e-commerce portals, digital voice and multimedia communications

Computer Based Degree Programs:

- Software Engineering
- Information Technology
- Computer Science
- Computer Engineering
- Bio-Informatics

Degree Programs:

- BS
- MS
- PHD
- BE

Why professional issues in IT?

- Computing key factor now a days

- So due to its rapid growth, advancement and contribution in almost every sectors. People used to face alot of issue related to it.

- Majority of universities in Pakistan that offer above degree programs do not have any course which covers:

 - Laws Related To Computing in Pakistan/Abroad

 - Computing Ethics in general

 - CS-based professional ethics in general

- The reason why professional issues occur in IT is that this is contradictory to other professions like medicine where a course related to this information(ethics) does exists.

CS/IT ethics are on rapid increase in books after the year of 2005

Consequence of professional issues in IT:

- computer/it/software sector important for mission-critical applications(Money+Life/Death involved here)

- something goes wrong,who to blame???

- developed contries vigorously follow laws/standards/ethics e.t.c related to computing

- professionals working in CS/IT with no knowledge of these aspects risk the chance of jobs, or procurement of contracts in developed contries.

BS DEGREE BREAKDOWN IN 2004:

- Core Areas

- supporting areas

- general areas:(Professional Ethics lie in this area)

- electives

- project

Weird Laws:

- Law of Recursion: understand recursion first

- brook's law: adding more man power to a late software project makes it more late

- reason: 1-new people must become educated with the project before actually working on it

 - 2-Communication over-head increases

- Law of Credibility or 99% rule:

 - 1st 90 percent of code accounts for 10 percent of development time.

 - remaining 10 perecent of code accounts for remaining 90 percent of

development time

- Quotation:"Project donot complete on time"

- 1 % rule:

- only 1 percent of users on a collaborative website actively create new content.

- remaining 99 percent only lurk

- 1-9-90

- 1 percent creators, 9 percent contributors, 90 percent lurkers

- Paretto's principle:

- 20 percent of group will produce 80 percent of activity

- applied in marketing: 80 percent sales obtained from 20 percent of clients

- Wirth's Law:

- software gets slower faster than hardware gets faster

- Gate's law:

- speed of software halves every 18 months (bill gates)

- Moor'es Law: Hardware gets faster every 18 months

- Many More Laws:.....

LAWS:

- we as a computer scientist should know the core computing laws mainly but having the knowledge of side laws as well is also necessary for us

Law: A set of rules that can be enforced in court

- varies from country to country

- Related to IT:

- data protection laws(controlling rouge markets)

- right to access of information laws

- laws for the misuse of computers

BROAD CLASSIFICATION of Laws:

- Crimianl Laws

- Civial Laws

- Criminal Laws:

- punishment of wrong-doers using fines or imprisonment

- Civial Laws:

- Settlementws of disputes between people,victims can be compensated

Criminal Law:

- What is a crime?

- society/government decides.

- murder, assault, narcotics, fraud, money laundering, customs, domestic violence, physical abuse, kidnapping e.t.c

- mechanism to determine whether person guilty of crime is guilty/not guilty

- Pakistan penal code is decide this thing

- range of punishments that can be awarded:

- qisas, diyat, death, life, property confiscation, imprisonment, fine .e.t.c

Criminal Law: How it works:

- crime discovery by police or reported by witness

- evidence collection by police for courts

- state starts proceedings for prosecution of accused/defendant

- If found guilty, accused will be sentenced

Criminal Law: Other important aspects:

- criminal dis-advantaged:

- a criminal is innocent until proven guilty, but society may think otherwise

- penalty should be sufficient to discourage others. How much is sufficient?

- Keep criminals away from public: But what can be done after they finish their sentences

- Rehabilitation: Reforming criminals during sentence/jail-term: if a criminal is institutionally rehabilitated (in jail), should society accept them? Will the victim families accept that he is reformed?

ALL the above are the ethical issues in legal perspective

Civil Law:

- resolution of disputes b/w people

- resolution of disputes b/w companies/organizations after they are incorporated

Terminologies:

- Plaintiff: Person who feels he is wronged moves court

Example: person a sues person b

Example: person A files shufa against person b

-Litigation: court proceedings ensued after court is moved

-Other applicable areas:

banking, business, company, constitution, corporate, insurance, labour, succession, tax

Concept of standard of proof vs burden of proof:

-standard of proof:

-in criminal law: prosecution must demonstrate that an accused is guilty (using witness, forensic e.t.c)

-in civil law: plaintiff merely claims that the other party is guilty

-burden of proof:

-criminal law: burden of presenting proof lies on prosecution
-defendant is innocent until proven guilty

-civil law: both plaintiff and defendant have the burden of presenting proof

Example of crimes involving CS/IT (Cyber Crimes)

- mobile credit/credit card/atm fraud
- threatening calls through mobile phones
- ip/email address tracing (by non-govt persons)
- threatening/abusive emails
- hacking related attacks, website defacements
- email scams, sms scams
- electronic money laundering (paypal???)
- pornography, gambling, virus/worm attacks, internet time theft e.t.c
- anything else??

Important cyber crimes laws in Pakistan:

- telegraph act
- wireless telegraph act
- federal investigation agency act
- Pakistan telecommunication act
- electronic transaction act
- electronic crimes ordinance
- payments and electronic fund transfer act

Application areas of electronic transaction act:

- criminal access to data/computers
- data/system damage

- electronic fraud/forgery
- encryption mis-use
- cyber stalking
- virus propagation
- spamming/spoofing
- cyber terrorism

FAMOUS Cyber Criminals:

-Amjad and Basit Farooq alvi created a first virus on dos. called as brain virus

CyberCrime: How Stuxnet work:

- infection
- search
- update
- compromise
- control
- decieve and destroy

Who Makes Law:

- National Assembly (Lower House) Legislation Types:
 - government bills
 - private member bills
- Provincial assembly legislation:
 - only if not in concurrent lists

Pakistan Process of passing a bill:

- bill intro
- referred to standing committee
- considered by standing committee
- standing committee presents report before house
- first reading of bill(overview)
- second reading of bill(clause of clause)
- third reading of bill (passing bill with 2/3 majority)
- transmit bill to upper house (senate)
- passing bill in upper houses with 2/3 majority
- get approval of president of pakistan
- bill become act part of constitution

Other Countries Law making: UK:

- house of commons
- house of lords
- Passing a bill:

- government introduces bill in house of comms
- upon approval, passed to house of lords
- upon approval, become act of parliament
- passed to queen for final approval(queen cannot refuse), then

becomes law

Law Making in US:

- legislation passes through senate, then forward to congress
- legislation debated in congress, then passed to president for approval
- president gives final approval, but has veto rights

UN-Constitutional: Supreme Court: can veto law passed by congress+president if it is

Profession:

- priest
- law officer
- policeman
- teacher
- doctor e.t.c

professional footballer:

- earn dollars

professional employee:

- put interest of organization above self
- others: just paid employees
- organization can rely on them to work competently

professional work:

- work that satisfies established criteria of quality

Professions example:

- doctor
- engineer

profession in eyes of Pakistani society:

- engineer
- doctor
- CSS

To achieve:

- income lvl
- power

Professionals Elsewhere:

- police
- nurse
- lawyers
- teachers

e.t.c

Social gratification:

- grouping of people into hierarchical social categories
- upper class:wealthy,powerful
- middle class:managers,workers, white collar jobs
- lower class:daily wagers, blue collar jobs

Higher class want to maintain their status

Lower class want to change their lives so they doctors and engineers as professions/career options

What makes a professional:

- Degree

Professional Bodies:

- how it's formed?
- started by group of people of profession coming together formally
- why is it formed?
- to protect business and work environment from non-professionals i.e quacks
- quacks: who do not have proper knowledge or may practice dishonestly
- Examples of professional bodies in UK:
 - british computer society
 - institute of electrical engineers
- Examples of professional bodies in Pakistan:
 - Pakistan engineering council
 - Pakistan engineering congress

Pakistan Engineering Council:

- federal institute
- functions:
 - regulations and registration of professional engineers, chartered engineers and technicians
 - accreditation of degree programs
 - rules for industry
- Areas covered by PEC:
 - Applied Sciences
 - Computing Engineering

-Engineering Technologies

NCEAC: National computing education accreditation council:

-Main functions:

- courses
 - accreditation of institutes teaching computer science related
 - define organization objectives, functions, duties
 - monitoring computing science teaching institutes of pakistan
 - no regulations yet defined for industry

General functions of professional bodies:

- establishment of code of conduct
- organizing seminars, knowledge related events
- set educational standards
 - accreditation
 - member grades and their promotion system
 - career counseling for its members
 - providing job related informations
 - advising government for improvement of field that are lagging behind

Code of Conduct

Doctors Oath

Membership Grades:

- define expertise levels of members
- In pakistan membership grades are defined by PEC
- In UK membership grades are defined by Engineering Council UK

Registration Types Of Engineer:

- Chartered Engineer:
 - technologies
 - develop solutions to engineering problems using new or existing
 - be innovative and creative
 - introduce new and efficient production techniques
 - introduce new and efficient marketing techniques
- Professional Engineer:
 - design and develop solutions using existing technologies

-operation/maintenance of products,equipments e.t.c

Titles of Engineer:

It's crime to call yourself engineer if not registered to PEC

Perks of Registered Engineers:

- Audits can be performed by registered chartered accounts only
- registered engineers can only take engineering related projects

Title of Eng/Doc is strictly to be used by respective bodies in Asia and Europe while UK is lax with its use

Status of engineer:

- illegal to call yourself engineer if not registered
- not allowed to call engineer if u are no longer connected to engineering association
- illegal for companies to use engineer if:
 - not registered with engineering body PEC (PEC rule)
 - if it does not have 2 registered employees (PEC rule)
- Engineering subjects must be taught by registered engineers- PEC Rule
- illegal to carry out engineering work if not carried out under the supervision of registered engineer-PEC rule

Pakistan Software Export Promotion Bureau

- apex government body
- falls under ministry of science and technology

Purpose:

- promotion of IT sector in local and international markets

Functions:

- internship facilitations
- incubation programs
- company certifications
- IT parks

Types of Engineering:

- chemical(material,textile)
- civil(environmental,geo-technical, structure, transport)
- electrical(computer,electronics,power)
- mechanical(manufacturing,thermal,industrial)

Software Engineering as an engineering discipline:

-software engineering and information systems are now accepted as branch of engineering

-What before?

-engineering is synonymous with building" dams, bridges, airplanes, car, radios e.t.c

-key features of building process:

-design and testing of object that is built

-completing task in time

-building process is not shared by other fields e.g doctors, medicine, accounting, etc

-this building thing is now shared by software engineering that is why software engineering is now included in engineering

Software engineering as discipline:

-university of texas by law don't allow courses in software engineering by law

-criticism: software engineering don't describe:

-materials and methods they use

-metrics that define their work(code is a metric but this metric don't have physical existing like the materials)

LONDON Ambulance System(LAS):

-Computerized dispatch system project

-7.5 million spent

-Duties:

-ambulance location system

-automatic ambulance allocation

-mapping software (no google maps at that time)

-centralized command/control system

-Failure:

failed after just 9 days due to software errors, written by non-regulated software developers

-Recommendations:

-compulsory registration of software engineers

-legislation which ensure software development carried out under supervision of registered SE

-design and control of critical systems should be under control of registered and software chartered engineer

-Consequences of recommendation:

- recommendation 1 and 3 accepted
- recommendation 2 not accepted

Software Engineering as an engineering discipline in Pakistan:

-PEC accepts

-bachelors of software engineering

-bachelors of computer engineering

-bachelor of computer engineering from following is recognized as engineering degree by PEC

-FAST NU Karachi

-FAST NU Lahore

International Recognition of Engineering Qualifications:

-Europe Mobility Directives: Get qualified in 1 country, practice in any european country

-USA: Washington Accord: recognize the qualification from germany, australia e.t.c

-Pakistan: PEC: Recognize the foreign engineering programs that are listed on 2nd schedule

Are Engineers terrorist?

-People who are with degree engineering are most commonly involved in terrorist attacks

-Electrical and computer engineers are most likely to involve in terrorism acts

IEEE Institute of Electrical and Electronic Engineers (IEEE)

-POSIX standard was introduced by IEEE

-areas of expertise of IEEE:

-CS

-Mechanical engineering

-civil engineering

-biology

-physics

-mathematics

-Membership Grades:

-students

-members(professional members with degrees)

-senior members(got this position after producing 3 letter of

recommendations from other seniors)

- Fellow Members(Highest grade, only nominated by other)

ACM Association for computing and machineary:

- chapters (student/professional)
- digital library
- publications/journals
- conferences
- career resources

Others associations are also there that are working in various fields and producing quality work for the ease of humanity (e.g Italian association for informatics and automatic computation)

Organizations Overview:

- All around us
- must have a legal existence
- types of organizations:
 - commercial
 - public
 - non-profit
 - Commercial:
 - sole trader
 - partnership or association
 - coopertaion
 - limited company
 - private limited
 - public limited
 - Non-profit:
 - trust
 - foundation
 - ngo
 - charity
 - Public Sector organization:
 - universities
 - schools

- banks
- software houses

Commercial Organizations: Sole Trader

- single individual
- registered with income tax, excise and customs
- personal liability for all debts of business
- if suffers losses, risks his own assets, possibly his home and other "real estate"

Commercial Organizations: Partnership

- group of people contribute to business
- each partner has "shares" in the company
- partnership "terms" as defined under the partnership act of 1932
- What about liabilities?
- Liability is the state of being responsible for something

Commercial Organizations: Partnership liabilities: Scenario

- You and your friend are working on a software
- your friend is doing majority of the work and you are doing very less work
- you and your friend decides that he will take majority of the money as he is contributing mainly
- unfortunately the software don't work
- the company for which u both were working claims the damage
- u two both have to pay for the damage now
- u have the house and car but your friend has no money
- the company sues you and claim the entire amount of the damage from you.
- Is it legally possible. (Yes btw)
- Yes partners are jointly and severally responsible for the partnership liabilities

-liability of a partner for acts of the firm: Every partner is liable, jointly with all the other partners and also severally, for all acts of the firm done while he is a partner

-Wrongful Acts of a Partner

-Liability of the firm for wrongful acts of a partner: by the wrongful act of a partner acting in the ordinary course of the business of a firm, loss or injury is caused to any third party, the firm is liable therefore to the same extent as the partner.

Commercial Organization: Partnership Liabilities: Other Factors

- One partner wishes to leave partnership (retiring)
- How much money is he entitled to have?
- How are the liabilities going to be distributed?

Rules:

- Retirement should only be consent (pr by giving notice)

- Retiree will still be liable to claims along with former partners

- retiree may be discharged from 3rd party liability claims by signing an agreement with the 3rd party as well as new partners.

- Partner is Expelled?

- Partner cannot be expelled unless expulsion clauses are clearly mentioned in partnership agreement. If so, public notice must be given.

Commercial Organizations: Partnerships

- who enters partnership?

- small businesses

- startups

- professional bodies recommend partnership company for both small businesses and start-ups

- liability law discourages recklessness

- usually found in organizations practicing law, Medicine

Commercial organizations: Cooperations

- Association of people who voluntarily cooperate for mutual, social and economic and cultural benefit. (Business interest placed before profit. if interest is served, profit will follow)

- community organizations:

- consumer cooperations: company managed by people who use its services

- worker cooperations: managed by people who work there

- housing cooperations: managed by people who live there

Trust/Foundations/NGO/Charities:

- charity: established for humanitarian purposes (profit used for furthering charitable causes)

- It has tax exemption

- NGO:

- can be used for social welfare

- can be welfare, trust or foundation, charity

- TRUST:

- A transfers assets to B (B==trustee)

- B will manage assets in favour of beneficiary and/or A

- Foundation:

- Donate funds or provide support to other organizations

- arrange source of funding for its own charitable purposes

-e.g Fauji foundation=commercial revenue direct to the welfare of ex-army officers

LIMITED COMPANY:

- most common commercial organization type

- 3 defining aspects

 - legal identity through legal person

 - ownership of company divided into number of shares(shareholders)

 - If company faces debt/or legal liability, owners have no obligation to pay, atmost he will lose his financial shares only

Limited Company Types:

- public:offer its shares to general public

- private

- Limited companies are registered under companies ordinance 1984

Liability:

- I am liable to pay xyz an amount of 100 rupees

- Bank loan: liable to pay back with intrest

- Taxes: liable to pay to government every year

Liability is limited to what members invest (shares), or what members guarantee to pay if company is liquidated

Limited Company:

United states call the large limited comapny as CORPORATION

Company has some obligations:

- provide its working details to registration authority

- produce annual account reports

- produce annual audit reports

Registration of a limited company:

- Registration = incoportaion(company ordinance 1984)

- Security and Exchange commision of Pakistan performs incooperation/registration

Registration of a limited company:

- name availability certificate(appropriate name=askrai,federal,uno e.t.c)

- incooperation fees (registration fees)

- prepare consitution (memorandum of associtaion+article of association)

- Deposit application pack with company law division, SECP

- share holder agreement (private document for members only)

Consitution of a Limited Company:

- consists of 2 documents
 - Memorandum of association
 - article of association

Example Document for starting IT Consultancy Company

- Name of company
- area of operation
- objectives of the company
- liability type(limited by share/gurantee)
- maximum share capital+total shares+cost/share
- Declaration of association
- share distribution and particulars
- witnesses

Article of Association:

- what to do when new shares are issued
- no of directors
- share allocation
- other information
- witnesses

Other Documentation:

- Get own letter head/business card
- registration with income tax department (to obtain NTN number)(National Tax Number)
- if software house, register with Pakistan Software Export Board(PSEB)

NTN Certificate

Benefits of registration with PSEB:

- Tax exemption on export of IT service
- Voip traffic legalized
- credibility in international market
- subsidized internation certifications
- Incubation programs

- visa facilitation

What do we need to register with PSEB

- registration form

- company profile

- company letter-head

- ntn certification

- cnic of director, shareholder, partner

- copies of:

 - memordium of association

 - article of association

 - incoopertion certificate

- 6 month bank statement

- 10,000

Exercise:

- What type of company would u need for the following scenarios?