CMP 403 DR. Anna Software Engineering

# Classwork

Systems involved

1. Education
2. Estate
3. Health
4. Maintenance
5. Fleet
6. Production
7. Finance accounting
8. E commerce
9. Restaurant
10. Logistics
11. Guesthouse
12. Animal husbandry
13. Fisheries
14. Decision support
15. Cooperative ventures
16. Inventory
17. Human re

Build a product, work on separate sectors, discuss hardware and functional requirements and properties to develop the final project,

# Chapter 1

Software engineering is concerned with theories, methods and tools for professional software development. It constituted a significant fraction of gross net profit in developed countries, which is often greater than hardware cost which also includes maintain cost being greater than development cost.

Types,

1. Generic: stand-alone systems that are sold to anyone who wants to buy them. E.g. graphic programs, project management tools, etc. Specs and decision are made by the developer
2. Customized: personalized e.g. embedded, monitoring software etc.by the customer

Attributes of good software

1. Functionality
2. Performance
3. Maintainable
4. Dependable
5. Usable
6. Secure

Software engineering activities

1. Specs: define the software and its constraints
2. Dev: designed and programmed
3. Validation: quality inspection
4. Evolution: modification based on customer and market requirement

Comp science vs software dev vs system dev

* Theory and fundamentals vs practicalities of developing useful software vs all aspects including hard, soft and process engineering

Challenges of soft engineering

* Diversity, reduced delivery times of trustworthy / quality software
* 60 – 40 dev – test then for custom, evolution cost > dev cost

Best dev techniques

* Games: prototyping
* Safety critical control systems: complete and analyzable system

Web to software engineering

* Highly distributed service based systems,
* Advances in programming languages and software reuse
* Availability of software services

Engineering discipline: using appropriate theories and methods to solve problems while maintaining scope

General issues that affect software

* Heterogeneity: requirement for distributed systems including multi-platforming
* Business and social change:
* Security and trust:

Application types

* Standalone: run on a local computer, do not need network
* Interactive transaction based: execute on a remote computer, accessed by users own computers
* Embedded control systems: control and manage hardware devices. The largest number among
* Batch processing: process data in large batches to create corresponding outputs
* Entertainment systems: personal entertainment of the user
* Modeling and simulations: model physical processes or situations which may include many separate interacting objects
* Data collection: use sensors to collect data and send it to other systems for processing
* System of systems: compose other software systems

Software engineering fundamentals

1. Systems should use a managed and understood development process
2. Dependability and performance are of top most importance
3. What the software should do are importance
4. Reuse existing software where necessary

Software engineering and the web

* Allow application functionality accessibility over the internet
* Cloud computing provision of computer services remotely on the cloud
* Assemble from pre-existing components and systems
* Should be developed and implemented incrementally
* User interfaces should be constrained by the capabilities of the web browser
* Web forms with local scripting are more used
* They are complex distribution systems

Software engineering ethics

* Involves wider responsibilities than just application of technical skills and upholding the law
* It involves following a set of principles, morally correct
* Confidentiality:
* Competence:
* Intellectual property rights: be aware if intellectual properties such as patents, copyright and their protections
* Computer misuse:

ACM/IEEEE code of ethics

professional societies in the US cooperated to produce a code of ethical practice that the members sign up to the code of practice when they join. There are 8 principal ethics made by all aspect of professionalism

computers have roles in all forms of life and profession, and because of this they can cause and influence harm or good

Ethical Principles

* PUBLIC: software engineers shall act consistent with the public interest.
* CLIENT AND EMPLOYER: they shall act in the interest of their client and employer consistent with the public
* PRODUCT: they must make sure their products meet the highest professional standards
* JUDGEMENT: they shall maintain integrity in their professional judgement
* MANAGEMENT: their leaders/managers shall promote ethical approach to the management of the software.
* PROFESSION: they shall advance the reputation of the profession consistent with the public
* COLLEAGUES: they shall be fair and consistent with their colleague
* SELF: they shall participate in the practice of life long learning regarding the practice of profession and integrity.

Ethical Dilemmas

* Disagreement with senior on principles
* Employee disregard rules and release unsafe systems
* Participation in the development of nuclear / military weapon system