TICT3153

SOFTWARE ENGINEERING

Chapter 01

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Course Overview

- Course Code : TICT 3153
- Course Title : Software Engineering
- Credit Value : 3
- Theory : 45 hours

Intended Learning Outcomes(ILO) :

- Explain the step-by-step software development process
- Compare the various software development process model
- Develop diagrammatic representations of software requirements
- Identify the software requirements specification of an organization
- Evaluate the usability of the developed software
- Demonstrate the Agile development process

Reference

- Roger S. Pressman. (2014) Software Engineering: A Practitioner's Approach, 8th Ed.
- Andrew Stellman. & Jennifer Greene. (2014) Learning Agile.
- Ian Sommerville. (2015) Software Engineering. 10th Ed.

Software

- Program is set of instructions that performs a specific task when executed by a computer.
- Software is the combination of program(s), documentation (documents produced during development), data and operating procedure manuals (delivered with programs to customer at the time of release).

Importance of Software

- Software has become an integral part of almost all fields of human life.
- More and more systems are software controlled (transportation, medical, telecommunications, military, industrial, entertainment, etc.

Software Products

- Generic Products

Stand-alone systems that are marketed and sold to **any customer** who wishes to buy them.

– Examples: PC software such as graphics programs, PC software such as Excel or Word; CAD software; Game software.

- Customized/Bespoke Products

Software that is commissioned by a **specific customer** to meet their own needs.– A software contractor develops the software especially for that customer.

– Examples of this type of software include control systems for electronic devices, systems written to support a particular business process

Widely Used Software Products

- System Software - Heavy interaction with Hardware, Multiple Users,Scheduling & Resource sharing– Provide interface to other applications.
- Real Time software - Monitor, Analyze, control the real time events.
- Business Software - Business software used by business users to perform various business functions.

- Engineering/Scientific Software - used to facilitate the engineering functions and tasks.
- Embedded software - Resides in ROM– specialized for the particular hardware– Embedded software is written to control machines or devices that are not typically thought of as computers.
- Personal Computer Software (MS Word, Spread sheet)

Essential Attributes of Good Software

- Maintainability : Software should be written in such a way so that it can **evolve to meet the changing needs of customers**.This is a critical attribute because software change is an inevitable requirement of a changing business environment.
- Reliability and Security : Reliable and Secure software **should not cause physical or economic damage in the event of system failure**.Malicious users should not be able to access or damage the system.
- Efficiency: Software **should not make wasteful use of system resources** such as memory and processor cycles. Efficiency therefore includes responsiveness,processing time,memory utilisation,etc.
- Acceptability : Software **must be acceptable to the type of users** for which it is designed. This means that it must be understandable, usable and compatible with other systems that they use.

Software Engineering

A **systematic** and **disciplined** approach that is concerned with **all aspects of software production** from designing, developing, testing, and maintaining software applications.

- Engineering discipline - Using appropriate **theories and methods** to solve problems bearing in mind organizational and financial constraints.
- All aspects of software production– Not just technical process of development. Also **project management** and the **development of tools,** methods etc. to support software production.

General Issues That Affects Software

- Heterogeneity: Increasingly, systems are required to **operate as distributed systems across networks** that include different types of computer and mobile devices.
- Business and social change: Business and society are changing incredibly quickly as **emerging economies develop and new technologies** become available. They need to be able to change their existing software and to rapidly develop new software.

- Security and trust: As software is intertwined with all aspects of our lives, it is essential that we can trust that software.
- Scale: From very small embedded systems in portable or wearable devices through to Internet-scale, cloud-based systems that serve a global community.

Web – Based Software Engineering

- The basic idea of web-based software engineering revolves around applying software engineering principles to the design, development, testing, deployment, and maintenance of software that runs over the web.
- This idea however, relied on a **web server** and a **web browser**. The web server stores the documents and "serves" them to other computers who desire access to the documents. The web browser allows user to request and view the documents.

Desktop Software vs Web-based Software

- Desktop software - **Self-contained** system that can be independently deployed on a specific type of hardware.

Example, when you download an installation tool that runs on your machine to install something like **Microsoft.**

- Web-based software - Delivered through a user's web browser, while they actually run on remote hardware that is maintained by the tool's owners.

Examples of such tools include **Google Docs** (a web-based word processor) or Salesforce.com (a web-based customer relationship management tool).

Feature	Desktop	Web - Based
Connectivity	Does not require an internet connection	Requires an internet connection.
Scalability	Dependent on client hardware.	Controlled by software provider's hosting infrastructure
Installation Skill / Maintenance	Requires customer installation and maintenance.	Requires no customer installation or maintenance.
Deployment	Must be installed and maintained on every workstation where it is used	No installation is required beyond logging into an account
Cost	Desktop applications must be developed for every target platform.	Similar or less expensive than developing a desktop application for any one target platform.

END!