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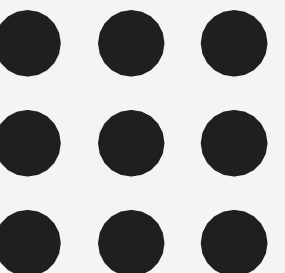
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Department of Artificial Intelligence and Data Science

23ITT203 Object Oriented Software Engineering

Software Configuration Management(SCM)

What is SCM?

- **Definition:**

  Software Configuration Management (SCM) is a process used in software engineering to manage and control changes in software projects.

- It ensures that the software product remains consistent, organized, and traceable during its development and maintenance.

Why is SCM Important?

- Avoids confusion from multiple versions.

- Helps track who made changes and why.

- Makes collaboration easier in teams.

- Supports rollback to earlier versions if needed.

- Improves software quality and reduces risk.

Key Activities in SCM

a. Version Control

Keeps track of different versions of files or documents.

Example:

A student writes an assignment and saves it as "Assignment_v1". After editing, they save "Assignment_v2". SCM manages these versions properly.

b. Change Control

Ensures all changes are planned, reviewed, and approved before being implemented.

Example:

Before adding a new topic in a textbook, a teacher discusses with the head of the department and then updates it. Similarly, in software, no change is made without approval.

c. Configuration Identification

Identifies all the important items that need to be managed, like documents, requirements, source files, and design diagrams.

Example:

A mobile app project may have images, screen designs, and user interface files—all these are configuration items.

d. Configuration Status Accounting

Maintains information about each configuration item: its current version, changes made, and its status.

Example:

In a group project, this helps the team know which documents are final, which are drafts, and which are under review.

e. Configuration Auditing

Ensures that the software follows all rules and contains only approved changes.

Example:

Before final printing, a book is checked to ensure it includes only the correct and approved chapters. Similarly, in software, configuration audits ensure correctness.

Software Configuration Items (SCIs)

SCIs are the individual components that are managed under SCM.

They can include:

- Requirement documents

- Design documents

- Test plans

- Source code files

- User manuals

Example:

Think of SCIs like parts of a car—engine, seats, wheels. In software, each item plays a role in the complete system.

Benefits of SCM

- Provides a clear record of what was changed, when, and by whom.

- Makes it easier to manage large projects.

- Reduces the chances of errors due to incorrect or outdated files.

- Helps maintain consistency throughout the software lifecycle.

SCM in Real Life – A Simple Example

- Imagine a group of students working on a class presentation:

- One student edits the introduction.

- Another student works on the conclusion.

- Without proper coordination, some parts might get overwritten or lost.

With SCM:

- Everyone knows who is working on what.

- Changes are tracked and saved.

- Mistakes can be undone.

- Final presentation is complete and correct.

SCM Tools (No technical details)

Some tools used in industry to support SCM are:

- Git

- Subversion (SVN)

- IBM Rational ClearCase

- Microsoft Team Foundation Server

These tools help teams manage and organize files, track changes, and collaborate efficiently.

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