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SOFTWARE QUALITY MANAGEMENT

CSP587

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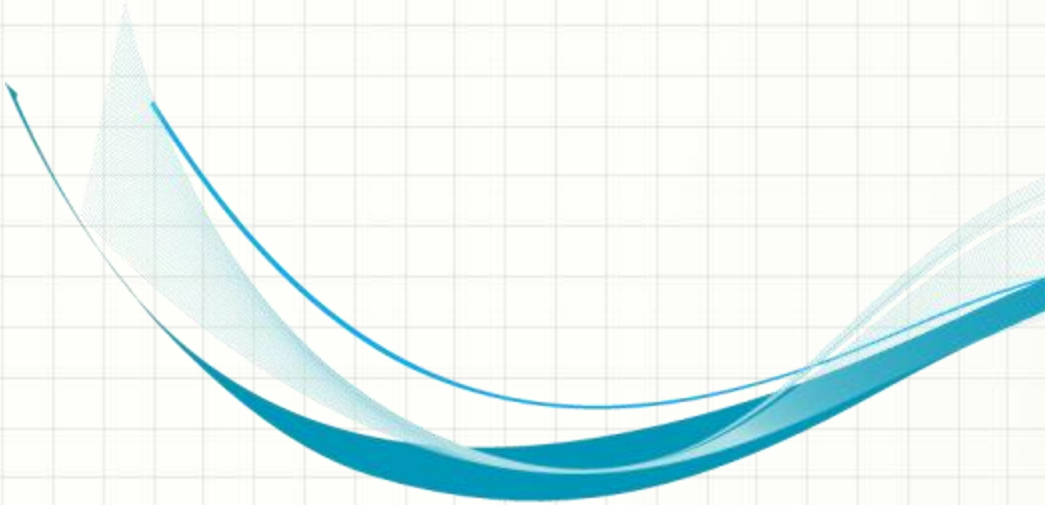
Computer Science

Reading

- Software Configuration Management
- Reading
  - Ch. 8 – Software Configuration Management
- Objectives
  - Describe the software system as a cooperating set of configurable and manageable software configuration items
  - Establish a process for effective management of all system components
  - Examine the human and tool elements needed for effective configuration management
  - Examine the documentation and reporting aspects of configuration management

Topics for Discussion

- Why is change necessary?, and why is change risky?
- What metrics can we use to measure both the necessity and the risk?
- What are the benefits of effective configuration management?
- Describe tool support for managing change.
- Describe organizational and process support for managing change.



Week 9
Software Configuration Management

Configuration Management

- The process of controlling and documenting modifications to a system under development
  - Identify and document the functional and physical characteristics of a configuration item
  - Control changes to those characteristics
  - Record and report change processing and implementation status
  - Verify compliance with specified requirements
- Motivation
  - Change can kill!
  - Establishing baselines
  - Version control
  - Documentation / history of change

Software Configuration Item (SCI)

- Classes
  - Design documents
  - Code
  - Data files
  - Tools
- Examples
  - Requirements spec
  - Design document
  - Database schema
  - Test plan
  - Source code
  - Prototype code
  - Test scripts and data
  - CASE tools

Benefits of Configuration Management

- Minimize confusion – organize and better manage SCIs
- Organize the required activities that ensure the integrity of the many software products
- Ensure traceable and current configuration of products
- Optimize the cost of development, maintenance, and after-sales support
- Facilitate the validation of the software with respect to its requirements
- Provide stable development, maintenance, testing, and production environments
- Improve quality and compliance to software engineering standards
- Reduce rework costs

CM According to CMMI

- Establish baselines
  - Identify configuration items
  - Establish a configuration management system
  - Create or release baselines
- Track and control changes
  - Track change requests
  - Control configuration items
- Establish integrity
  - Establish configuration management records
  - Perform configuration audits

CM Process

- Control change and handle software change requests (SCRs)
- Manage releases
- Document and disseminate configuration information
- Assure compliance
- Authority generally comes from a Configuration Control Board (CCB)

Change Request Assessment

- Requests for change should be formally documented and submitted to the CCB
- Software Change Requests
  - Purpose / justification
  - Expected timeframe and cost
  - Impacted modules
- Decision making
  - Benefit/need vs. risk/cost

Release Management

- Change with care
  - Choose a “low-impact” time
  - Communicate to interested parties
  - Verify
  - Rollback if necessary
- Release types
  - Baselines
  - Intermediate versions
  - Revisions
  - Production

Evolution Models

- Linear Evolution
  - Only one “active” version at a time
  - The current version is sunset with the release of the next version
  - Good for applications targeted for a single organization and/or for software packages
- Tree Evolution
  - Several parallel versions can be “active”
  - Good for diverse user communities and where the SCI is a component to be used in different “parent” systems

Controlled Documentation

- Vital or likely to become vital
  - Development and/or maintenance
  - Current and/or future customer relationships
- Documentation control procedures
  - Preparation, storage, retrieval, and disposal
- Assures
  - Quality
  - Completeness and compliance
  - Future availability of vital information
  - Support of root-cause analysis

Quality Records

- Special type of controlled document
- A customer-targeted document used to demonstrate
  - Full compliance with requirements
  - Effective SQA operation

Documentation Control Procedures

- Define documents to be controlled
- Establish requirements for preparing each
- Establish requirements for approval
- Establish requirements for storage, retrieval, and disposal