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SOFTWARE QUALITY MANAGEMENT

CSP587

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Computer Science

Reading

- Reviews
- Reading
  - Ch. 5 – Reviews
- Objectives
  - Appreciate the value of reviews
  - Understand the variety of review processes which can be utilized to address the variety of software engineering work products
  - Examine the mechanisms of the different review processes with the goal of maximizing the effectiveness of each
  - Discuss the requirements of standards relevant to conducting reviews

Topics for Discussion

- State the objective of reviews in measurable terms.
- Explain why reviews cannot prove that a software system is perfect.
- Discuss the effectiveness and efficiency of different review approaches.
- Discuss the role of:
  - Discipline,
  - Management,
  - Culture,
  - Training, and
  - Tool support.

Week 6 Reviews

Checks and Balances

- Work products should be reviewed to discover defects
  - Work products come in many forms
  - So do defects
  - Undiscovered defects will be passed downstream
- Defect discovery is much more effective when the reviewer is independent of the production team
  - Why?
  - How do we achieve necessary independence while maintaining sufficient knowledge?

Review Objectives

- Direct objectives – related to the current project
  - Detect defects, including deviations from standards
  - Identify new risks
  - Obtain approval to move forward
- Indirect objectives – long-term team growth
  - Facilitate the exchange of professional knowledge regarding development
  - Data collection for future process improvement

The Nature of Informal Reviews

- No documented approach, and therefore wide variation in execution and effectiveness
- Lack of participant role definition
- Lack of objectives (e.g., fault detection rate)
- Lack of planning (often improvised)
- Lack of measurement (e.g., number and severity of defects)
- Lack of management oversight (or interest?)
- No checklist is used to identify defects

Inexpensive Options

- Personal Reviews
  - Do-it-yourself, but following structured process
  - Rely on personal past history (checklist)
  - Look for the root-cause of each defect
  - Requires personal discipline
- Desk-check reviews
  - Pass the item under review around for inspection
  - Rely on checklists targeting specific work products
  - More “eyes”, more objectivity … variability?
  - Limited presence of “authority”
  - More focused on defect detection than approval
- Effectiveness
  - Easier to organize, not as bureaucratic, etc.
  - But may not be reliable enough to serve as a milestone gate

Formal Design Reviews

- Conducted at milestones requiring the completion of analysis or design products
- Participants
  - Independent, senior leader
  - Review team (primarily senior personnel)
- Approval decisions
  - Full, partial, or denial
- Document the outcome
  - Including responsibilities for required corrections
- Follow up

Expert Opinions

- Significantly independent
- Either external review or participation in internal reviews
- Beneficial when:
  - In-house expertise is absent or unavailable
  - Internal deadlock due to disagreement by senior personnel on significant issues

Review Standards

- ISO Work Product Reviews
  - Applicable to any life-cycle stage
  - Generic review process to be tailored to each situation
- Capability Maturity Model Integration (CMMI)
  - Verification process area
  - Assigned roles supported by training
- IEEE 1028 – Software Reviews and Audits
  - Voluntary, teams ofparticipants
  - Defines what to do and how to do it
  - Results must be documented

IEEE 1028 Template

- Introduction – objectives and overview
- Roles and responsibilities
- Input – description of what will be reviewed
- Entry criteria – authorization and kickoff
- Procedures – description of key activities
- Exit criteria – definition of the “finish line”
- Output – minimum set of deliverables

Walk-Through

- Evaluate and create discussion of a work product
  - Discover defects
  - Improve the product
  - Consider alternatives
  - Evaluate conformance to standards
  - Evaluate usability and accessibility
- Benefits
  - Reduce the impact and correction cost of errors
  - Development process improvement
  - Improve the quality of the software product
  - Reduce development costs
  - Reduce maintenance costs

Inspection Review

- Developed at IBM (1970s)
  - Strives for early detection of defects
  - And to find defects missed by less-than-perfect testing (< 100% coverage)
  - Chaotic environment with 30% - 80% of development budget spent on rework
- Approach
  - Disciplined verification that work products adhere to standards / specifications, and that anomalies are assessed (root-cause improvement) and adjudicated (waivers)

Launch Reviews and Assessments

- Project Launch
  - Establish the start
  - Ensure everyone is on the “same page” (objectives, constraints, milestones, responsibilities, etc.)
  - Can be used to launch project phases as well
- Project Retrospectives
  - Analyze performance and capture lessons learned

Agile Meetings

- SCRUM – frequent, short meetings
  - What have you accomplished (relative to the to-do list) since we last met?
  - What obstacles are holding you up?
  - What will you accomplish by the next meeting?
- Goods and bads
  - Frequent interaction with accountability
  - Short (not an impediment), but frequent (adds up)
  - Intensive period of interactive inspection

Success Factors

- Factors that foster success
  - Visible management commitment
  - Positive culture
- Factors that adversely affect quality
  - Using reviews to evaluate employee performance
  - Ego (I’m too good to be reviewed)
  - Lack of preparation for sessions
  - Lack of training
  - Axe grinders (reviewers looking to get revenge)

As Compared to Software Testing

- Testing was traditionally applied late in the SDLC
- Common sense has moved it up
- Testing differs from reviews in that it involves exercising work products
  - Specialized testing team
  - Approved test procedures
  - Approved test cases
- Objectives
  - Direct
    - Discover defects and achieve acceptability
  - Indirect
    - Collect data