Software Quality Assurance in Practice

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Panelists

• Paul Grizzaffi, MedAssets
• Mas Kono, MedAssets
• Tim McClung, NTT Data North America QAT Practice
• John Medellin, Medellin Applied Research Concepts
• Chad Virnig, IBM
• Stuart Yarost, Parker Aerospace
The Initial Question

• How is software testing conducted in practice?

• Inspired by topics covered in software testing classes and textbooks as compared to observations about how (informally) testing is frequently conducted in industry…
• SQA is broader than testing
  – A planned and systematic pattern of all actions necessary to provide adequate confidence that the item or product conforms to established technical requirements. IEEE 730
  – The purpose of the Software Quality Assurance Process is to provide assurance that work products and processes comply with predefined provisions and plans. ISO/IEC 12207
    • Assure … make certain that the specified … activities have been performed by others.
    • Ensure is used when software assurance practitioners themselves perform the specified software activities.
• Equivalence class partitioning
• Boundary value analysis
• Dominators and postdominators
• Test generation from predicates
  – BOR, BRO, BRE, MI, BOR-MI
• Test generation from finite state models
  – specification, analysis, or design
  – characterization set, W-method, partial W-method, UIO-sequence method
• Test generation from combinatorial designs
  – latin squares, mutually orthogonal latin squares, pairwise design, orthogonal arrays, covering arrays
• Minimization and prioritization for regression testing
• Control flow graphs
  – statement coverage, decision coverage, condition coverage, LCSAJ coverage, MC/DC coverage
• Data flow graphs
  – def-clear paths, def-use pairs, c-use coverage, p-use coverage, k-dr chain coverage

• Mutation testing
  – traditional mutation operators (Fortran), Java mutation operators, C mutation operators
• Which of the techniques that we teach our undergraduate students are broadly used in industry?

• Which are used in regulated industries?
  – e.g., DO-178B requires MC/DC
  – DO-178C allows formal methods in some areas

• Which techniques are only used by researchers in academia?
  ➔ transitioning SOTA to SOTP
Panelists will present a brief overview of their experience in using testing and SQA

Open the floor to audience questions and open discussion

– What is the state-of-the-practice?
– What can / should we do to encourage adoption of the state-of-the-art?
– What research directions might be fruitful in affecting industry practice?