What Makes Good Research in Software Engineering?

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Future of Software Engineering

Testing

- Problems
  - Software quality will become the dominant success criterion in the software industry...one process that is performed to support quality assurances is testing – Osterweil
  - More than 50% of the cost of software development is devoted to testing, with the percentage for testing critical software being even higher – Harrold
  - Emergence of new technologies, such as component based systems and product families... need for improved testing methodologies - Harrold

Testing Continued.

- Open Questions / Progress
  - Testing component-based systems. Different criterion for component provider and component user.
  - Testing based on pre-code artifacts. Generation of test cases based on architectures.
  - Testing evolving software. Test suite selection, growth and reduction.
  - Demonstrating effectiveness of testing techniques. Adequacy for certain criterions.
  - Creating effective testing processes. Quantify effectiveness of current practices.
  - Using testing artifacts. Providing testing information to developers and users.
  - Other testing approaches. Intrusiveness of instrumentation. Data generation techniques.

Economic Driven Software Engineering

- Problem
  - Design for change is based on recognition that much of the total lifecycle cost of a system is incurred in evolution, and that a system that is not designed for evolution will incur tremendous costs – Parnas
  - Past work focuses largely on costs, not benefits, thus not on value added; nor are current technical software design criteria linked clearly to value creation – Sullivan, Bohem
  - There is “disconnect” between the decision criteria that tend to guide software engineers and the value creation criteria of organization in which software is developed – Sullivan, Bohem
Economic Driven Software Engineering Continued.

- Open Questions / Progress
  - …Win-Win Spiral Lifecycle Model represents a serious attempt at economic-driven software design. – Bohem
  - Microsoft’s independent-feature-based architectural style for many applications… creates real options to abandon features late in the development to meet time-to-market requirements. – Cusumano, Selby
  - …Dynamic management process in which progress toward achieving benefits is traced with respect to expenditure… three key component to this process: model costs, benefits, and value; tracking and managing for value; and design for lifecycle value. – Sullivan, Bohem

The End – Questions?