The University of Alabama
Department of Computer Science
Colloquium Series Speaker

Dr. Larry Bernstein
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IEEE Distinguished Speaker Talk: Trustworthy Software Systems

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11:00a.m., Houser 108

Abstract:

Much software engineering focuses on cost and schedule, especially schedule. My view is that a shift is needed. The software engineer must make judgments or tradeoffs among the features the software provides, the time it will take to produce the software, the cost of producing the software, how easy it is to use and how reliable it is. Too often performance and functional technical requirements become an issue once the software is deployed. Rarely is trustworthiness considered. Not only must software designers consider how the software will perform they must account for consequences of failures. Trustworthiness encompasses this concern. The requirements must encompass the trustworthiness of the emerging system.

Trustworthy software is stable software. It is sufficiently fault-tolerant that it does not crash at minor flaws and will shut down in an orderly way in the face of major trauma. Trustworthy software does what it is supposed to do and can repeat that action time after time, always producing the same kind of output from the same kind of input. The National Institute of Standards and Technology (NIST) defines trustworthiness as "software that can and must be trusted to work dependably in some critical function, and failure to do so may have catastrophic results, such as serious injury, lost of life or property, business failure or breach of security. Some examples include software used in safety systems of nuclear power plants, transportation systems, medical devices, electronic banking, automatic manufacturing, and military systems.

This talk presents principles of requirements engineering for trustworthy software intensive systems-of- systems. A process for getting to a quantitative and feasible set of software feature requirements is the theme. The approach is to deduce a Measurable Operational Value from a customer prospectus, establish feature sets, set priorities using a simplified quality function deployment approach, validate the feature packages with prototypes, and extending the prototypes to models. The tutorial includes ways to estimate staffing, schedules and reliability and evaluating the resulting product with ICED-T metrics. It is based on my recently published book, TRUSTWORTHY SYSTEMS THROUGH QUANTITATIVE SOFTWARE ENGINEERING, Wiley-IEEE Computer Society Press; September 2005; 0-471-69691-9.

Dr. Bernstein's Bio:

Larry is the Industry Research Professor of Software Engineering at Stevens Institute of Technology, Hoboken, NJ. He is Director of the Quantitative Software Engineering Program and teaches Quantitative Software Engineering. He had a 35-year distinguished executive career at Bell Laboratories managing huge software projects. His systems are used worldwide. He is a Fellow of the IEEE and the Association for Computing Machinery for innovative software project management that he introduced to Bell Labs. He is on the Board of Center for National Software Studies and Director of the NJ Center for Software Engineering. He is an active speaker on Trustworthy Software in the IEEE Computer Society DVP program, visiting a chapter monthly in the US, Canada and Mexico. He served on the Board of Governors with the IEEE Communications Society.