Applying Software Design and Requirements Engineering Techniques to System Conception

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Abstract
While classical software engineering dictums separate the development of a system’s requirements from its design, practice has largely shown this to be either impractical or naive. Much of the design of large software-dependent systems comes from prior systems, and that knowledge affects the requirements for new systems. Even if prior systems do not directly determine new system’s requirements, the activity of developing requirements is, in practice and emerging theory closely intertwined with the activity of designing the system’s structure and correlating design decisions. This survey examines requirements engineering techniques, assessing them with regard to how well they support the inclusion of prior design knowledge and how well they support the co-development of designs. The survey is based on the application of an evaluation framework to a set of well-known requirements engineering techniques. The framework includes criteria such as mapping to architecture, expressibility of design choices, and accessibility to relevant information. The techniques surveyed include Problem Frames, Use Cases, and Agile. The evaluation results in identifying a set of outstanding holes to be fixed in Requirements Engineering.