

# Requirements Engineering: From Goals and Informal Requirements to System Specification

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From a practical point of view, requirements engineering is one of the decisive steps in software and system development. Only if valid and complete requirements are captured, analyzed, documented and specified in an adequate way, software and systems engineering can produce a high quality result with adequate functionality. From a theoretical point of view the process of requirements engineering is in particular interesting, because it includes the formalization of informally stated goals and requirements. This task is a fascinating mixture of making requirements precise and making decisions about different understandings and interpretations resulting in system specifications as the overall result of requirements engineering with respective functional requirements. Understanding requirements as logical statements about systems, we use the complete machinery of predicate logic to define relationships between requirements in terms of traces and healthiness conditions for sets of requirements. A comprehensive specification of a system has to be given in a structured manner in terms of adequate formal system models. The model includes a data model, a context model, and structured interface model.

## References

- [1] M. Broy. *The Semantic and Methodological Essence of Message Sequence Charts*. Science of Computer Programming, SCP, Vol. 54(2-3), pp. 213-256; 2004.
- [2] M. Broy. *Multifunctional Software Systems: Structured Modeling and Specification of Functional Requirements*. Science of Computer Programming, Vol. 75, pp. 1193-1214, 2010.
- [3] M. Broy. *A Logical Basis for Component-Oriented Software and Systems Engineering*. The Computer Journal, Vol. 53(10), pp. 1758-1782; 2010.