40 years of formal methods

In this "40 years of formal methods" essay we shall first delineate, Sect. 1, what we mean by method, formal method, computer science, computing science, software engineering, and model-oriented and algebraic methods. Based on this, we shall characterize a spectrum from specification-oriented methods to analysis-oriented methods. Then, Sect. 2, we shall provide a "survey": which are the 'prerequisite works' that have enabled formal methods, Sect. 2.1, and which are, to us, the, by now, classical 'formal methods', Sect. 2.2. We then ask ourselves the question: have formal methods for software development, in the sense of this paper been successful? Our answer is, regretfully, no! We motivate this answer, in Sect. 3.2, by discussing eight obstacles or hindrances to the proper integration of formal methods in university research and education as well as in industry practice. This "looking back" is complemented, in Sect. 3.4, by a "looking forward" at some promising developments-besides the alleviation of the (eighth or more) hindrances! © 2014 Springer International Publishing Switzerland.