



## RESUME

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Mr. Bender has over fifty- years' experience in software with a primary focus on quality assurance and testing. He has consulted internationally to large and small corporations, government agencies, and the military. This has involved a wide range of applications including finance, billing, manufacturing, operating systems, data base management systems, communications, medical, command and control, satellite intelligence, aircraft, trains, automobiles, air traffic control, shipping, insurance, utilities, sales and distribution, education, prison management, and weather forecasting.

The technology base for these applications includes embedded systems, mobile applications, PC-based, client-server, mid-range, mainframe, super computer, and web based applications. It encompasses many major programming languages and operating systems.

Over the years Mr. Bender has been actively involved in various activities to improve software quality and productivity. These include:

BenderRBT Test Case Design software – This PC-based tool designs test cases from the system's specifications and is independent of the application's programming language and target operating environment. It is the only software test design tool to address the logical consistency of the specifications and the observability of defects.

Training – He has developed and teaches numerous courses including Writing Testable Requirements, Requirements Based Testing, Code Based Testing, Finding Ambiguities in Requirements, Finding Ambiguities in Contracts, Laws, and Regulations, and the Quality Program Overview. These courses focus on techniques that are both disciplined and practical.

Consulting – Mr. Bender has developed a Quality Process Assessment (QPA) which is applied at a project level or for an organization as a whole. It addresses how well testing is integrated into the development process; how testable the requirements and design specifications are; what methods and tools are used to design, build, execute, verify, and manage test cases; how testing is staffed and organized; how management measures quality; and the overall quality culture. The focus is on identifying immediate areas of opportunity as well as putting in place a long-term improvement program. Mr. Bender and his staff are then actively involved in assisting the client in implementing the recommendations. This includes training, the tools infrastructure, and hands-on guidance. He has performed QPA's for such organizations as Intel, TDS Health Care, Xerox, US West, Ameritech, and IBM.

Contract Testing – For Bender RBT Inc. a significant portion of their efforts are actively testing major applications using the methods and tools we recommend, including BenderRBT. The tasks include performing ambiguity reviews of the specifications, user manuals, and training materials. It also includes designing highly optimized test libraries to ensure that the design and code fully meet the requirements.

Bender Test Methodology (BTM) – The BTM is a test methodology designed to supplement the client’s and third party system development life cycles, which are often fairly weak in the verification and test area. It is designed to cover all classes of applications and has road maps for various types and sizes of projects – e.g., new development, maintenance, re-engineering, and packages

Software Contracts – Mr. Bender has co-authored, with a lawyer, a Software Contracts Guidelines tutorial that explains in English and legalese the various clauses which need to be considered in dealing with outside vendors. While not a lawyer, he has also done numerous contract reviews for such organizations as the Strategic Air Command, Bank of America, and the Arizona Supreme Court, among others. The focus is on the completeness of the contract from a business perspective and on identifying any ambiguities in the wording.

Expert Testimony – The exposure to litigation has become a very real factor in determining how much testing is enough. In order to provide more thorough advice to his clients in this area, Mr. Bender has gained invaluable experience and insight by testifying in a number of cases as an expert witness on software development, testing, and software contracts. His clients in this area include Wells Fargo Bank, the California Department of Corrections, ScanGraphics, Spectra Renal Chem, and the Central Illinois Light Company.

Industry Standards – Mr. Bender was the technical leader for defining the industry’s Y2K worldwide Software Test Certification Standards. Various individuals and organizations were on the review committee such as the IEEE Y2K group, SEI, and the CIO of Canada. Mr. Bender assisted in defining the current Software Quality Guidelines for the U.S. Food and Drug Administration. He has also worked with the Object Management Group on defining industry standards for Business Requirements.

Conferences – Mr. Bender is a frequent keynote and track speaker at various conferences including SQE’s STAR and Better Software, USPDI’s International Software Testing, QAI’s International Software Testing, PSQT’s testing conferences, ICS TEST (Germany), China Test, SIGIST (Israel), NISTL (nuclear industry), and ASM. He has also been a frequent speaker at the American Bar Association’s national conference speaking on the topics of Software Liability and Ambiguities in Contract, Laws, and Regulations. All told, he has been a speaker at over a hundred software quality conferences around the world.

Guest Lectures – Mr. Bender has guest lectured at various universities around the world including Ohio State, Stanford, University of Wales, and the Beijing University of Aeronautics and Astronautics.

Awards – Mr. Bender was one of the first programmers ever awarded IBM’s Outstanding Invention Award. This was for his breakthroughs on code-based testing via data flow analysis.

Mr. Bender was the winner of the 2019 Software Testing Excellence Award from the International Software Testing Qualifications Board (ISTQB) for his lifetime contributions to software quality and testing.

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### **Bender RBT Inc. (formerly Bender & Associates Inc.) (1977 – Current)**

Mr. Bender founded Bender RBT Inc., initially called Bender & Associates, in 1977. Its primary charter is to assist clients in improving software quality and productivity, especially in business critical, mission critical, and safety critical applications. It has five major product and service offerings: the BenderRBT test case design tool (previously known as SoftTest and Caliber-RBT), training, consulting, contract testing, and the Bender Test Methodology. In this role Mr. Bender has consulted to hundreds of clients in 45 of the 50 states and across five continents.

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**Crocker National Bank (1976 - 1977)**

Prior to starting Bender & Associates, Mr. Bender was the Vice President for Applications Development for Crocker National Bank, then the twelfth largest bank in the U.S. When he joined the bank, they had not delivered a new system in over six years. In the next fifteen months they delivered fifteen major new systems with a staff merely one third the size of Crocker's peer banks. Many of these systems were delivered faster than any other bank had ever done. They were also delivered at exceptionally high quality – about one defect per fifty thousand lines of executable code (industry average even today is around five defects per thousand lines of code). The keys were a strong focus on business objectives; heavy user involvement; an iterative project life cycle; detailed, unambiguous specifications; testing integrated throughout the project life cycle; forward scheduling instead of the normal back scheduling to a dictated date – where possible; focused accountability; and, most important of all, small teams of good people.

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**IBM (1969 – 1976)**

On graduating from Temple University in Philadelphia, Mr. Bender joined IBM as a system tester in the Poughkeepsie, NY Labs. There he was involved in testing OS, TSO, and MVS. While doing this, he developed improved methods and tools for code based testing. For this work he was the first programmer ever in IBM to receive their Outstanding Invention Award. His next role was Manager of Software Test Technology for the corporation. In this position he and his staff developed and deployed improved testing methods and tools across the company. His final assignment was as IBM's first consultant on software engineering to their major accounts as one of the early members of IBM Global Services. The objective was to accelerate hardware sales by improving the clients' software productivity.

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**Provident National Bank / Temple University (1967-1969)**

Mr. Bender began his career as an applications programmer in the mid nineteen-sixties at Provident National Bank in Philadelphia. Concurrently, while still an under-grad, he lectured at Temple University on (what else) how to test software.

Bachelor of Arts degree in mathematics, with minors in archeology and anthropology, from Temple University in Philadelphia, PA (1969)

United States Army Reserves (1970 - 1976)

MOS - Medical Records Specialist (E5)

Locations - Various Hospitals Including West Point