Bill Baker

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Experience 6 years as a high school and college instructor in technical subjects: computer science, statistics, probability, calculus, robotics.
15 years of professional programming experience. Programmer, technical designer, mentor, Linux integrator & administrator, open source contributor.

Skills High school & college teaching; software development; computer system administration; documentation; training & mentoring.
Servers, embedded devices, user interfaces, databases.

Computer languages and tools: C/C++, Java, Python, JavaScript, Perl, Linux/Unix, SQL, other languages and technologies as needed.

Education MIT BS, Computer Science and Electrical Engineering

Experience

四川大学附中 **AP Program** September 2012 – Present
The High School Attached to Sichuan University (Chengdu High School #12)
AP Teacher, Calculus and Computer Science

Teaching calculus and computer science to high school students to prepare them to attend university abroad. For calculus, “flipped” or “inside-out” classroom, with video lectures assigned as homework and problem-solving exercises in class.

西南财经大学 September 2011 – May 2012
Southwestern University of Finance and Economics (SWUFE)
Instructor, Overseas Education Preparation Institute, Chengdu, China

Mathematics and Introduction to Computers for college students who are preparing to study abroad in English-language universities.

National Center for Supercomputing Applications February 2005 – July 2011
University of Illinois, Urbana, Illinois
Research Programmer

Support of scientific computing — software development, security, data, integration, automated tools, system administration. To summarize: doing the non-scientific part of scientific computing. C/C++, Perl, Java, Python, Linux scripting, and domain-specific languages.

- Security software and services
  - Web Single-Signon and credential management system for the National Virtual Observatory. Developed and integrated software and managed the deployed service. Used PAM, Pubcookie, and OpenID. See sso.us-vo.org
  - Open source contributions to MyProxy credential manager: Added PAM support and other features for integration with external authentication mechanisms.
  - Integrated external authentication services into existing systems including Liferay Portal Server and internal custom frameworks.
  - Led security policy development and planning for LSST, an astronomy survey project.

- Web development
    - Developed and administered web applications to manage scientific computing projects. Both dynamic (AJAX) and static page approaches.
- System administration: Linux servers, monitoring, VM management, automated build systems, server replication.
- Open-source software development: Added features and fixed bugs in open-source packages used by scientific computing projects.

Contributor to these scientific research projects and open source software projects:

- NVO—National Virtual Observatory, www.us-vo.org
- DES—Dark Energy Survey, cosmology.illinois.edu
- LSST—Large Synoptic Survey Telescope, www.lsst.org
- LTER—Long-Term Ecological Research Network, www.lternet.edu
- MyProxy—Credential Management for grid computing, grid.ncsa.illinois.edu/myproxy

NEXVU Technologies, Champaign, Illinois May 2002 – February 2005
Senior Software Engineer

Design and programming at a technology startup company developing an embedded network monitoring device, written in Java and C and running on Linux. Member of a team of 6-8 programmers. Led design & development of reporting, web UI, console UI, and security.

One-to-One Service.com, Champaign, Illinois May 1999 – April 2002
Principal Programmer

Led technical design and development of web-based applications and e-commerce websites, using Java, Visual Basic, ASP, SQL, and XML.

Beckman Institute, University of Illinois, Urbana, Illinois November 1997 – May 1999
Research Programmer

Programmer for interdisciplinary research project. Led development of a distributed application with rich inputs including voice, face, and gesture recognition. Worked with researchers in educational psychology, linguistics, education, and computer science. Primarily C/C++ and Java.

Cognex Corporation, Natick, Massachusetts February 1996 – August 1997
Associate Software Engineer

Software engineer at Cognex Corporation, a leading producer of industrial machine vision systems. C and C++; Unix, Windows, and proprietary embedded OS.

MIT Robot Competition, *Organizer and Teacher* September 1993 – May 1996

Taught and organized “6.270” Autonomous Robot Design Competition at MIT, an annual student-run Computer Science class. Recruited and managed teachers, gave lectures and led discussions, planned budget, coordinated materials, and contacted sponsors.

Cambridge Massachusetts, *High School Class Instructor* Fall 1995, 1996

Taught a scaled-down version of MIT’s autonomous robot competition to high school students.

MIT Department of Electrical Engineering and Computer Science 1994 – 1995
Laboratory Teaching Aide

Helped students debug digital circuits for Digital Design Lab (6.111) and Computation Structures (6.004), undergraduate Electrical Engineering laboratory classes.

Consulting

Vigilant Technology, Mahomet, Illinois, *Consultant* April 2002 – 2005

- Architecture, design, and toolset development for database-centric web applications.

On The Job Consulting, Champaign, Illinois, *Consultant* June 1999 – May 2000

- Kiosk music browser (C++, BeOS)
- Web development (Perl, C++, SQL)

Advanced Scheduling and Control, Champaign, Illinois, *Developer* July 1999 – January 2000

Developed planning and process management applications for manufacturers.

- Client-Server applications using Visual Basic, SQL, MS Access, and IBM DB2
- Software libraries for graphical interfaces and database abstraction

Education

Massachusetts Institute of Technology B.S., June, 1996

B.S. in Computer Science and Electrical Engineering.

Awards:

- Received George C. Newton Prize, "Best Undergraduate Laboratory Project of 1994," for "Robotic Sheepdog," a group project of three people. Functioned as team leader.
- Won Fall 1995 Introduction to Software Engineering class contest, computer vs. computer anti-chess, a group project of four people. Co-leader.

Selected Projects

NEXVU Technologies May 2002 – February 2005

Description

Network monitoring appliance, built on Java, C, and Linux.

Role

Senior programmer.

I worked together with a team of 6-8 programmers to develop NEXVU's network monitoring appliance. My main responsibilities were:

- Mentoring and code review.
- Led development of reporting module, web UI, curses-based console UI, and security integration. Assisted with Swing-based GUI.
- Integration of 3rd-party packages — principally for report layout, authentication, and web serving.
- Miscellaneous – all those little details that make a workable and sellable product.

Technology

- Java, both server- and client-side.
- Embedded Linux-based device, designed to work with few service interruptions.
- Based on free and open source software (Linux, various Java libraries), proprietary licensed software (Java, database, report layout engine), and home-grown libraries.

6.270 Robotics Contest MIT, January 1994 – May 1996

Description

6.270 is an annual robotics competition run almost entirely by undergraduates during MIT's Independent Activities Period, which occupies the month of January. It is an intense month of sleepless hacking for its participants and a year of planning and preparation for its organizers.

Role

- Student (January 1992), 1 of 120 students
- Teaching Assistant (January 1994), 1 of 10 teachers
- Organizer (1994-1996), 1 of 6 year-round organizers

My responsibilities as a teacher and organizer:

- Lectures and demonstrations
- Small group instruction and problem-solving
- Recruiting and managing Teaching Assistants
- Coordinating sponsors and managing the budget
- Planning and ordering robot-building materials

Technology

The robots are:

- Programmed in interpreted C,
- Built out of LEGO Technic parts, and
- Sense their environment with various switches and light sensors.

Building a robot is an intensive exercise in balanced design and systems integration.

iService Assistant One-to-One Service.com, August 2001 – April 2002

Description

Customer Relationship Management (CRM) web application designed for a mixed-media call center, with an integrated knowledge base and optional real-time interaction (telephone and chat) add-on. Development has continued after my departure, and the product is still sold as “iService” at www.1to1service.com.

Role

Refactorer, architect, implementer.

I received a hastily-built prototype and was asked to “fix it up” and continue development.

- Continued development of new functionality in collaboration with a subject-area expert.
- Integrated third-party call-center software, CosmoCom's CosmoCall Universe, to handle telephone calls, voice over IP, and text chat.
- Refined the interface for consistency and clarity.
- Refactored, debugged, and commented original code.

Technology

ASP, Microsoft SQL Server 2000, browser-embedded ActiveX control for integration with real-time interaction package used by customer service representative (not needed on customer side).

Demonstration

www.1to1service.com

Demonstration of Rich Computer Interfaces University of Illinois, November 1997 – May 1999

Description

An application to explore and demonstrate the use of rich inputs and expressive interfaces. The system used:

- Face recognition to log people on and off automatically.
- Gesture recognition for simple navigation and to monitor the user's attentiveness.
- Voice recognition for navigation and feedback.
- Web interface to display information and navigation choices.
- Synthesized speech to give abbreviated responses.

The voice synthesis and graphical interface adjusted automatically to external parameters indicating a user's personality and emotional state.

The system was developed for a research project involving about 30 graduate students and professors in Linguistics, Educational Psychology, Education, and Computer Science whose goal was to explore computer interfaces that are sensitive to the emotional and cognitive state of their users. It was sponsored by a company interested in developing an electronic companion.

Role

Technical lead.

- Integrated researchers' existing individual projects into a single system, via a master controller and socket communication.
- Designed and developed data storage and transport layer.
- Implemented dynamic web interface using C++ CGI.
- Implemented adaptive decision tree that chose questions in an order that optimized multi-step searches.

Technology

Distributed, heterogeneous application using socket communication to coordinate inputs and responses.

- Face and gesture recognition used a Silicon Graphics supercomputer running Irix.
- Voice recognition used IBM ViaVoice on a PC running Windows NT.
- Speech synthesis used a proprietary Bell Labs code library running on a Sun workstation running Solaris.
- Web interface used C++ CGI and a Java applet for preemptive navigation.
- Internal communication was via UDP sockets.
- Data representation and storage used a simple string-based abstract data format designed for fast set-based operations and filtering.

Grower Direct Roses One-to-One Service.com, December 2000 – February 2002

Description

E-commerce website for a rose seller in New Jersey, now defunct.

Role

Coordinated development team of three main programmers. Wrote bulk of (about 80%) library code and web interface.

Technology

Java, JSP, Microsoft SQL Server 2000, JDBC, XML, XSLT, Formatting Objects for transformation from XML to PDF, ASP and COM for credit card processing.

iQuiz One-to-One Service.com, May 1999 – February 2001

Description

Web application to assess writing ability, aimed at call centers that are adding e-mail and chat alongside traditional telephone interaction.

Allows a geographically dispersed team of human graders to give detailed feedback on writing samples that is then combined with results of multiple-choice test sections.

Includes detailed reporting and back-office management features to facilitate, for example, customer-specific reports, grader quality-control, and test management.

Role

Architect, implementer, maintainer.

- Explored requirements and design details with experts in customer service and English composition.
- Implemented the user interface twice - once as a client-server (using an applet and a Java daemon), and once as a web interface, each time using the same core class library for object representation and database access.
- Managed occasional input from other programmers and integration with proprietary job application system.

Technology

Java, Microsoft SQL Server 7 and 2000, Applets, Client-Server, Servlets, JSP, JDBC, HTTP tunneling.

Music Republic On The Job Consulting, March 2000 – May 2000

Description

Next-generation listening station for music stores developed for Music Browser, Inc.

Embedded PC-based application with an extremely rich and responsive graphical interface and innovative music exploration system. Increased music sales 30% in a pilot project at NYC Tower Records store.

Role

Did follow-up debugging and preparation for pilot deployment at Tower Records in NYC. Worked with one other programmer to track down nagging bugs and add missing features after the application's original developer returned to college.

Technology

Be Internet Appliance OS (BeIA), C++, MP3 for music, MPEG2 for video.