

Jeremy Baker

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Skokie, Illinois

Lead developer with over 15 years of experience creating applications and services and managing all aspects of the software development life-cycle. Proficient in JavaScript, TypeScript, Scala, Java, C#, SQL, and more. Designed and wrote applications and services for the Java Virtual Machine (JVM), the .Net framework, web browser front-end APIs, the Node.js platform, and more.

Northwestern University - Senior Software Developer

2017 to 2024 - Evanston, IL

The Center for Connected Learning (CCL) at Northwestern University is a research lab focused on advancing the learning sciences with technology. The lab's primary product is NetLogo, a programming language with an all-in-one interactive development environment and agent-based modeling and simulation engine. NetLogo is used around the world by students of all levels to learn about programming and topics in science, and also by researchers to create models of complex real-world phenomena and emergent systems.

Accomplishments

- » Designed and created the NetTango Web Builder in TypeScript, an extension of NetLogo Web to allow creation of blocks-based models and experiments to be used in education. Collaborated with graduate students to outline requirements and improvements for NetTango Web based on their research needs and grant funding proposals; implemented changes to meet those requirements. Used templated HTML controls and CSS for styling.
- » Designed and implemented a runtime error-handling middle-layer for NetLogo Web's simulation engine that elides wasteful calls when checks are guaranteed to succeed. Architected to keep the error checking concerns separate from the main runtime code for clarity and to allow the checks to be optional.
- » Designed and implemented an eventing, logging, and reporting API for use in routing error messages within the NetLogo Web application, and for embedding NetLogo Web models into other apps or standalone pages. Used the API to add a low-friction auto-save feature for users authoring models in NetLogo Web.
- » Added an internationalization framework for translating error messages in NetLogo Web, and made the first batch of 5 language translations available.
- » Implemented a standardized release process for NetLogo Web using GitHub Actions, with a staging branch for deployment process verification, pre-release testing by the CCL team, and batching features and fixes together for versioning purposes.
- » Created new NetLogo and NetLogo Web extensions, adding functionality such as a simple persistent key-value data store, a CSV file reader and exporter, and an HTTP requester.
- » Migrated repositories off of Travis and Jenkins to GitHub Actions for automated testing and deployment, eventually retiring both services. Setup GitHub to AWS S3 and CloudFront integrations for automated site deployment, as well as GitHub to SSH integrations for our static web sites.

Development Duties

- » Designed, implemented, and documented fixes and features in Scala, Java, JavaScript, and TypeScript; added unit tests in various language-specific testing libraries to verify work. Added optimizations for the NetLogo Web app, diagnosed slow-running models, designed and implemented changes to the core engine in JavaScript, tested for regressions, and ran benchmarks for confidence in improvements. Improved compatibility between the NetLogo desktop and web applications, verified with appropriate unit and integration tests.
- » Released new versions of NetLogo desktop and NetLogo Web; coordinated between internal and external software developers to finalize submissions; wrote release notes describing feature changes and bug fixes; performed package builds across macOS, Linux, and Windows; smoke tested release packages before publication.
- » Wrote sections of grant proposals on technical topics; wrote reports to satisfy grant requirements.

Team and Community

- » Led regular development team meetings. Led and participated in design discussions around changes to the NetLogo programming language, architecture, and ecosystem.
- » Supervised and mentored over a dozen undergraduate student interns, introducing them to our development process, teaching git and other tools and proper practices as needed, and shepherding numerous projects to completion: optimizations for geometric functions, GIS extension improvements, a library to ease making external language extensions for NetLogo Web (which included Node.js, Python, and R extensions as deliverables), internationalization (I18N) improvements, OAuth support, and more.
- » Acted as the primary technical lead with the NetLogo community, handling questions to Google Groups, IM, and private CCL mailing lists; responding and triaging GitHub issues, helping new contributors get setup and answering development questions, answering NetLogo-tagged programming questions on StackOverflow, and performing pull-request reviews. Oversaw the development team's efforts and activity across our organization's 129 source code repositories and 20 services.
- » Acted as organization administrator and project mentor for Google Summer of Code 2018 and 2019, guiding students to completion both years. Worked with students from greeting, introductions to NetLogo coding, and proposal reviews. Selected projects based on community benefit and chance of successful completion in a short time frame.
- » Wrote documentation for new features and products for both end users and developers, including describing new extension primitives, explaining the NetLogo code base, and updating older documentation for clarity.

General Growth Properties (GGP) - Senior Software Developer

2011 to 2017 - Chicago, IL

GGP was a retail space management company, owning hundreds of upscale malls and other properties across the United States. I was a full-stack developer working on their custom leasing software, public website CMS, and many ancillary business applications.

Accomplishments

- » Led a redesign and refactor of a large budget forecasting application, over 250,000 lines of code. Applied modern development practices such as single-responsibility of components, and pure, testable functions to decrease incidences of crashes, data errors, and performance problems and to ease future improvements and fixes.
- » Designed and implemented a unit-testing library specific to GGP applications for easy automated test setup, significantly reducing the time to create tests for new code for the development team.
- » Designed and implemented over a dozen enterprise-wide data integrations using SOAP web services, SQL database views, and Jitterbit ETL middle-ware to handle complex object-relationship updates, including logging and error-reporting.

- » Developed and maintained web services for securely providing XML-formatted employee information, photos, and other data to mobile end-points using the ASP.Net Web API and C#.
- » Designed the architecture of system components for in-house projects; reviewed design and architecture work done by other internal and external developers for conflicts, coherency, and security concerns. Analyzed feature requests and requirements to uncover potential conflicts, security impacts, estimate levels of effort, and propose alternative solutions.
- » Profiled app performance and found bottlenecks and inefficiencies to improve responsiveness for end-users and to reduce resource usage. Assisted 2nd and 3rd level support personnel in diagnosing issues including root-cause analysis and mitigation.

Northeastern Illinois University - Instructor

2014 to 2018 - Chicago, IL

Taught Programming II, covering basic object-oriented concepts in Java, and Theory of Computation, discussing abstract models of computation. Researched and tested ideas for illustrating abstract concepts for better student understanding; moved from a typical rote lecture-and-homework style, to one that emphasized in-class work, discussion, and hands-on tutoring. Reviewed student code for syntax and logic errors, provided tips to avoid common programming pitfalls. Maintained a 90% student approval rating while enforcing a strict grading system.

Illinois State University - Software Developer

2006 to 2011 - Normal, IL

Lead on the automation team for the enterprise systems support group. Created custom tools in C# to automate common administration tasks, and made scripts for PowerShell and VBScript to manage and monitor servers and user resources. Automated new virtual machine provisioning within the VMWare ESX environment. Managed SharePoint customization with HTML, JavaScript, and CSS.

Education

- » Northeastern Illinois University - Master's Degree in Computer Science - August 2014 - Chicago, IL
- » Illinois State University - Bachelor's Degree in Mathematics - May 2005 - Normal, IL