Kshitij Jain
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Education – Purdue University, Bachelor of Science in Computer Engineering **(Dec 2017)**
Programming Languages – Rust, Java**,** C and C++
Coursework – Intro to Compilers and Translation Systems Engineering, Advanced Compilers and Optimizations, Computer Design & Prototyping

PROJECTS

Microc Compiler (https://github.com/jain98/Microc)
Compiler written in Rust for a simple programming language called Micro. Micro is a simple, statically typed programming language. Its core consists of 3 data types - int, float and string literals (with simple math operations supported on the numeric types), 4 statements - assignment, read, write and return, conditional blocks, for-loops and user-defined functions. Micro does not support data aliasing, either in the form of references or pointers. User memory allocation is not supported either. Microc performs the following compilation steps before finally lowering Micro to a fictional target called Tiny which feels like a subset of x86.

1. Lex and parse source code using LALRPOP parser generator.
2. AST generation.
3. Lower AST into a Three Address Code (3AC) IR.
4. Control-flow graph generation out of 3AC.
5. Liveness data-flow analysis on CFG.
6. Register allocation on the 3AC, using the liveness metadata from step 5.
7. Lower register allocated 3AC IR into Tiny.

LLVM JITLink ELF/i386 backend (https://github.com/llvm/llvm-project/commits?author=jkshtj)

- Wrote an LLVM JITLink backend for ELF/i386. The project involved working with ELF object file format, static linking, dynamic loading, JIT linking and regression testing in LLVM.
- LLVM blog post about the project - https://blog.llvm.org/posts/2023-03-16-adding-new-llvm-jitlink-target-object-backend/.

WORK EXPERIENCE

AWS – S3 **January 2021 - Present**

- Working on a high performance and low-latency S3 offering written in Rust, leveraging its async ecosystem.
- Wrote a low latency telemetry framework that is now used across different components of the team/product for observability.
- Implemented front-door reactive and distributed rate-limiting for Veyron's server fleet.
- Disambiguated initial region build steps and completed 3 region builds for the service.
- Added source ip parsing support to the frontend server fleet, required to support S3 Copy and batch operation APIs.

AWS – RDSonVMware **May 2018 – January 2021**

- Delivered RDSonVMware, a new managed relational databases service on AWS as one of the core engineers on the team.
- Created the system testing framework for RDSonVMware, which involved maneuvering the inherent network complexities of the product and our test environments, along with managing multiple test environments for developers.
- Automated the onboarding process for RDSonVMware, required for automated system testing, saving approximately 13 developer hours per month.
- Delivered the scale-compute feature for RDSonVMWare.
- Delivered DB engine patching for open-source engines supported in RDSonVMware and helped the team move away from a monolithic architecture by implementing the patching solution as a microservice built on AWS StepFunctions, Lambdas and Systems Manager.
- Delivered on-premise control plane and data plane patching scheduler for RDSonVMware, automating administration of security/feature patches to customer environments using a controlled strategy, prioritizing safety and rollback-ability.

2K - Visual Concepts - *Gameplay Engineering Intern* **May 2017 - August 2017**

- Refactored the character head-tracking system, making the head-tracking interface and APIs easier to use.
- Fixed bugs in the character head-tracking system to increase accuracy of head positioning in different situations.
- Migrated adjustable parameters from various modules to a specific tunable class for easier changes of gameplay parameters after launch of game.

Purdue University – CS 159 (Basic C Programming) Teaching Assistant **January 2015 – December 2015**

- Responsibilities included supervising lab sessions and grading assignments.

Purdue University - Physics 172 (Modern Mechanics) Teaching Assistant **August 2014 - December 2014**

- Responsibilities included facilitating instruction during lab sessions and grading lab practicals.