

Tomas Rotbauer . Jarvis Consulting

I am a recent bachelor of applied science (BASc) graduate from the University of Toronto with a major in computer engineering. I specialized mostly in software, spanning from compiler development all the way to machine learning, as well as computer hardware and digital logic which allows me to understand how software runs at the processor level. As a software developer, I believe that being able to work with/understanding lower levels of abstraction behind a program is a prerequisite to writing highly optimized code. In my eyes, programming is not just a job but rather a skill and a personal hobby of mine that I enjoy practicing in my spare time. My countless personal and academic projects, as well as internship experience, demonstrate my wide background in software as well as the general engineering discipline. My experiences have taught me how to think outside the box when developing software, and I always strive to find the most optimized solution to the problem.

Skills

Proficient: Java, C/C++, Python, Linux/Bash, RDBMS/SQL, HTTP/REST API, Agile/Scrum, Git, Algorithms and data structures, Verilog HDL, Linear algebra/calculus

Competent: Docker, Maven, Spring Boot, Concurrent programming, Neural networks, Processor architecture, Assembly Language

Familiar: JavaScript, HTML/CSS, TensorFlow, LLVM, GNU Bison, Networking (OSI model), MATLAB

Jarvis Projects

Project source code: https://github.com/jarviscanada/jarvis_data_eng_TomasRotbauer

Cluster Monitor [GitHub]: Developed a minimum viable product (MVP) for demonstrating how hardware usage data could automatically be collected from Linux machines within a cluster and stored into a database. The design works primarily with Linux bash scripts which periodically obtain the necessary data and store it into a containerized PostgreSQL database instance.

Core Java Apps [GitHub]:

- **Twitter App:** Developed a Java command line CRUD application capable of posting, viewing, and deleting tweets from a user's Twitter account. Utilized Twitter REST API and leveraged HTTP for client-server communication. The application follows the MVC architecture and comprises multiple layers to facilitate development and testing. Spring Boot was used for dependency management, Docker for deployment, and Maven for building and packaging the application.
- **JDBC App:** Implemented a simple data access object (DAO) application using Java Database Connectivity (JDBC) API for accessing and running queries on a small relational database with a couple of tables. The application can perform all the fundamental CRUD (create, read, update & delete) operations on the local PostgreSQL instance via transactions.
- **Grep App:** Programmed with Java 8 and leveraged its latest features including the stream API and lambda functions to develop an application similar to the Linux built-in grep feature. The program searches recursively through a root directory to map out all files and finds the lines that match the user-specified Java regular expression. Compilation was handled with the Maven tool, and the final product was packaged into a Docker container using Dockerfiles.

Springboot App [GitHub]: Implemented a proof of concept stock market trading platform allowing users to manage their market securities. The application follows the microservices architecture for maintainability and was developed in Java using Spring Boot for facilitating dependency management across all the MVC layers. Current market data is retrieved from a cloud service via REST API using Apache Tomcat as the application web servlet container. Data is safely persisted from the main application container into a separate PostgreSQL database container over a bridge network. The app was built using Apache Maven, containerized with Docker, and developed with GIT.

Python Data Analytics [GitHub]: Analyzed structured retailer data using data wrangling and OLAP methodologies to provide statistical insight for a prospective marketing team. Segmented customers into RFM categories with the help of Python Pandas and SQL querying. The analysis was performed in a Python Jupyter notebook and includes common visualizations to illustrate trends.

Highlighted Projects

Database Design Toolkit [GitHub]: Developed a Python script for automating database design decisions. Capable of functional dependency-set closure, minimization, BCNF decomposition, and more.

Chess Game [GitHub]: Developed an against-the-computer chess game with intuitive GUI in Java using the Java Swing API. Followed MVC architecture for better code organization. Employed multithreading for increased performance when traversing the game tree. Utilized Negamax algorithm with alpha-beta pruning that reaches a ply depth of 7 in a timely manner.

Checkers Game [GitHub]: Developed fully functional, against-the-computer checkers game with intuitive GUI in C++ using SFML graphics library. Implemented Minimax algorithm with alpha-beta pruning capable of looking 12+ moves ahead in a timely manner which makes the AI virtually unbeatable by human players.

Python Sudoku Solver [GitHub]: Developed a Sudoku-solver program in Python featuring a user-friendly GUI implemented with Tkinter. Capable of solving all Sudoku puzzles, regardless of the difficulty level.

Neural Network Implementation [GitHub]: Developed a simple 3-layer neural network with Python and Numpy using the gradient descent with momentum algorithm for training. The program is capable of distinguishing between ten different letters from the notMNIST dataset.

C Compiler Implementation Project [GitHub]: Built a compiler for a subset of C fully capable of scanning, parsing, and generating code. I Learned about Flex, GNU Bison, and LLVM in this project.

Custom Processor Design/Implementation: Implemented fully functional custom processor in System Verilog with 16-bit pipelined architecture and 19 different instructions on the DE1-SoC Intel FPGA development board. Tested with custom assembly language programs to verify and test the correctness of the implementation.

Jump Car Hardware Mini-Game Project: Designed and implemented a fun mini-game with Verilog HDL on the DE1-SoC Intel FPGA. Short demo video clip link -> <https://www.youtube.com/watch?v=NfYLQWxKTjU&feature=youtu.be>

Multidisciplinary Capstone Design Project: Designed and engineered a more efficient aircraft braking technology for Safran Landing Systems on a multidisciplinary engineering team of five senior students. Helped with CAD-ing in SOLIDWORKS and ANSYS to simulate the design. Won best multidisciplinary capstone award, worth \$2000. Project portfolio link -> <https://tomasrotbauer.wixsite.com/website>

Professional Experiences

Software Developer, Jarvis (2020-present): Developed many different software applications for various data engineering projects. Examples of tools that I worked with include Java, SQL, Docker, Linux Bash, and many other important technologies all while crafting solutions to real-world problems. Followed the Agile/Scrum team framework for team collaboration, and played the team lead role for several scrum ceremonies.

Electromagnetic Shielding Intern, C-Intech (May-July 2018, 2019, 2020): Fabricated and installed specialized electromagnetic shielding panels on a team to block electromagnetic interference (EMI). Followed complex engineering schematics to meet critical fabrication and EMI shielding standards

Education

University of Toronto (St. George Campus) (2017-2021), Bachelor of Applied Sciences, Electrical and Computer Engineering - Faculty of Applied Science & Engineering Award of Excellence in Multidisciplinary Capstone Engineering Design - worth \$2000 - Edward S. Rogers Sr. Admission Scholarship - Faculty of Applied Science & Engineering Admission Scholarship - Dean's List (2017, 2019): Obtained sessional average of at least 80% - GPA: 3.22/4.0

Miscellaneous

- Coursera/Duke University - Java Programming: Solving Problems with Software. Link: <https://www.coursera.org/account/accomplishments/certificate/TSV3868USM7P>
- Coursera/Duke University - Programming Foundations with JavaScript, HTML, and CSS (with Honours). Link: <https://www.coursera.org/account/accomplishments/certificate/677cfcea2b01>
- HackerRank - Problem Solving (Intermediate). Link: <https://www.hackerrank.com/certificates/6b4cfd58445>
- Honours certificate of bilingual studies in extended French
- English

- French
- Czech