**Project Proposal: Java Automated Theorem Prover**

**Introduction**

Java Automated Theorem Prover (JATP) is a symbolic logic tool designed to verify and demonstrate the equivalence of mathematical and logical statements. By processing user-inputted equations and mapping their logical relationships, JATP aims to build a comprehensive library of theorems. This proposal outlines the project's objectives, scope, requirements, and benefits, as well as the necessary resources for successful implementation.

**Objectives**

1. Develop a Robust Theorem Prover: Create a system capable of processing and mapping logical relationships between mathematical and logical statements input by users.
2. Build a Persistent Knowledge Base: Utilize file-based I/O operations to store and retrieve mappings, enabling incremental expansion of the theorem library.
3. Scale for Large-Scale Data Handling: Extend the system's capabilities to handle vast amounts of data efficiently, with a focus on storage, retrieval, and computational efficiency.
4. Implement Advanced Computational Techniques: Use parallel computing and optimized algorithms to manage the increasing complexity of theorem verification and proof generation.

**Scope**

1. System Design: Develop the core functionalities of JATP, including input processing, logical mapping, theorem storage, and proof generation.
2. Data Management: Implement file-based I/O operations for data persistence, including saving and retrieving theorem mappings.
3. Scalability Enhancements: Upgrade the system to handle large datasets, ensuring efficient storage and retrieval.
4. Computational Optimization: Incorporate parallel computing techniques and optimize algorithms to manage complex theorem proofs and real-time operations.
5. Global Data Integration: Prepare the system to interact with large, globally distributed datasets.

**Requirements**

1. Technical Requirements:

* Development Environment: Java programming language, file-based I/O operations.
* Computational Resources: High-performance servers with large memory capacity and processing power for handling complex data.
* Data Storage: Advanced data structures and efficient storage solutions for managing growing theorem maps.

1. Human Resources:

* Developers: Skilled in Java programming and algorithm optimization.
* Data Scientists: Expertise in managing large datasets and implementing computational techniques.
* Infrastructure Specialists: For setting up and maintaining high-throughput computing resources.

1. Financial Resources:

* Hardware: High-performance servers and storage systems.
* Software: Development tools and licenses for computational optimization.
* Operational Costs: Ongoing maintenance, support, and system upgrades.

**Benefits**

1. Enhanced Theorem Proving: JATP will provide a powerful tool for verifying and proving mathematical and logical statements, supporting academic research and industrial applications.
2. Efficient Knowledge Management: The persistent library of theorems will facilitate easy access to a wealth of logical relationships and proofs.
3. Scalable Solution: The system's ability to handle large datasets and complex computations will make it adaptable to future growth and diverse applications.
4. Global Collaboration: By preparing for global data integration, JATP will foster collaboration across institutions and industries, advancing the field of automated theorem proving.

**Conclusion**

The JATP project represents a significant advancement in symbolic logic and automated theorem proving. By addressing the challenges of data management and computational complexity, JATP aims to become a leading tool in the field, providing valuable support for both academic and industrial purposes. The successful implementation of this project will require a substantial investment in technical resources, human expertise, and computational infrastructure. We seek support and collaboration to achieve these objectives and realize the full potential of JATP.

**Caleb Princewill Nwokocha**

+1 (204)-979-9618 |nwokochc@myumanitoba.ca |calebnwokocha.github.io/blog/

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Summary**

Highly skilled and motivated professional with a background in data science, computer science, and business management. Proven expertise in designing and implementing complex software solutions, with a strong focus on logic, algorithms, and computational efficiency. Adept at leading innovative projects and managing large-scale data systems.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Education**

Red River College Polytechnic August 2023 – April 2024

Business Accounting & Management

University of Manitoba January 2017 – February 2023

General Science

Education First International Language Center September 2015 – February 2016

University Foundation Semester Program

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Experience**

Research Volunteer August 2024 – August 2024

Faculty of Science, University of Manitoba

- Contributed to a research project on fairness in data-driven decision-making in machine learning systems.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Project**

Java Automated Theorem Prover

* Developed and implemented a symbolic logic tool for verifying and demonstrating mathematical and logical statements.
* Designed the system to handle logical relationships and incremental knowledge base expansion.
* Utilized file-based I/O for persistent data storage and retrieval.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Skills**

* Programming Languages: Java, C++, JavaScript ES6, HTML, CSS
* Data Management: File-based I/O, persistent storage, data retrieval
* Computational Techniques: Algorithm optimization, parallel computing
* Project Management: Leading innovative projects, managing large datasets, cross-functional team collaboration

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**References**

Available upon request.