Reflection on the Happiness Index Project

Overview

This project involved implementing a solution that calculates and compares the Happiness Index (HI) of individuals based on their interactions with various cafes and drinks, using a combination of Scala, Prolog, C++ and the Java Native Interface (JNI) API. The experience was challenging yet rewarding, offering deep insights into working with diverse programming paradigms, data processing, inter-language communication, and problem-solving.

Learning Outcomes

Multilanguage Software Architecture

Building a solution using Scala, Prolog, and C++, and connecting these through JNI, was a unique learning opportunity. It exposed me to the nuances of interfacing between different languages and the challenges and advantages of employing diverse programming paradigms.

Data Handling

Processing data from .csv files in Scala and transforming this data into a Prolog knowledge base was a valuable exercise. It honed my skills in data manipulation, handling, and transformation across different formats and languages.

Complex Logic Implementation

Defining and implementing the complex logic for computing the Happiness Index in Prolog deepened my understanding of logic programming. It required careful thinking about breaking down the problem into manageable pieces and designing predicates accordingly.

JNI and API Usage

Using the Prolog C++ API and the JNI was an exciting aspect of this project. It provided practical experience in working with APIs, understanding how different programming languages can inter-operate, and the complexities and efficiencies gained through such interoperability.

Problem Solving and Debugging

Debugging across different languages and isolating issues in the complex workflow spanning Scala, Prolog, and C++ was a unique problem-solving experience. This project enriched my debugging skills and ability to solve complex, multi-faceted problems.

Challenges

Interoperability

The most significant challenge was managing the interoperability between different languages. Setting up the JNI and ensuring smooth data and control flow between Scala, C++, and Prolog required careful planning and debugging.

Understanding and Implementing HI Logic

The complexity of the Happiness Index logic posed a substantial challenge. Understanding the requirements, translating them into Prolog predicates, and ensuring they worked correctly required time and extensive testing.

Data Conversion

Converting data from .csv files into Prolog facts, and then handling the results returned from Prolog in C++ and Scala, was another challenge. Ensuring data integrity and correctness across these transformations was critical.

Conclusion

Despite the challenges, this project provided a rich, multidisciplinary learning experience. It deepened my understanding of different programming paradigms, problem-solving strategies, and using APIs for inter-language communication. I look forward to leveraging these skills in future projects and developing further proficiency in these areas.