Domain Specific Language with IDE for commision plan designer

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19Z620 - INNOVATION PRACTICES

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Contents

1. Abstract

A domain specific language(DSL) with an integrated development environment(IDE) for a commission plan designer would provide a way to create and modify commission plans using a specialized language that is tailored to the specific needs of the commission plan designer. The IDE would include tools such as a syntax highlighting editor, code completion, and debugging capabilities to make the process of designing commission plans are more efficient and user-friendly

The DSL would provide a way to specify various components of a commission plan, such as commission rate, the eligible products or services, and the conditions under which a commission is paid out. This would allow designers to easily create and modify complex commission plans without needing to have a deep understanding of programming.

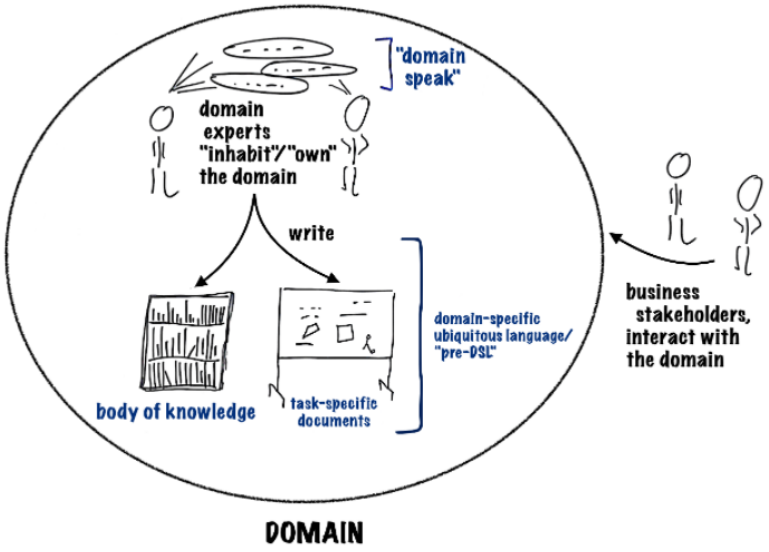

Figure 1. 1

2. Problem Statement

To develop a domain specific language(DSL) with an integrated development environment (IDE) for a commission plan designer

1. The language should have an intuitive syntax that is easy for non-programmers like subject matter experts to understand.

2. IDE should have syntax highlighting, code completion and debugging facilities.

3.Project Requirements

3.1 Hardware requirements

A pc/laptop with stable internet connection which has the following specifications:

- ➢ Processor: A fast, multi-core processor would be recommended to support the computational demands of the IDE and DSL
- ➢ Memory: A minimum of 4 GB of RAM would be required, with 8 GB or more recommended for larger, more complex commission plan designs.
- ➢ Storage: A solid-state drive (SSD) or hard disk drive (HDD) with a minimum of 250 GB of storage capacity would be required, with more storage recommended for larger projects or if the IDE includes version control functionality.
- ➢ Display: A high-resolution display with a minimum resolution of 1920x1080
- ➢ Peripherals: A keyboard and mouse or trackpad would be required for input.

3.1 Software requirements

- ➢ Operating System: A modern operating system such as Windows 10, macOS, or Linux would be required
- ➢ Development Environment: IDE will be built using a Language Workbench called MPS
- ➢ Dependent Libraries: The implementation may require several third-party libraries and frameworks, such as a lexer/parser generator library for the DSL, a GUI library for the IDE, and a database driver library to interface with the DBMS.

4.Software Design

- ➢ The general paradigm that programming languages follow is a parser-based approach where the program is stored as text and then parsed to form an intermediate representation.
- ➢ This intermediate representation is an Abstract Syntax Tree or AST that is formed by using the parser for our language on the program.

➢ This DSL will be built using the projectional editing paradigm in which the program is stored as an AST and editing is done directly on the AST. The AST is projected in a more readable format on screen to allow for easier programming and editing.

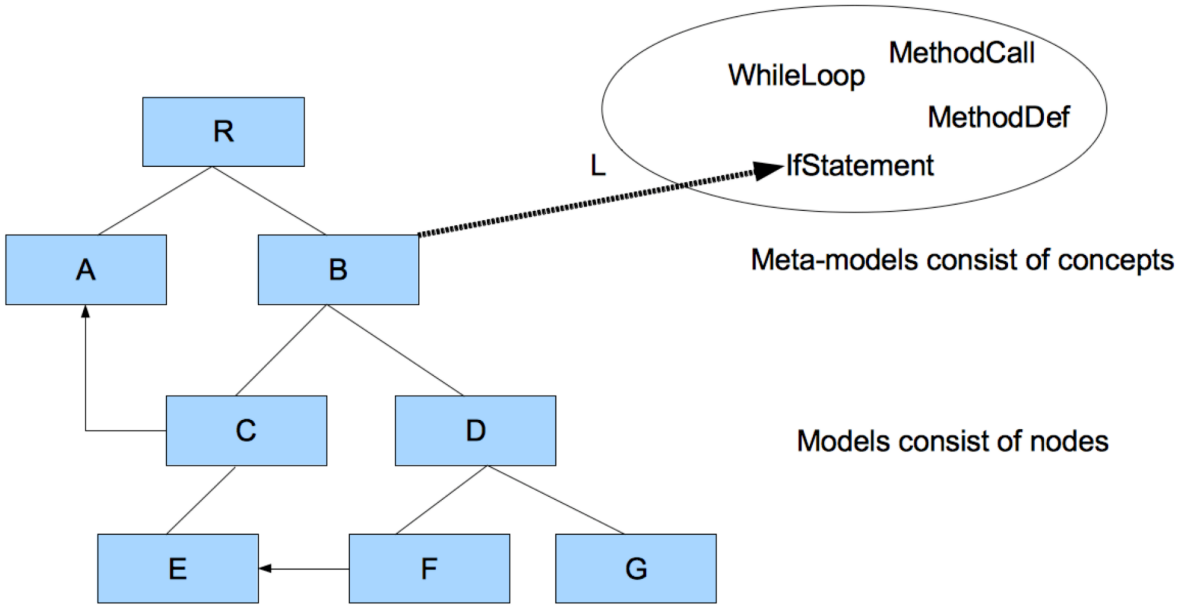

Figure 4.1

➢ Instead of defining a CFG for our language, MPS' Structure Language will be used to define the structure of the DSL.

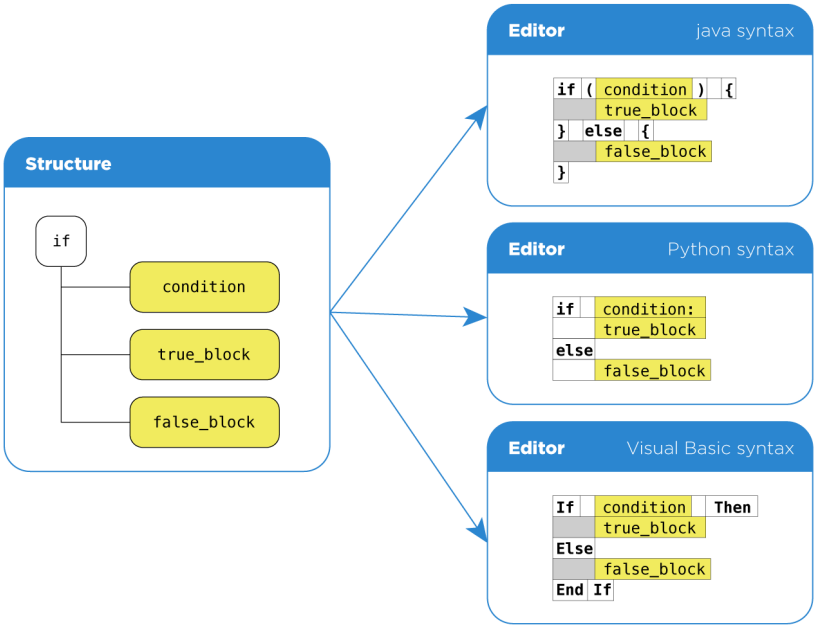

Figure 4.2

- ➢ Programs written using the DSL will be converted to a target language(Java) for compilation.
- ➢ The DSL will be able to be edited, compiled and debugged in the standalone IDE that is built by stripping the unnecessary parts of MPS.

5.References

- ➢ https://www.jetbrains.com/help/mps
- ➢ Fowler, Martin & Parsons, Rebecca - Domain-specific languages (2011, Addison-Wesley Professional)

6.Timeline Chart

Task	Due date
1.Team finalized	19th December 2022
2.Approval and submission of Problem statement	5th January 2023
3.Requirement gathering and Analysis	19th January 2023
4.Design and Planning	4th - 6th February 2023
5.Development of DSL	2nd March 2023 (Tentative)
6.Development of IDE	14th March 2023 (Tentative)
7.Integration and Testing	21 March 2023 (Tentative)
8.Deployment and Maintenance	28 March 2023 (Tentative)

7.Internship work done so far

- ➢ Had meetings with industry mentors to discuss the problem statement.
- ➢ Collected basic requirements from the industry.
- ➢ Based on the requirements provided, a documentation of the abstract of the problem statement was submitted to industry mentors for verification.
- ➢ Problem statement was approved, green light given to start finalizing the architecture.
- ➢ Sample input and output received from industry mentors. (shown below)

Simple:

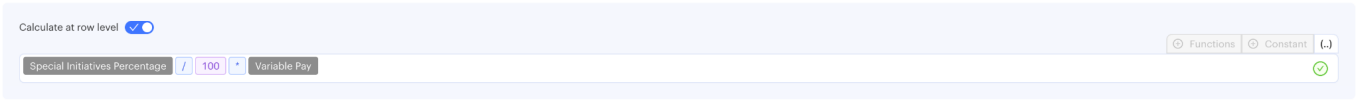

Figure 5.1

Conditional:

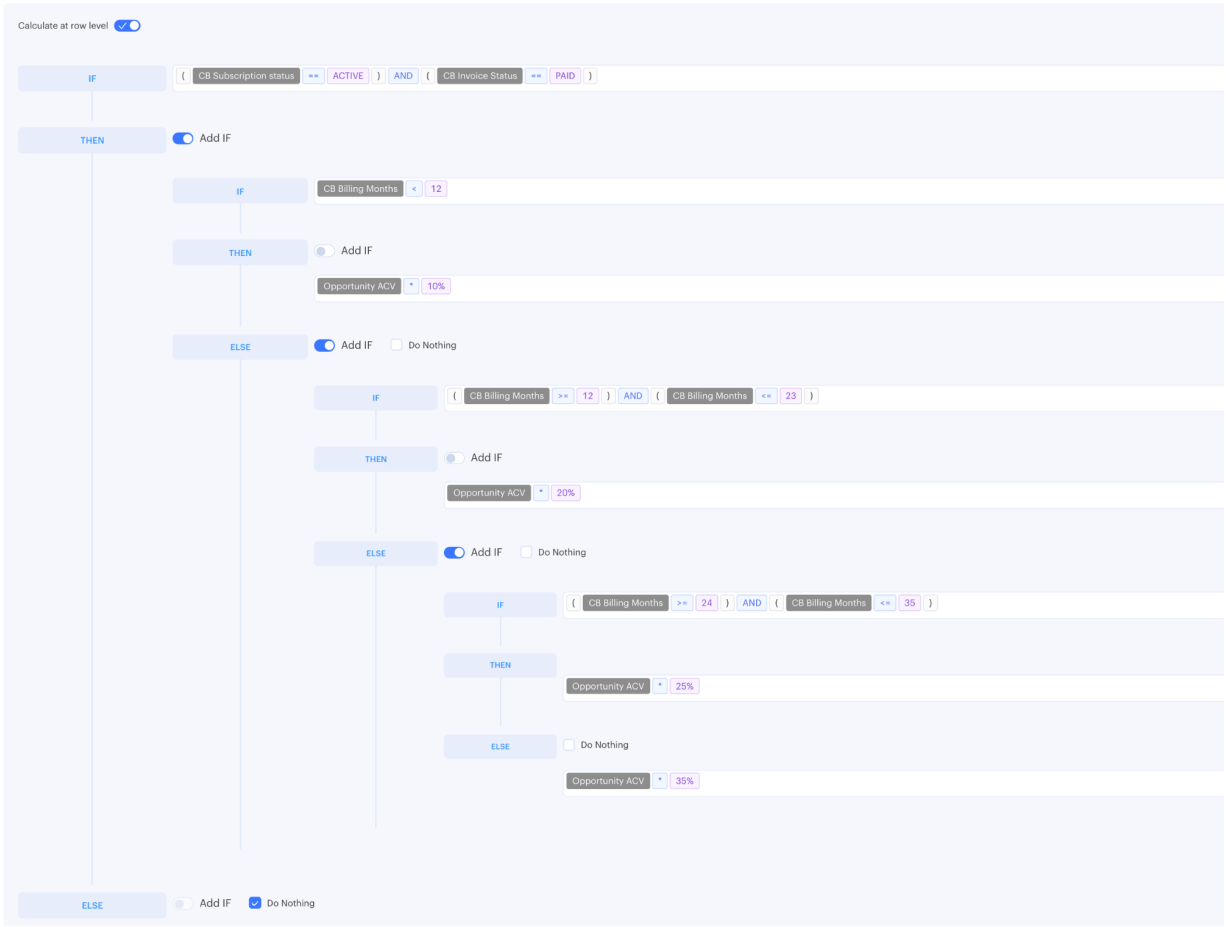

Figure 5.2

Figures 5.1 and 5.2 are examples of the current environment available for the end users. Our DSL will aim to make this job simpler for the commission plan designers while also providing more robust features like error handling, code completion and syntax highlighting.