SIMPLEX

Syntax for International Monetary, Property and Liquidity Exchange

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Is SIMPLEX really that SIMPLE?

- Syntax for International Monetary, Property, and Liquidity Exchange
- Lightweight non-object oriented C like language
- Superior “Dynamic Data Casting”
- Superior data type output representation
- Similar syntax to that of C, C++, and Java

Is SIMPLEX for me?

- SIMPLEX was created for the financial audience
- Provides data types that revolve around financial applications
- Allows focus on analysis rather than the minute details that languages like C++ and Java need
- Allows handling of mathematical equations with many data type
- Simple and quick

Data Types

- Five main Data Types / Two types of Constants
  - Number: [number constant] 64bit floating point numbers
  - Currencies: [number constant]

    `USD, YEN, EUR, CAD, GBP, AUD, CHF, CNY, MXN, SOS`
  - Date: [number constant] Three data types:

    `year, month, day`
  - Rate: [number constant] Representation for percentages
  - String: [string constant] Data type that allows storage of arbitrary sequences of characters
- Type Casting
  - `(type) expression`
- *All* number constant Data Type expressions are handled by SIMPLEX and will not return any exceptions

Statements

- To keep programming familiar with today's popular program languages, SIMPLEX follows similar statement syntax to that of C, C++, and java
- Assignment Statements
- Jump Statements
- Procedure Call Statements
- Return Statements
- Conditional Statements
- Iterative Statements
- Output Statements
- Input Statement

Procedures / Scoping

- SIMPLEX allows creation of user defined procedures

```
type-specifier procedure-identifier (identifier-list) {
     statement-list
}
```

- Static Scoping
- Applicative Order Evaluation
- Recursion

SIMPLEX Special Features

- User Defined Function and casting of currencies

```
USD calculateYearlyRent(USD a, EUR b, CAD c, YEN d){
    USD yearly;
    yearly = ( (USD)a + (USD)b + (USD)c + (USD)d );
    return yearly;
}
```

- Preformatted Currency Outputs

```
rent_2008 = 3496340.6446234623462346;
print ("Total 2008 Rent: " + rent_2008);
```

`Output: Total 2007 Rent: $3496340.64`

- Built-in Input Function
  - Takes user input from the command line

```
print("Enter Total Mortgage amount: ");
input(totalMortgage);
```

SIMPLEX Special Features (continued)

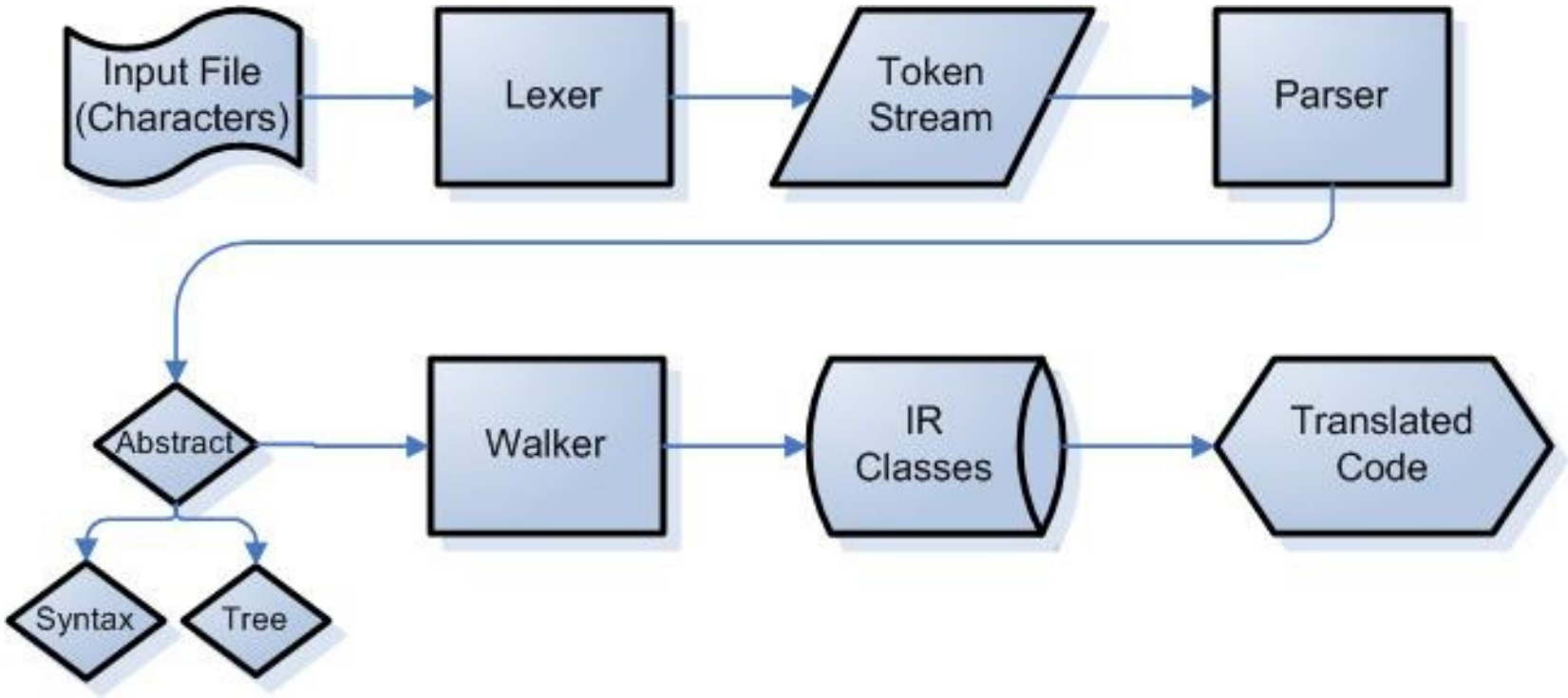
- Intuitive mathematical operators
  - Percent Sign (automatically divides by 100)

```
rate a;
a = 5%;      // stored as 0.05
```

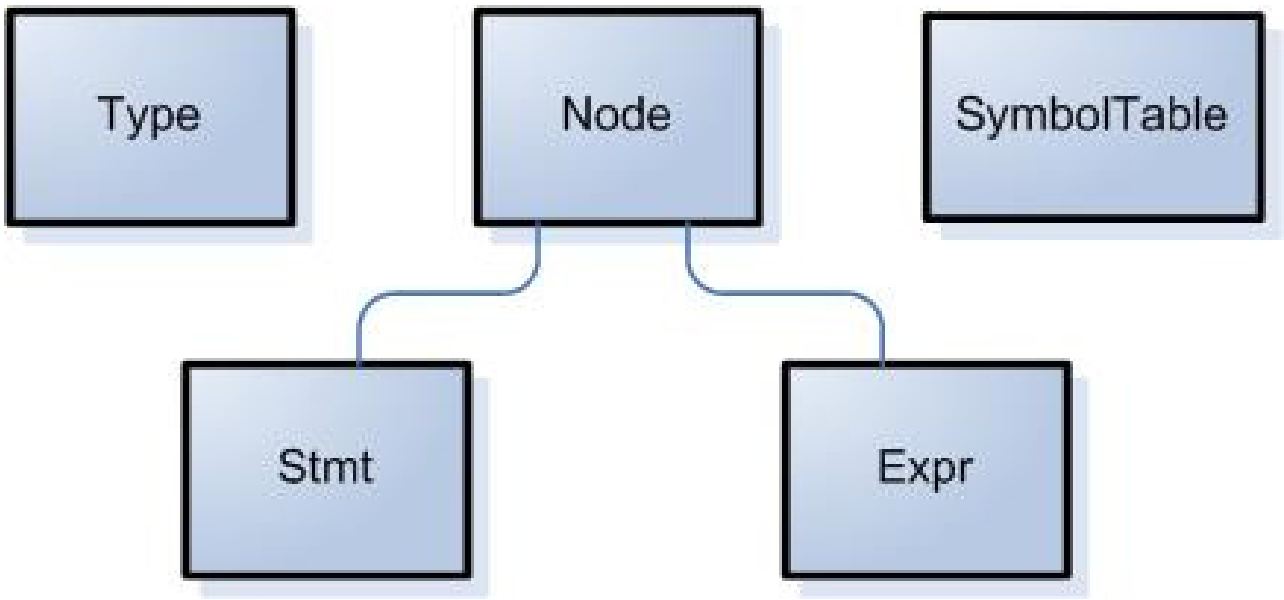
  - Exponential Powers

```
number a;
a = 3 ^ 3;  // a stores 27
```

Top Level Design



Class Hierarchy



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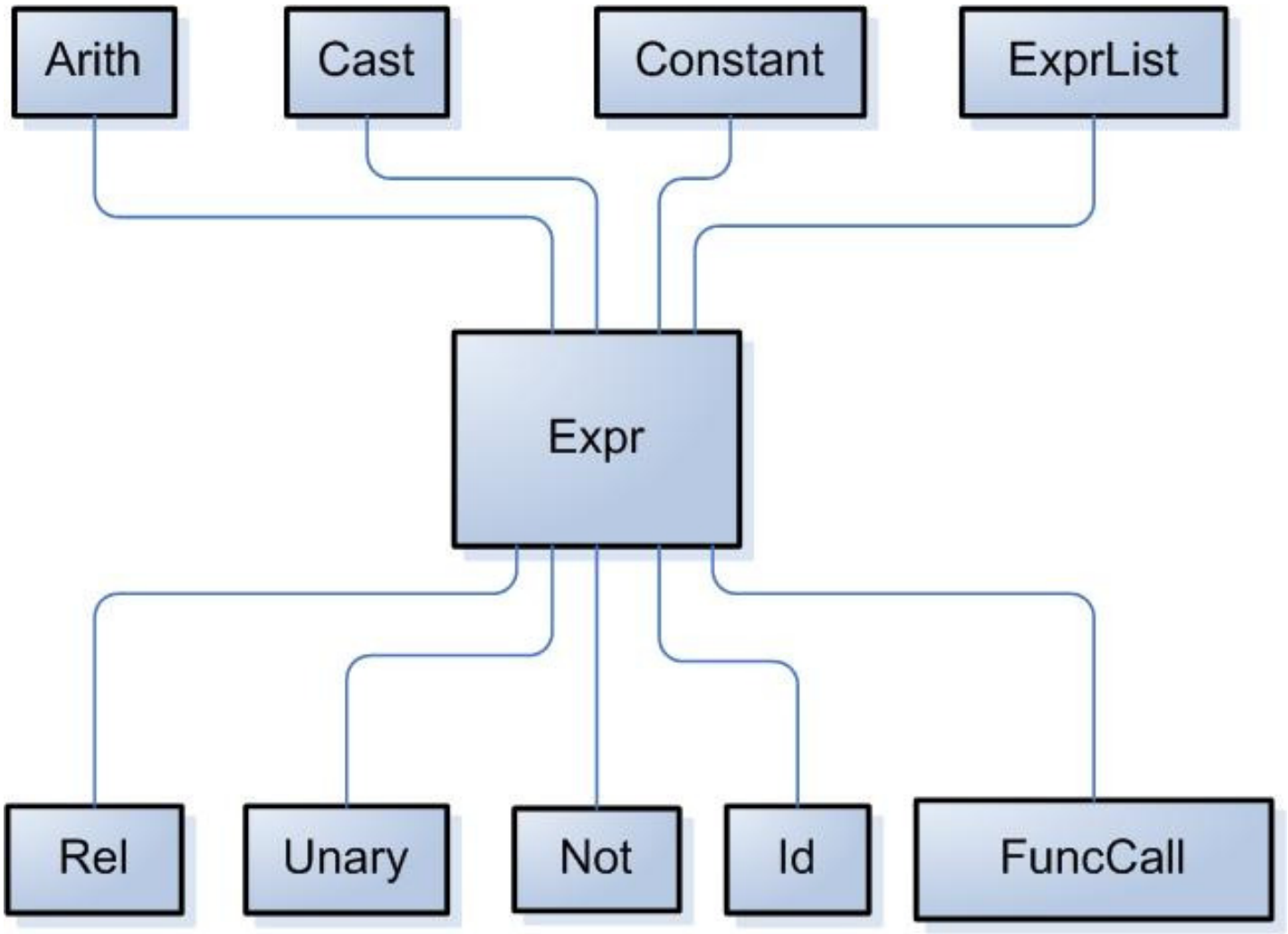

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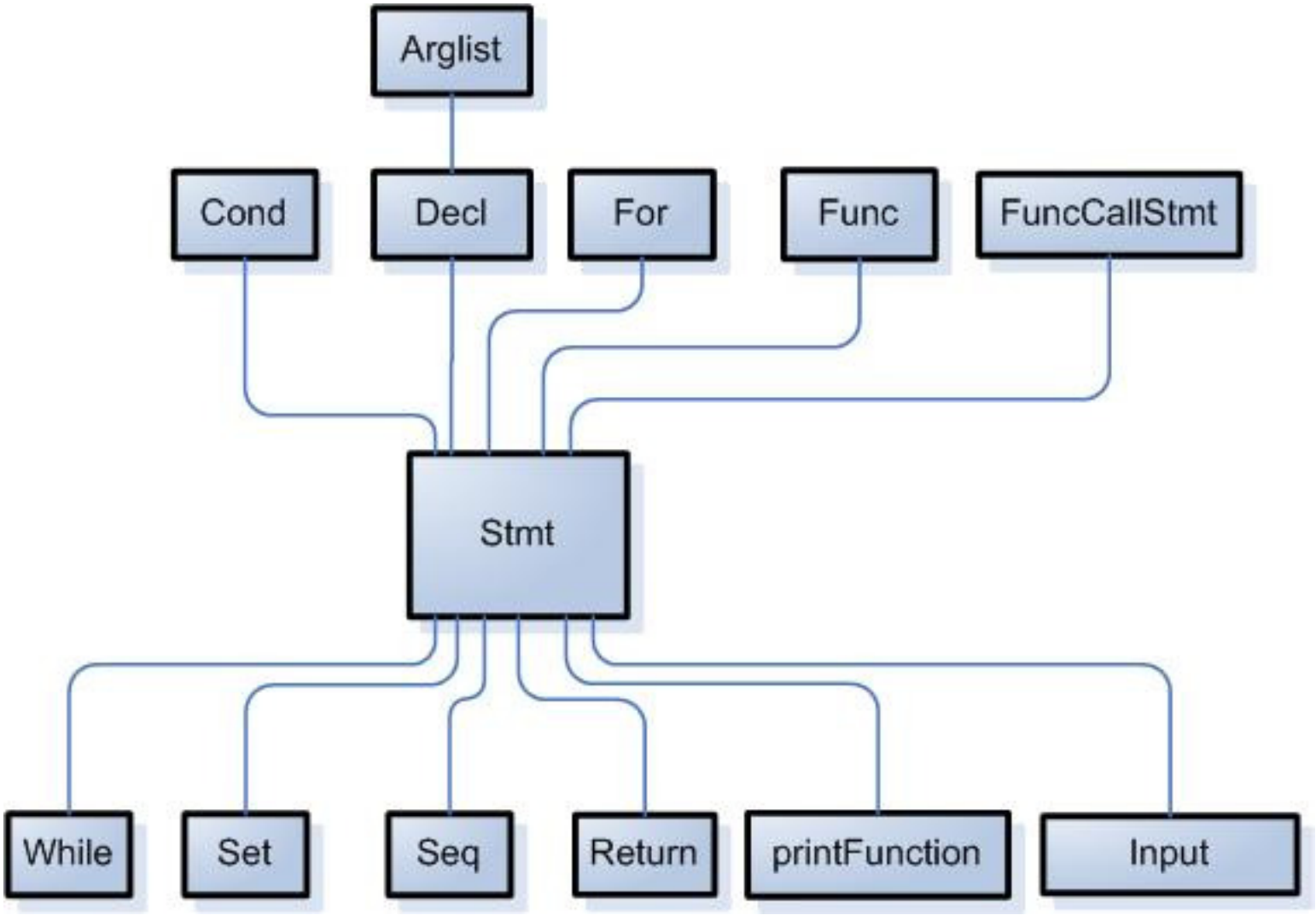
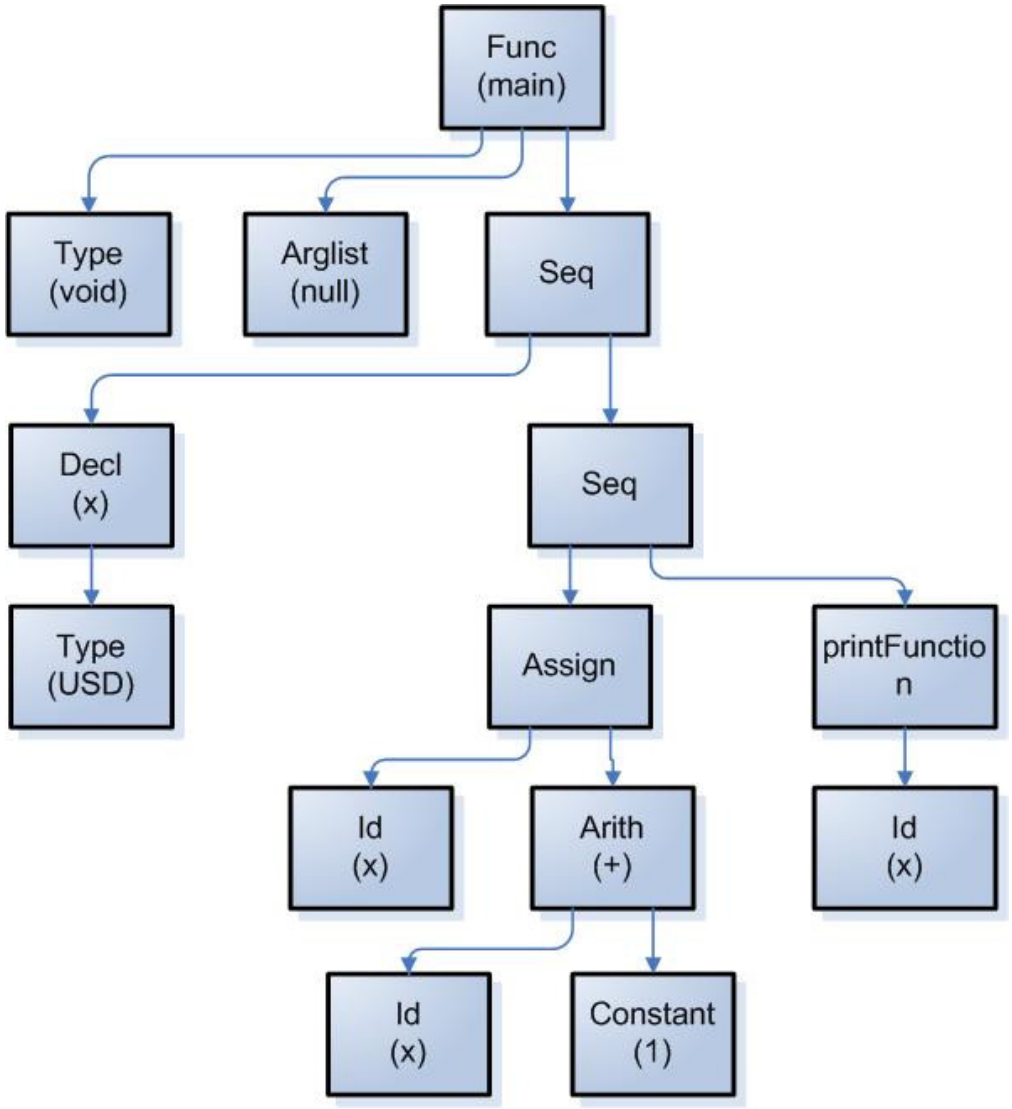


Sample Intermediate Representation

```
void main() {
    USD x;
    x = x + 1;
    print(x);
}
```



Compiling and Testing

- Console
  - Customized interface to compile and run SIMPLEX programs
  - Does so through a series of shell commands
- Regression Test Suite
  - Suite built on top of the console
  - Test cases isolate specific features
    - Test suite includes: declaration, for, arithmetic, if, dangling else, user-defined functions
  - Test Suite run constantly after updates to compiler
- Test Applications
  - Larger scale applications integrating several features of the language at the same time

Issues We Faced and Lessons Learned

- Dynamic group with different personalities and specialties
- KISS – Keep it Simple Stupid
- Strong foundation and working platform
- Thorough and complete testing

- **Planning**
  - Solid foundations based on solid ideas
  - Allow for adaptability and changes
  - Revisions Revisions Revisions!

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