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Programming Languages and Translators

ECO SL: White Paper

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EcoSL

Economical Spreadsheet Language

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1. Introduction

Spreadsheets are a well-known and widespread set of language systems. They have been found very useful, mainly in the business world, for the manipulation and presentation of financial and other sorts of tabular data.

EcoSL (Economical Spreadsheet Language) will be a language for users who deal with simple to complex operations on spreadsheets. It will be a boon to the amateur user who prefers to work on simple, and easy to learn software. The purpose of EcoSL will be to create efficient and simple programs to deal with various features of spreadsheets. Functionally, EcoSL will be more than a basic scientific calculator and close to full scale spreadsheet like Excel or Openoffice.

EcoSL will serve as a good alternative to the current users of commercial spreadsheet software. The most commonly used functions like Mathematical Computations, data interpretation, graphical representation of data such as graphs would be supported by EcoSL. EcoSL is being designed to support users who log into terminal based systems. Apart from its simplicity and powerful features, the EcoSL is Free!!!

Programs written in EcoSL will be analyzed and interpreted by ANTLR, translated to Java code and then executed by JVM. The ANTLR will generate lexer, parser, and tree walker from the lexer and parser grammars. The lexer and parser constructed by ANTLR will catch all the lexical and syntactic errors.

2. Data Types

EcoSL supports all primitive data types that are commonly used in different programming languages. For example:

int – integer

float – floating

char – character

string – string of characters

There is a data type called cell, represents a basic addressable unit in the spreadsheet. It has the following syntax:

```
cell int identifier r[id]c[id] = initialised_value;
```

Example:

```
cell int temp r[x]c[y] = 12;
```

In this example, cell is the data type, which represents a particular cell in the spreadsheet, temp is the identifier, r[x] represents xth row, c[y] represent yth column of the spreadsheet and int represent what kind of data the cell contains.

Other data types supported by EcoSL:

date – in the format mm-dd-yyyy

time – in the format hh:mm in 24 hr

3. OPERATIONS

3.1 Simple operations

EcoSL supports nearly all simple operations such as addition, subtraction, multiplication (with constant), division (with constant) and assignment operation. Example:

```
x = y + z;
```

```
x = y * 2;
```

```
x = 3.0;
```

3.2 Graphical Operations

EcoSL supports graphical operations such as plotting line graphs, scaling graph (interpolation and extrapolation). Example:

```
plot (r[1]c[1],r[5]c[5]);
```

This function will plot a line graph with the values from r[1]c[1] to r[5]c[5], where r[] is the row index and c[] is the column index.

3.3 Compound operations

EcoSL supports some complex operations such as sum (summation of cells), average (average of the column), min (minimum value among the cells), max (maximum value among the cells) on the cells. Example:

```
x = sum(r[1]c[1],r[5]c[1] );
```

```
y = min(r[1]c[1],r[5]c[1] );
```

4. Control Flow Structures

EcoSL will support most common control flow structures such as iterations (while loops) and conditional statement like if-else. Example:

```
if (r[1]c[1] > r[5]c[1])
    r[1]c[1]= r[1]c[1] + 5;
```

5. I/O Operations

EcoSL supports input and output from console. For graphical operations, EcoSL will generate a line graph. If the user has a terminal based system (without any GUI), he/she can opt for a file as an output (will be implemented later).

6. Blocks and Comments

The program will start with a Begin keyword followed by a '{' and will end with a End keyword preceded by a '}'. All the internal blocks will start with a '{' and end with a '}'. Example:

```
Begin{
....{
....}
....
}End
```

Single line comments will start with '//' and end with a newline. Multi line comments will start with '/*' and end with the first '*/'.

7. Plan for Next Release

The next release of EcoSL will implement

- Multiple spreadsheets and various operations among the different spreadsheets.
- File handling, i.e. users can perform I/O operations on files.
- User-defined functions.
- Representation of data on different types of graphs like pie chart, bar graph
- Some standard formula which can be applied on any elements of similar data type.