Compiler Design Project

ezlisp

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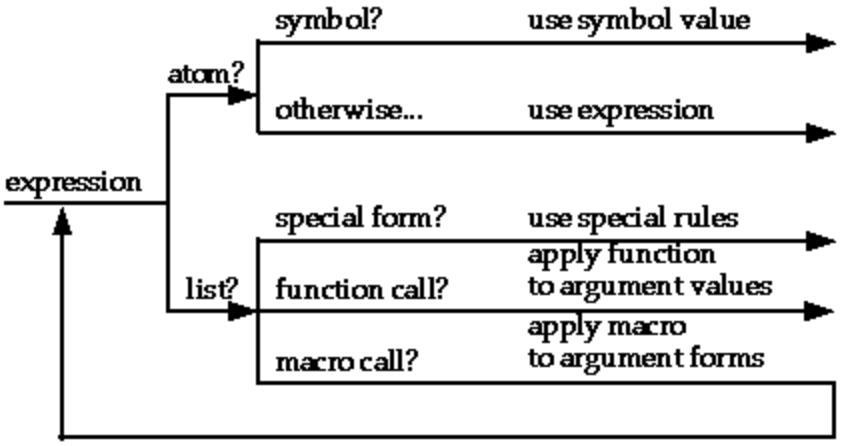
Abstract

Lisp is a family of computer programming languages with a long history and a distinctive, fully parenthesized prefix notation. Originally specified in 1958, Lisp is the second-oldest high-level programming language in widespread use today. Lisp has changed since its early days, and many dialects have existed over its history. Today, the best known general-purpose Lisp dialects are Common Lisp and Scheme.

Paul Graham, best known for his work on Lisp, said, “Part of what makes Lisp distinctive is that it is designed to evolve. As new abstractions become popular (object oriented programming, for example), it always turns out to be easy to implement them in Lisp. Like DNA, such a language does not go out of style.”

This project implements **ezlisp**, a basic Lisp interpreter for the Scheme dialect, written in Python. It has support for Lisp predefined functions like *car*, *cdr*, and *cons*, among others. Functions are defined using the *define* keyword, and the *lambda* keyword is used to pass in arguments.

Working of the Interpreter



The heart of the Lisp interpreter is the “read-eval-print” loop. That is, the interpreter does the following three jobs over and over:

- Read an input expression
- Evaluate the expression
- Print the results

Each expression in Lisp is enclosed under parentheses. The Lisp evaluator takes an expression and returns an expression. The expression returned is called the value of the expression evaluated.

Expressions enclosing other expressions to make one large symbolic expression makes up the whole code interpreted by the Lisp interpreter.

ezlisp has the following data types making up the expressions:

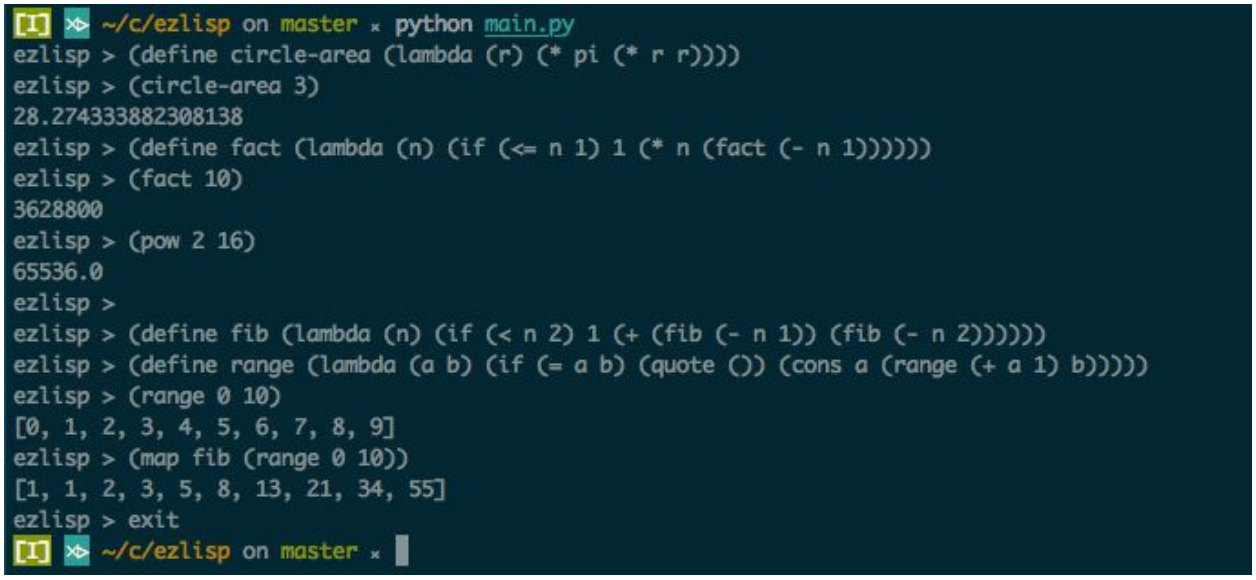
- Symbol
- Number
- Atom
- List

Installation and Execution

Python 3 is the only requirement for the running of the interpreter. Following are the steps to set up and start the interpreter:

- `git clone https://github.com/anaskhan96/ezlisp`
- `cd ezlisp`
- `python main.py`

The following image shows **ezlisp** in action:



Bibliography

These websites were referenced during the implementation of this project:

- https://en.wikipedia.org/wiki/Lisp_(programming_language)
- https://en.wikipedia.org/wiki/Scheme_(programming_language)
- https://www.cs.northwestern.edu/academics/courses/325/readings/interpreter.php