Homework 3 – Lisp

Lab Report

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1. **Problem Statement**

The purpose of this program is to evaluate an expression given an input file of the coefficients and a user chosen x value. The program should store the input, calculate the polynomial, and return the value calculated.

1. **Input and Output**

**Input:** The input is from a combination of file input and user input. The program pulls the coefficients from the file and uses them to form the polynomial, then takes the value of user input to replace the x-value.

**Output:** The program provides an output of the value that the polynomial generates from the given input. The input and output can within the terminal can be shown below.

**A screenshot of a computer

Description automatically generated**

1. **Usage**

To compile and run the program, open the terminal, navigate to the directory using the cd command, and run the file as input by using the sbcl --load command. Once the file has been compiled, you must enter the desired x-value as an input to run the code. The filename is hardcoded, allowing easy use of the operating system through command prompts. Therefore, we can complete compilation and run the program by typing specific commands rather than using GUI buttons.

1. **Theory**
   1. **Why does LISP treat all the data structures as various lists?**
      * LISP treats all data structures as lists because LISP was originally designed for AI research and is known for its list-focused notation. This is supported by the fact that all code and data is represented in lists when using Lisp coding.
   2. **What are the main components of a LISP program?**

* The main components of a LISP program are expressions and functions, since these serve as the overall theme that Lisp programming entails. Every Lisp procedure is called a function that can return a data object as its value. Lisp supports iterative statements, decision making statements, all different data types, and input/output functions.
  1. **Usually LISP is a classic language used for machine learning. Why do you think this language was useful for such a field?**
* LISP is most likely useful for machine learning as it is very organized as far as machine processing, yet slightly harder to understand for human notation. The lists allow a more mechanical, formatted way to decipher what is happening, while humans enjoy seeing a better formatted codespace with color and white space between. It also works with a lot of mathematical processes which could be another factor.