CS143 PA1 Design Document

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1 Overview

PA1 is about making a simple Stack Machine in COOL that supports the following operations:

Operation	Outcome
integer	Adds the integer to the top of the stack.
+	Pushes + to the top of the stack.
s	Pushes s to the top of the stack.
e	Evaluates the top of the stack.
d	Displays the contents of the stack.
x	Stop the program.

Evaluation can be divided into three sub-cases based on what content is at the top of the stack:

- If + is at the top of the stack, pop it off along with the next 2 integers and add their sum to the top of the stack.
- If s is at the top of the stack, swap the next 2 elements on the stack.
- If an integer is at the top of the stack, leave the stack unchanged.

2 Key Files

- **atoi.cl** - File with utility functions for converting strings to numbers and vice-versa.
- **stack.cl** - Main file with the command classes and Stack implementation.
- **stack.test** - File with test inputs that will run during make test

3 Stack Machine Implementation

There is a Main class that extends the IO class and reads in the inputs from the Terminal, and passes them into the correct command class. This class also terminates the program after reading in a 'x'. There is a StackCommand base class that implements base versions of the methods apply_command and

print_list. There are also multiple classes that extend the StackCommand class and process the various inputs. For a breakdown, IntCommand processes integer inputs, StringCommand processes string inputs, DisplayCommand processes the special 'd' input, and EvalCommand processes the special 'e' input. The stack itself is represented as a List of SttackObjects, which have type, intValue and stringValue attributes.

4 3 Pros of the COOL Language

• COOL has static typing so you don't have to guess the types of variables
• Since COOL has OOP capabilities it is relatively easy to avoid repeated code.
• It is easy to tell where loops and conditionals end because of the end lines like 'pool' and 'fi'

5 3 Cons of the COOL Language

• The List implementation is more convoluted then mainstream languages like JAVA and Python.
• COOL syntax is also quite a bit different than JAVA, C++ and Python
• COOL has less in built functionality than the other previously mentioned languages.