Assignment 3, Flowcharts

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Contents

1 Very simple calculator

This calculator works similar to earlieast HP 9100A calculator, However, it can only add, subtract, divide and multiply.

1.1 Reverse Polish Notation

Calculator uses reverse Polish notation (assignment doesn't specify the notation to be used) because it is easier to implement, it allows variable number of operands (assignment requires two operands, but doesn't state bounds), and because this is typical in professional calculators.

Conceptually, this means that operands are written before the operation, the operation "consumes" all operands to the left of it. See the grammar below for more formal description:

$$
\begin{aligned}
&S \to Num(Delim\ Num)^* Op \\
&Delim \to \sim (Digit \mid Op)^+ \\
&Op \to + \mid - \mid * \mid / \\
&Digit \to [0..9] \\
&Num \to Digit^+ \ .
\end{aligned}
$$

1.2 Two stacks and two streams

Conceptually, the calculator operates on two stacks and two streams:

character stack Is used to accumulate characters to later interpret them as a number.

number stack Is used to accumulate numbers to later feed them to the selected operation.

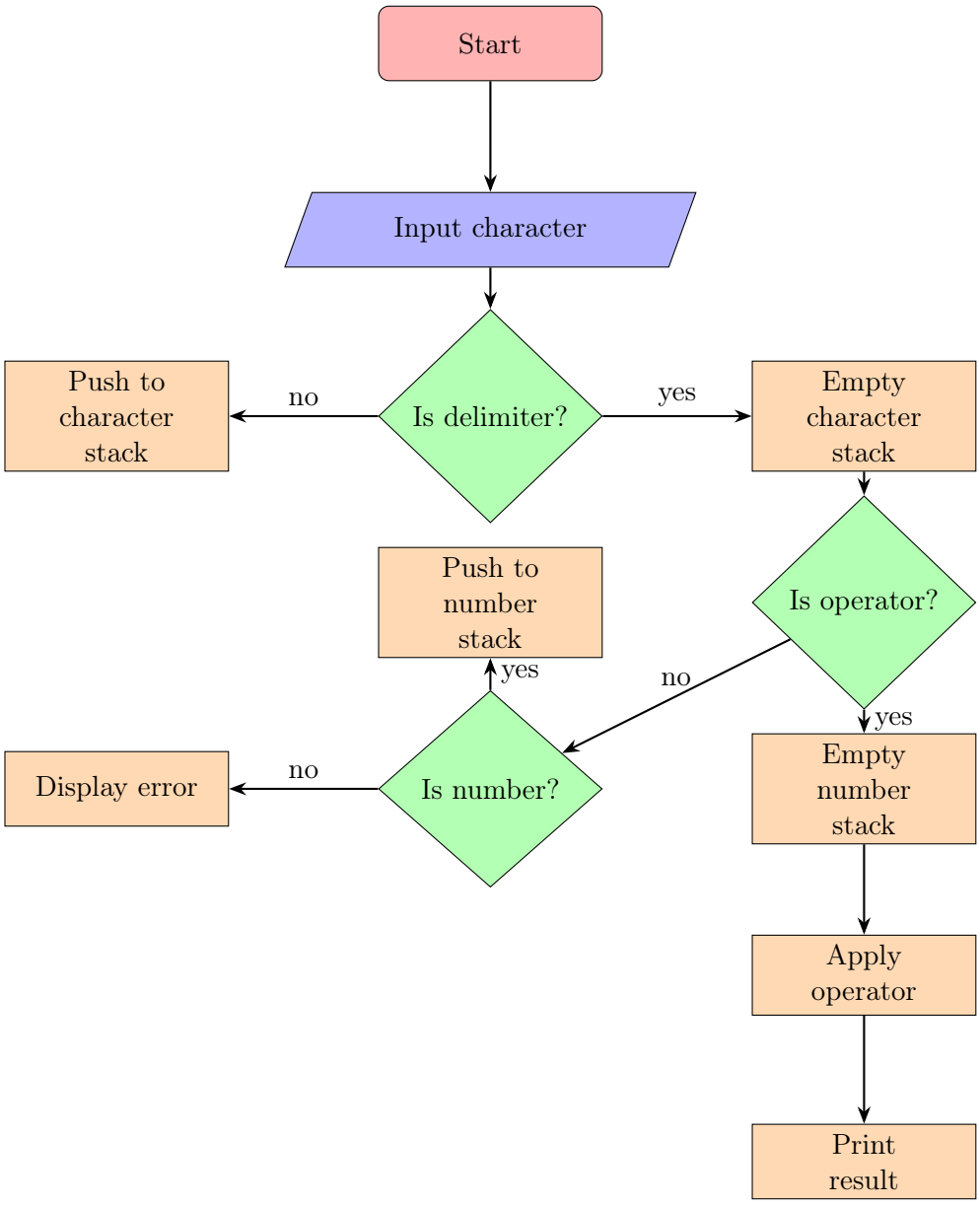
input stream Is used to read the input from user.

output stream Is used to print the results.

1.3 Limitations

- To simplify the code, the calculator only works with positive integers.
- The limits on the number of arguments, size of integers etc. are all the same as for the Python interpreter used.
- Division by zero is handled by Python itself, not this program.

2 Flowchart diagram



To simplify the diagram, all transitions from final states to the input state have been omitted.