# Forth Golfscript Interpreter

# Golfscript

#### Code Golf

- shortest possible source code that implements an algorithm
- solving problems (holes) in as few keystrokes as possible

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### Golfscript

- stack oriented, variables exist
- single symbols represent high level operations
- strong typed
- heavy use of operator overloading and type coercion

## Golfscript Types

- ▶ Integer: 1 2
- Arrays: [1 2 3] [3]
- ▶ Strings: "one two three"
- ▶ Blocks: {1+}

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#### Golfscript Operator Example

- **▶** 12 3 \* **->** 36
- ▶ [50 51 52]' '\* -> "50 51 52"
- ► [1 2 3]{1+}/ -> 2 3 4
- ▶ {.@\%.}do; ( n1 n2 -- gcd )

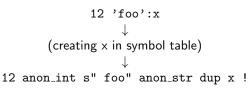
# Forth Implementation

### Typesystem

- Values as scalar references on stack
- Anonymous functions

#### Parser

- translates golfscript to forth execution tokens
- based on regular expression of reference implementation
- Responsible for:
  - ▶ infer initial type from syntax
  - symbol table for variable tracking
  - note that every value can be a variable!



#### Arrays

- Construction similar to postscript.
- ▶ [ marks stack size, ] collects back to marked size.
- ▶ Mark moves when stack becomes smaller:
  - 1 2 [\] -> [2 1]

## Type Coercion and Overloading

- Typeorder for Coercion
- Coercion according to highest order type
- Heavy operator overloading results in wide range of functionality

## Implementation Status in Percentage

Complex Overloaded 1		Stack Operators		Loops & Conditionals		Math		Output	
1	100	@	100	until	100	abs	100	-	0
=	100	\	100	while	100	base	100	print	100
~	100	;	100	do	100	rand	0	puts	100
\$	100		100	if	100			P	0
+	100							•	
	100								
*	100								
/	100								
%	100								
,	75								
?	75								
(	75								
ì	75								
ĺ	50								
&	50								
^	50								
<	100								
>	100								
and or xor	0								
zip	100								

Testsuite covering 130 golfscript programs.

 $<sup>^{1}\</sup>mbox{Introspection}$  based features for Blocks have not been implemented.

#### Cutbacks

- Error Handling differs
- ▶ Introspective Block operations not implemnted

### Usage of Idiomatic Forth

- Stack paradigma mapped to typed language
- Wordlists for variable tracking
- Macros & anonym functions for
  - ► language implementation
  - operator implementation