

## Evaluation of Expr

Expr is a Linux utility that takes a command line input as a mathematical expression, and returns the result of said expression to standard out. To pass the expression to the expr, each token must be its own argument, separated by a space, and sensitive tokens may need to be placed in quotation marks, such as variable names that require a space. Further detailed documentation on accepted input can be found at [1]. Note the potential exit statuses, due to a lack of script testing knowledge, I will avoid testing anything that results in expr returning a non-zero exit status.

The tester used to determine the stability of the utility involves testing of all numeric expressions and relations expressions that use numeric arguments. This was chosen since building a string tester is much more involved to determine correct output due to not having an oracle available. This being said, here is a list of tests that were performed:

- Addition & Subtraction    ( + , - )
  - Overflow & Underflow for 32/64 bit ranges
- Multiplication, Division, & Remainder    ( \* , / , % )
  - Overflow & Underflow for 32/64 bit ranges (Multiplication only)
- Or & And    ( | , & )
- Comparison Tests    ( < , <= , = , == , != , >= , > )

After running the tester, all numeric operations and numeric comparison tests returned the proper output. In addition, a few non automated tests were run to confirm the utilities rejection of invalid input such as non-numeric argument during numeric calculations, unexpected tokens, and other error conditions that the documentation states to notice. Thus leading me to an

opinion that the expr utility (version 8.4) is stable as far as numeric calculations and comparisons when given input that follows their predefined standard. Again, string expressions were NOT tested for stability, only numeric.

#### Referenced Documentation

[1] Expr Invocation

[http://www.gnu.org/software/coreutils/manual/html\\_node/expr-invocation.html](http://www.gnu.org/software/coreutils/manual/html_node/expr-invocation.html)