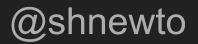
ActiveState

It's properties all the way down!

Narrowing in on a property test's input space.



It's properties all the way down!

Unit test: 1 input scenario

```
addUnitTests : Test
addUnitTests =
    describe "some add tests"
         [ test "commutative property" <|</pre>
                ->
                 add 1 2
                      | > Expect.equal (2 + 1)
```

Property test: "All" input scenarios

```
addPropTests : Test
addPropTests =
    describe "properties of addition"
        [ fuzz2 int int "commutative property" 
            ∖x y ->
               add x y
                    |> Expect.equal (y + x)
```

Step 1: Have code

 $| (_I0_BE((_fp)->_I0_read_ptr >= (_fp)->_I0_read_end, 0) \&\& __underfl$

#define _I0_putc_unlocked(_ch, _fp) \
 (_I0_BE((_fp)->_I0_write_ptr >= (_fp)->_I0_write_end, 0) \
 ? __overflow(_fp, (unsigned char)(_ch)) \
 : (unsigned char)(*(_fp)->_I0_write_ptr++ = (_ch)))

```
#if defined _LIBC || defined _GLIBCPP_USE_WCHAR_T
#define IO getwc unlocked( fp)
  (_IO_BE((_fp)->_wide_data == NULL || ((_fp)->_wide_data->_IO_read_p
      ? wuflow( fp)
      : (_I0_wint_t) * (_fp)->_wide_data->_I0_read_ptr++)
#define _I0_putwc_unlocked(_wch, _fp)
  (_IO_BE((_fp)->_wide_data == NULL || ((_fp)->_wide_data->_IO_write_
      ? __woverflow(_fp, _wch)
       : (_I0_wint_t)(*(_fp)->_wide_data->_I0_write_ptr++ = (_wch)))
#endif
```

Step 2: Write a toy property test

```
firstPropTest : Test
firstPropTest =
    describe "properties of list reversal"
    [ fuzz (list char) "reverse and reverse again!" <|
        \chars ->
        reverse (reverse chars)
        |> Expect.equal chars
```



Step N: You have a rich set of property tests

This talk: Step 3

It's *fuzzes* all the way down!

 $| (_I0_BE((_fp)->_I0_read_ptr >= (_fp)->_I0_read_end, 0) \&\& __underfl$

#define _I0_putc_unlocked(_ch, _fp) \
 (_I0_BE((_fp)->_I0_write_ptr >= (_fp)->_I0_write_end, 0) \
 ? __overflow(_fp, (unsigned char)(_ch)) \
 : (unsigned char)(*(_fp)->_I0_write_ptr++ = (_ch)))

```
#if defined _LIBC || defined _GLIBCPP_USE_WCHAR_T
#define IO getwc unlocked( fp)
  (_IO_BE((_fp)->_wide_data == NULL || ((_fp)->_wide_data->_IO_read_p
      ? wuflow( fp)
      : (_I0_wint_t) * (_fp)->_wide_data->_I0_read_ptr++)
#define _I0_putwc_unlocked(_wch, _fp)
  (_IO_BE((_fp)->_wide_data == NULL || ((_fp)->_wide_data->_IO_write_
      ? __woverflow(_fp, _wch)
       : (_I0_wint_t)(*(_fp)->_wide_data->_I0_write_ptr++ = (_wch)))
#endif
```



WC ls locate grep

"fuzzed" args: []

"fuzzed" args: ['-h']

"fuzzed" args: ['-h', '-v']









sheas.blog/talks (slide deck)

Twitter: @shnewto Blog: sheas.blog GitHub: shnewto Email: shnewto@gmail.com