Integral operators quot vs. div

Type class Integral has two operations `quot` and `div`, yet in the Haskell 2010 Language Report it is not specified what they're supposed to do. Assuming that `div` is integral division, what does `quot` differently, or what is the purpose of `quot`? When do you use one, and when the other?

haskell

asked Nov 13 '11 at 11:08

Ingo
26.6k 2 32 78

1 This seems like a promising link: cdsmith.wordpress.com/2007/06/02/… – Stuart Golodetz Nov 13 '11 at 11:19

2 Answers

To quote section 6.4.2 from the Haskell report:

The quot, rem, div, and mod class methods satisfy these laws if y is non-zero:

```
(x `quot` y)*y + (x `rem` y) == x
(x `div`  y)*y + (x `mod` y) == x
```

'quot' is integer division truncated toward zero, while the result of 'div' is truncated toward negative infinity.

The `div` function is often the more natural one to use, whereas the `quot` function corresponds to the machine instruction on modern machines, so it's somewhat more efficient.

answered Nov 13 '11 at 11:27

augustss
18.5k 3 34 79

4 +1 for the discussion of when you might prefer one over the other – Stuart Golodetz Nov 13 '11 at 11:35

11 or, equivalently, the result of `mod` has the same sign as the divisor, while the result of `rem` has the same sign as the dividend – newacct Nov 13 '11 at 12:12

Thanks for the answer, especially for mentioning the paragraph in the HR. I was looking only in chapter 9. – Ingo Nov 13 '11 at 16:05

I worked this out as an English sentence to help me grok it. I believe this describes the truth for both equations; the variation in meaning is determined by what is meant by "quotient" (i.e. whether using quot or div semantics). Here goes: "The remainder is the difference between the dividend and the product of the quotient and the divisor." – Evan Lenz Mar 31 at 23:58

The two behave differently when dealing with negative numbers. Consider:

```
Hugs> (-20) `divMod` 3
(-7,1)
Hugs> (-20) `quotRem` 3
(-6,-2)
```

Here, `-7 * 3 + 1 = -20` and `-6 * 3 + (-2) = -20`, but the two ways give you different answers.

Also, see here: http://haskell.org/ghc/docs/latest/html/libraries/base/Prelude.html

The definition for `quot` is "integer division truncated toward zero", whereas the definition for `div` is "integer division truncated toward negative infinity".

edited Nov 13 '11 at 13:59

answered Nov 13 '11 at 11:23

Stuart Golodetz
14.5k 2 26 69

You know, there is also `divMod` and `quotRem` ... – FUZxxl Nov 13 '11 at 11:45