Hoogle

http://haskell.org/hoogle

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Haskell Types 101

- isURI :: String -> Bool
- (||) :: Bool -> Bool -> Bool
- or :: [Bool] -> Bool
- id :: a -> a
- Just :: a -> Maybe a
- map :: (a -> b) -> [a] -> [b]
- (+) :: Num a => a -> a -> a

What does Hoogle do?

- Search for Haskell functions
  - By type
  - By name
- Demonstration...

λ What did Hoogle used to do?

- Version 1
  - Written in Javascript
  - Only exact matches
- Version 2
  - Written in Haskell
  - Partial matches
  - Only the Haskell 98 libraries

The bits inside Hoogle

- Generate a list of functions
- Search
  - By name
  - By type
- Decide on a ranking
- Display documentation

A list of functions

- Version 1 & 2
  - Borrow them from Zvon
- Version 3
  - Take HTML documentation by Haddock
  - Process it
  - Try and figure out the original data
- Dies on certain files...

Search by Type – v1

- Rename all free variables to a canonical form
  - [fred] -> bob → [a] -> b
- Match by string comparison
- No argument reordering
- No “close” standards

Search by Type – v2

- Use **unification**
  - Have argument reordering on top
  - Have missing arguments allowed
- Example: search [c] -> [c]
- map :: (a -> b) -> [a] -> [b]
  - a = b = c
  - (c -> c) is a missing argument

λ A problem...

- Search for: k -> [(k,v)] -> v
- lookup :: a -> [(a,b)] -> Maybe b
  - a = k
  - b = v = Maybe b [occurs check fails]
  - = Maybe (Maybe b) = Maybe (Maybe...)
- Also:
  - Ranking is very hard

Searching by Type – v3

- Convert type sig -> single steps
- Apply each step
  - Can fail => no match
  - Can part fail => bad marks
- map :: (a -> b) -> [a] -> [b]
  - #1{->}   {#1.1,#2.1}
  - #2{[]}   {#1.2,##.1}
  - ##{[]}

Matching to filter

- filter :: (a -> Bool) -> [a] -> [a]

#1{->}	(a->Bool){->}	Yes
#2{[]}	[a]{[]}	Yes
##{[]}	[a]{[]}	Yes
{#1.1,#2.1}	{a, a}	Yes
{#1.2,##.1}	{Bool, a}	Partial
a in two different sets		Partial

Bad marks

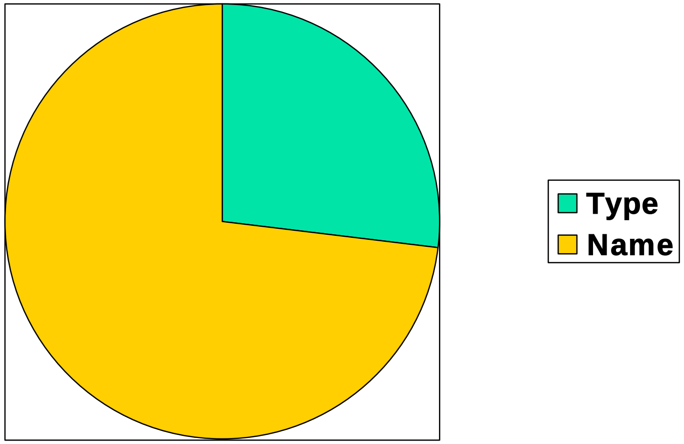
- Accumulate bad marks
  - Argument missing
  - Data too free/specific
  - 6 in total
- Matches two ways, so a multiset of items from a 12 item set
- Assign each item a score
- Sum all the items

How to assign scores

- Almost impossible to get right
- Highly subjective
- So don’t do it!
  - Have an example set – when searching for a, I expect result b above result c
  - Run a program, get a constraint program
  - Solve constraint program, get answer
  - Put back into Hoogle

λ What do people search for?

- 3300 searches (about in a month)
- 600 used the prewritten searches
- Lots of people search for “where”



What else do people search?

- hotmail.com
- google
- eastenders
- california public schools portable classes
- Nintendo Revlution
- Bondage

Conclusion

- A useful practical tool for working with Haskell
- Often just a fast way to lookup the documentation!
- Online at http://haskell.org/hoogle
- Open source, patches welcome!