1 Problem

A googol 10^{100} is a massive number: one followed by one-hundred zeros; 100^{100} is almost unimaginably large: one followed by two-hundred zeros. Despite their size, the sum of the digits in each number is only 1.

Considering natural numbers of the form, a^b, where $a, b < 100$, what is the maximum digital sum?

2 Solution

```haskell
import Data.List
import qualified Data.Map as Map
import Data.Maybe
import System.Environment

sumDigits x = foldl (λacc z → acc + (read (z : "") :: Integer)) 0 (show x)

main = do
  let soln = maximum [sumDigits $ a ↑ b | a ← [1 . . 100], b ← [1 . . 100]]
  putStrLn $ "The maximum digital sum is " ++ show soln ++ "."
```

3 Result

```
runhaskell problem56.lhs
The maximum digital sum is 972.
```