Staple here!
CMSC 22311 Spring 2015

I worked on this assignment with Kira Ghandhi.

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Section: 1

Homework # 10

```haskell
------------------------------ Globber.hs ------------------------------
module Globber where

import Data.List (tails)

data GlobChar
  = Literal Char
  | AnyOne
  | AnyMany deriving (Eq, Show)

type GlobPattern = String
type ParsedPattern = [GlobChar]


parsePattern :: GlobPattern -> ParsedPattern
parsePattern [] = []
parsePattern (x:xs) = parse x xs
  where parse '\\' (y:ys) = (Literal y):(parsePattern ys)
        parse '?' _ = AnyOne:parseRest
        parse '*' _ = AnyMany:parseRest
        parse c _ = (Literal c):parseRest
        parseRest = parsePattern xs

matchParsed :: ParsedPattern -> String -> Bool
matchParsed [] [] = True
matchParsed [] _ = False
matchParsed (g:gs) cs'@(c:cs) = match g
  where match AnyOne = matchRest
        match (Literal l) = l == c && matchRest
        match AnyMany = any (matchParsed gs) $ tails cs'
        matchRest = matchParsed gs cs
matchParsed gs [] = all (== AnyMany) gs

matchGlob :: GlobPattern -> String -> Bool
matchGlob = matchParsed . parsePattern


------------------------------ TestGlobber.hs ------------------------------
module Main (main) where

import Test.Hspec
import Data.List (tails)
import Globber

main :: IO ()
```

```
46  main = hspec $ describe "Testing Globber" $ do
47            describe "parser" $ do
48              it "preserves literals" $ do
49                parsePattern "abce" `shouldBe` map Literal "abce"
50              it "recognizes special characters" $ do
51                parsePattern "*?" `shouldBe` [AnyMany, AnyOne]
52              it "escapes special chacters" $ do
53                parsePattern "\\*\\?*?ab" `shouldBe` [Literal '*',
54                                                     Literal '?',
55                                                     AnyMany,
56                                                     AnyOne,
57                                                     Literal 'a',
58                                                     Literal 'b']
59              it "escapes backslashes" $ do
60                parsePattern "\\\\" `shouldBe` [Literal '\\']
61
62            describe "empty pattern" $ do
63              it "matches empty string" $
64                matchGlob "" ""
65              it "shouldn't match non-empty string" $ do
66                not $ matchGlob "" "string"
67            describe "question mark" $ do
68              it "matches any character" $
69                all (matchGlob "?") $ map (:[]) ['A'..'z']
70              it "does not match empty string" $ do
71                not $ matchGlob "?" ""
72            describe "star" $ do
73              it "matches the empty string" $
74                matchGlob "*" ""
75              it "matches any string" $
76                all (matchGlob "*") $ tails ['A'..'z']
77              it "can be repeated indefinitely" $
78                all (matchGlob $ replicate 30 '*') $ tails ['A'..'z']
79            describe "mixtures" $ do
80                it "can intersperse ? and literals" $ do
81                  matchGlob "?b?b?b" "abababb"
82                it "rejects bad matches with ? and literals" $ do
83                  not $ matchGlob "?b?b?b" "bababa"
84                it "can intersperse * and ?" $ do
85                  all (matchGlob "*???*") ["aaa", "aaaaaa", "aaaaaaaa"]
86                it "rejects bad patterns with * and ?" $ do
87                  all (not . matchGlob "*?????*") $ tails "aaaa"
88                it "can intersperse * and literals" $ do
89                  matchGlob "*a*b*c*d*e" "aebdcbdae"
90
91  ------------------------------ Output ----------------------------------
92  {- From a clean build:
93  $  cmsc-223-wk8-hw1  cabal configure --enable-tests
94  Resolving dependencies...
95  Configuring globber-1.0.0...
96  cabal: At least the following dependencies are missing:
97  hspec -any
98  $  cmsc-223-wk8-hw1  cabal install
99  Resolving dependencies...
```

```
Notice: installing into a sandbox located at
/home/patrick/hacking/courses/cmsc223/cmsc-223-wk8-hw1/.cabal-sandbox
Configuring globber-1.0.0...
Building globber-1.0.0...
...
Installed globber-1.0.0
$  cmsc-223-wk8-hw1  dist/build/test-globber/test-globber

Testing Globber
  parser
    preserves literals
    recognizes special characters
    escapes special chacters
    escapes backslashes
  empty pattern
    matches empty string
    shouldn't match non-empty string
  question mark
    matches any character
    does not match empty string
  star
    matches the empty string
    matches any string
    can be repeated indefinitely
  mixtures
    can intersperse ? and literals
    rejects bad matches with ? and literals
    can intersperse * and ?
    rejects bad patterns with * and ?
    can intersperse * and literals

Finished in 0.0105 seconds
16 examples, 0 failures
-}
```